CHAPTER 7

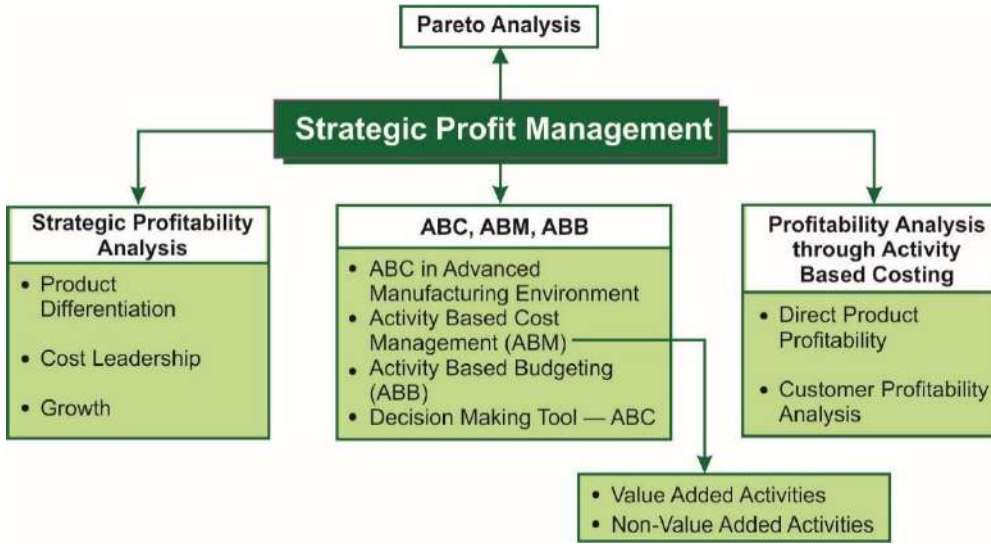
STRATEGIC PROFIT MANAGEMENT

LEARNING OUTCOMES

After studying this chapter, you will be able to:

- ❑ EVALUATE profitability.
- ❑ ADVISE on advanced activity based costing, activity based management, activity based budgeting.

CHAPTER OVERVIEW



An organisation which operates in a competitive environment has to adopt various strategies to survive profitably in the market where it operates. ***Porter, in his generic strategy theory, has suggested that a firm can survive profitably in the long term if it chooses its generic strategy according to the environment in which it operates, and which conforms to the overall corporate objectives.*** A firm would be profitable if it is either a cost leader, i.e., it can produce its product at a lower cost than its competitor and enjoy maximum market share, or if it produces its products with some peculiar features that make it different from others. Whichever approach a firm may choose, it has to be very careful on the part of actual performance and any deviation from the set performance target. To achieve its objectives, it has to put some performance measurement mechanisms in place so that any deviation can be measured, and corrective action can be taken.

Profitability Analysis can be useful to measure the performance of a firm against acceptable standards. Profitability can be analysed as per the requirements of the management to assist them in identifying the critical success factors and taking appropriate decisions.

A. STRATEGIC PROFITABILITY ANALYSIS

Operating Profit of a firm is affected by various components that are responsible for changes in revenue and costs. A change in profit may be due to revenue, costs, or both the factors. For analyzing operating income, we spread our analysis into three main areas or components, which are (a) Growth Component (b) Price Recovery Component and (c) Productivity Component. Analysis will cover both the revenue and cost effect, wherever applicable, on these components separately.

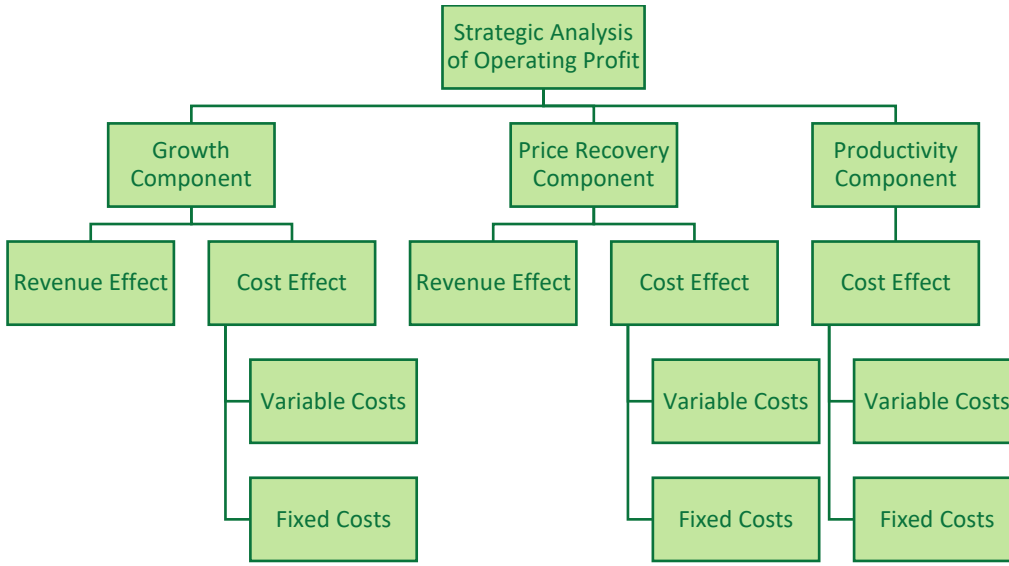


Figure A.1 – Components of Strategic Analysis

1. Growth Component

Growth Component measures the change in the quantity of output sold. The growth component of the change in the operating income measures the increase/ decrease in revenue and in costs due to selling more/ less quantity units from the previous period.

1.1 Revenue Effect

Revenue effect of growth can be measured with the help of the following formula:

Revenue Effect of Growth

$$= \left[\begin{pmatrix}\text{Actual units of output}\\ \text{sold in current year}\end{pmatrix} - \begin{pmatrix}\text{Actual units of output}\\ \text{sold in last year}\end{pmatrix}\right] \times \text{Selling price in last year}$$

The revenue effect of growth measures the increase/ decrease in revenue solely due to change in number of units sold.

1. 2 Cost Effect

Cost effect of growth measures the effect of variable cost and fixed cost separately.

Cost Effect of Growth for *Variable Costs*

$$= \left[\begin{pmatrix}\text{Unit of input required to}\\ \text{produce current year output}\\ \text{in last year}\end{pmatrix} - \begin{pmatrix}\text{Actual units of input}\\ \text{used to produce last year's}\\ \text{output}\end{pmatrix}\right] \times \text{Input price in last year}$$

Cost Effect of Growth for *Fixed Costs*

$$= \left[\begin{pmatrix}\text{Actual units of capacity in last year if adequate to produce current year's production in last year}\end{pmatrix} - \begin{pmatrix}\text{Actual units of capacity in last year}\end{pmatrix}\right] \times \text{Price per unit of capacity in last year}$$

2. Price Recovery Component

Price Recovery Component of change in operating income measures the changes in the revenue and costs solely due to changes in prices.

2.1 Revenue Effect

Revenue effect of price recovery can be measured with the help of the following formula:

Revenue Effect of Price Recovery

$$= \left[\begin{pmatrix}\text{Selling price in current year}\end{pmatrix} - \begin{pmatrix}\text{Selling price in last year}\end{pmatrix}\right] \times \text{Actual units of output sold in current year}$$

The revenue effect of price recovery measures the increase/ decrease in revenue solely due to change in selling prices.

2.2 Cost Effect

Cost effect of price recovery measures the effect of variable cost and fixed cost separately.

Cost Effect of Price Recovery for *Variable Cost*

$$= \left[\begin{pmatrix}\text{Input price in current year}\end{pmatrix} - \begin{pmatrix}\text{Input price in last year}\end{pmatrix}\right] \times \text{Units of input required to produce current year's output in last year}$$

Cost Effect of Price Recovery *for Fixed Costs*

$$= \left[\begin{pmatrix}\text{Price per unit of capacity in current year}\end{pmatrix} - \begin{pmatrix}\text{Price per unit of capacity in last year}\end{pmatrix}\right] \times \text{Actual units of capacity in last year, if adequate to produce current year's output in last year}$$

3. Productivity Component

Productivity Component measures the change in the operating income due to changes in the product mix and/ or yield of inputs as compared with the last year. This component uses the current year's prices of input to measure the changes in **costs only**.

Cost Effect of Productivity for Variable Cost

$$= \left[\left(\begin{array}{l}\text{Actual units of input}\\ \text{used to produce current}\\ \text{year's output}\end{array}\right) - \left(\begin{array}{l}\text{Units of input required}\\ \text{to produce current year's}\\ \text{output in last year}\end{array}\right)\right] \times \text{Input price in current year}$$

Cost Effect of Productivity for Fixed Costs

$$= \left[\left(\begin{array}{l}\text{Actual units of capacity}\\ \text{in current year}\end{array}\right) - \left(\begin{array}{l}\text{Actual units of capacity in}\\ \text{last year if adequate to}\\ \text{produce current year's}\\ \text{production in last year}\end{array}\right)\right] \times \text{Price per unit of capacity in current year}$$

4. Reconciliation of Operating Profit

Particulars	Costs	Revenue
Operating Profit in Last Year	xxx	
Add/(Less): Revenue and Cost Effect of Growth Component	(+) F (-) A	(+) F (-) A
Add/(Less): Revenue and Cost Effect of Price Recovery Component	(+) F (-) A	(+) F (-) A
Add/ (Less): Cost Effect of Productivity Component	(+) F (-) A	-
Total	xxx	xxx
Operating Profit in Current Year (Revenue – Costs)	xxx	

F= Favorable, A= Adverse

Illustration 1

Y Limited is a manufacturer of Cardboard boxes. An analysis of its operating income between 2023 and 2024 shows the following:

	Income Statement (amount in 2023)	*Revenue & Cost Effect of Growth Component in 2024*	*Revenue & Cost Effect of Price Recovery Component in 2024*	*Cost Effect of Productivity Component in 2024*	*Income Statement (amount in 2024)*
Revenue (₹)	*40,00,000*	*2,00,000(F)*	*4,20,000(F)*	*-*	*46,20,000*
Cost (₹)	*29,20,000*	*60,000 (A)*	*2,56,000(A)*	*58,000(F)*	*31,78,000*
Operating Income (₹)	*10,80,000*	*1,40,000(F)*	*1,64,000(F)*	*58,000(F)*	*14,42,000*

Y Limited sold 4,00,000 boxes and 4,20,000 boxes in 2023 and 2024, respectively. During 2024, the market for cardboard boxes grew 3% in terms of the number of units, and all other changes are due to the company's differentiation strategy and productivity.

Required

COMPUTE how much of the change in operating income from 2023 to 2024 is due to the industry market size factor, productivity, and product differentiation and also reconcile the profit of both years due to these factors.

Solution

Reconciliation of Operating Income

Particulars	Amount (₹)
Operating Income in 2023	10,80,000
Add: Change Due to Industry Market Size Factor (W.N.-1)	84,000
Changes Due to Productivity (W.N.-2)	58,000
Changes Due to Product Differentiation (W.N.-3)	2,20,000
Operating Income in 2024	14,42,000

Workings

Total Increase in Sale of Cardboard Boxes 20,000 Boxes (4,20,000 Boxes – 4,00,000 Boxes). Out of this increase in Sales of 20,000 Boxes, 12,000 Boxes (3% of 4,00,000) are due to *growth in market size*, and the remaining 8,000 Boxes (20,000 Boxes – 12,000 Boxes) are due to an increase in *market share*.

W.N.1 Effect of the Industry Market Size Factor *on operating income*:

= Revenue and Cost Effect of Growth Component in 2024 × $\frac{\text{Increase in Sales Unit Due to Market Growth}}{\text{Total Growth in Sales Unit (from 2023 to 2024)}}$

= ₹1,40,000 × $\frac{12{,}000\,\text{Boxes}}{20{,}000\,\text{Boxes}}$

= ₹84,000 (F)

W.N.2 Effect of Productivity *on operating income*:

= Cost Effect of Productivity Component in 2024

= ₹ 58,000 (F)

W.N.3 Effect of Product Differentiation *on operating income*:

Particulars	Amount (₹)
Increase in the Selling Price (Revenue Effect of the Price Recovery Component)	4,20,000 (F)
Increase in Prices of Inputs (Cost Effect of the Price Recovery Component)	2,56,000 (A)
Growth in Market Share Due to Product Differentiation* $\left(₹1,40,000 \times \frac{8,000 \text{ Boxes}}{20,000 \text{ Boxes}}\right)$	56,000 (F)
Total	2,20,000 (F)

* Revenue and Cost Effect of Growth Component in 2024 $\times \frac{\text{Increase in Sales Unit Due to Product Differentiation}}{\text{Total Growth in Sales Unit (from 2023 to 2024)}}$

B. PROFITABILITY ANALYSIS THROUGH ACTIVITY BASED COSTING

Activity Based Costing (ABC), which has become an important aspect of manufacturing or service organizations can be defined as a methodology that means the cost and performance of activities, resources, and cost objects. A well designed and implemented ABC system is a powerful aid to management evaluation and decision making, thereby improving organizational performance. In the service sector, direct costs are generally low, and overheads tend not to be volume related or capable of being easily attributed to product/ service being supplied. In this situation, ABC, with its emphasis on activities and their cost drivers, helps in identifying cost more easily and manage it more effectively. In addition, because resource consumption by different products, customers, or segments of the business is more accurately measured, activity-based profitability analysis is likely to provide more useful information to management.

1. Direct Product Profitability (DPP)

For a profit-making organisation, profit earned from an operation is a key performance indicator that assures and controls the direction towards the organisation's objectives. In today's competitive business era, most firms have a portfolio of various ranges of products, either for the same consumer market or for different consumer markets. A firm which has a portfolio of profitable products enjoys high profitability. However, it is very important to know the relative profitability of an individual product so that management can concentrate on the profitable products and weed out the loss-making products from the products' portfolio. Direct Product Profitability is one of the various analytical methods that analyse the profitability of each product or segment of products separately.

DPP is used to measure the profitability of an individual product and assist management in knowing its true profitability to make appropriate decisions. As opposed to traditional absorption costing, where normally labour hours or machine hours are used as a basis for absorption of indirect costs, DPP uses a variety of measures like space used for transportation and storage of goods, refrigeration time, etc. DPP is generally used in retail trade to determine the profitability of an individual product.

CIMA describes DPP *"used primarily within the retail sector; DPP involves the attribution of both the purchase price and other indirect costs (for example, distribution, warehousing, and retailing) to each product line. Thus, a net profit, as opposed to a gross profit, can be identified for each product. The cost attribution process utilizes a variety of measures (for example, warehousing space and transport time) to reflect the resource consumption of individual products."*

1.1 Benefits of DPP

- Better cost analysis.
- Better pricing decisions.
- Better management of stores and warehouse space.
- The rationalisation of product ranges.

1.2 Direct Product Profitability Statement

Retail organisations traditionally deduct the bought-in cost of goods from the selling price to give a gross margin. The gross margin is a useless measure for controlling the costs of the organisation itself or making decisions about the profitability of the different products. In the calculation of gross margin, only the direct costs involved in buying the product by retailers are considered; however colossal amount of indirect costs incurred at organization level rather than at the product level gets ignored completely. For example, it does not include the storage costs of various goods, and these costs vary considerably from one good to another. A method was needed that relates the indirect costs to the goods according to the way the goods use or create these costs.

Indirect costs for DPP may be analysed into basic cost categories as follows:

(i) *Overhead Cost:* This is incurred through an activity that is not directly linked to a particular product.

(ii) *Volume Related Cost:* The cost is incurred in relation to the space occupied by products. This includes storage and transport costs.

(iii) *Product Batch Cost:* This cost is often a time-based cost. If product items (that is, a number of identical products which are handled together as a batch) are stocked on shelves, a labour time cost is incurred.

(iv) *Inventory Financing Costs:* This is the cost of tying up money in stock and is the cost of the product multiplied by the interest rate per day or per week.

Direct Product Profit can be derived as shown below:

Sales	xx
Less: Cost of Goods Sold	xx
Gross Margin	xx
Less: Direct Product Costs (Warehouse, Transportation, Store, etc.)	xx
Direct Product Profit	xx

Table 1, given below, shows the DPP for product A. Directly attributable costs have been grouped into three categories and are deducted from the gross margin to determine the good's DPP.

Table- 1

Direct Product Profit for Product A

Particulars	(₹)
Selling Price p.u.	150.00
Less: Bought-in Price	80.00
Gross Margin	70.00
Less: Direct Product Costs:	
Warehouse Costs	16.00
Transport Costs	18.00
Store Costs	22.00
Direct Product Profit p.u.	14.00

Warehouse and store costs will include items such as labour, space, and insurance costs, while transport costs will include labour, fuel, and vehicle maintenance costs. The usual way to spread these costs across the different goods sold is in relation to volume or area occupied, as most costs increase in direct proportion to the volume of the good or the space it occupies. However, there are some exceptions to this; for example, insurance costs may be better spread on value or on a risk index. Risk is greater with refrigerated or perishable goods. Refrigeration costs must only be related to those products that need to be stored in the refrigerator.

The result of this type of DPP cost analysis may give information such as that given in the following table:

Table-2

Profit	Gross Margin (%)	DPP (%)
Ice-Cream	20.40	4.60
Baby Food	11.00	5.50
Tooth Paste	31.20	18.80
Wine	45.30	17.20
Paper Tissues	15.70	0.00

Above table-2 shows that for ice-cream, there is a considerable gap between the gross margin and the DPP because its refrigerated storage is expensive. It also shows that paper tissues, which had quite a healthy gross margin, are just breaking even with DPP; this is because they consume more store space relative to their price.

While the supermarket or other retailer does not have the luxury of stopping selling paper tissues because, obviously, it would lose considerable trade if it did not stock a complete range of goods, it does have other choices. The choices are merchandising ones, such as where to display the stock and in what position on the shelves. Stocks at eye level sell more quickly than the ones above or below eye level. *The brand with the greatest margin should be placed at eye level*. Goods at the front of the store tend to sell faster than goods at the back. This explains why tissues are rarely found close to the entrance or the cash till.

With manufactured products, the cost per unit for the different products is often calculated, and then the products are ranked. For a retail organization, DPP per unit may not be the best measure to use.

DPP per unit of time adds another dimension to the measurement and DPP per unit of time *per measure of space* adds a third. This is automatically built in when overheads are spread if a cost each product uses this rate multiplied by the volume and the number of days or weeks in the system. In the example in Table-1, the store costs would be based on a rate per cubic centimeter or metre per day and the product cost can be calculated according to its size and the time it takes to flow through the system. For example, if the store cost per cubic cm is ₹0.0073 per day and good A is 10 cubic cms and the average stay in the store is three days, the store cost per item is ₹0.0073 × 10 cms. × 3 days = ₹0.22.

Illustration 2

Jigyasa India Ltd. (JIL) has 30 retail stores of uniform sizes 'Fruity & Sweety Retails' across the country. Mainly three products namely 'Butter Jelly', 'Fruits & Nuts' and 'Icy Cool' are sold through these retail stores. JIL maintains stocks for all retail stores in a centralised warehouse. Goods are released from the warehouse to the retail stores as per requisition raised by the stores. Goods are transported to the stores through two types of vans, i.e., normal and refrigerated. These vans are to be hired by the JIL.

Costs per month of JIL are as follows:

	(₹)	Total (₹)
Warehouse Costs:		
Labour & Staff Costs	*27,000*	
Refrigeration Costs	*1,52,000*	
Material Handling Costs	*28,000*	*2,07,000*
Head Office Cost:		
Salary & Wages to Head Office Staff	*50,000*	
Office Administration Costs	*1,27,000*	*1,77,000*
Retail Stores Costs:		
Labour Related Costs	*33,000*	
Refrigeration Costs	*1,09,000*	
Other Costs	*47,000*	*1,89,000*

Average transportation cost of JIL per trip to any retail store is as follows:

Normal Van	*₹ 3,200*
Refrigerated Van	*₹ 4,900*

The Chief Financial Manager asked his Finance managers to calculate profitability based on three products sold through Fruity & Sweety retail stores rather than using the traditional method of calculating profitability.

The following information regarding retail stores are gathered:

	Butter Jelly	*Fruits & Nuts*	*Icy Cool*
No. of Cartons per cubic metre (m^3)	*42*	*28*	*40*
No. of Items per cartons (units)	*300*	*144*	*72*
Time in the Warehouse (in months)	*1*	*1.5*	*0.5*
Time in Retail Stores (in months)	*1*	*2*	*1*
Selling Price per unit (₹)	*84*	*42*	*26*
Purchase Price per unit (₹)	*76*	*34*	*22*

Butter Jelly and Icy-Cool are required to be kept under refrigerated conditions.

Additional information:

Total Volume of All Goods Sold per month	*40,000 m^3*
Total Volume of Refrigerated Goods Sold per month	*25,000 m^3*
Carrying Volume of each van	*64 m^3*

Required

CALCULATE the Profit per unit using the Direct Product Profitability (DPP) method.

Solution

Direct Product Profitability (DPP) Statement

(Amount in ₹)

	Butter Jelly	Fruits & Nuts	Icy Cool
Selling Price *per unit*	84.00	42.00	26.00
Less: Purchase Price *per unit*	76.00	34.00	22.00
Gross Profit …(A)	8.00	8.00	4.00
Direct Product Costs:			
Warehouse Costs *per* m^3 [W.N.-1]	7.46	2.07	3.73

Retail Stores Costs *per* m^3 [W.N.-2]	6.36	4.00	6.36
Transportation Costs [W.N.-3]	76.56	50.00	76.56
Total DPP costs *per* m^3	90.38	56.07	86.65
Items *per* m^3 [W.N.-4]	12,600	4,032	2,880
Cost *per item* …(B)	0.007	0.014	0.030
Direct Product Profit …(A) – (B)	7.993	7.986	3.97

Working Notes

(1) Warehouse Related Costs

	General Costs (₹)	Cost Related with Refrigerated Goods (₹)
Labour & Staff Costs	27,000	---
Refrigeration Costs	---	1,52,000
Material Handling Costs	28,000	---
Total	55,000	1,52,000
Volume of Goods Sold	40,000 m^3	25,000 m^3
Cost *per* m^3 *per month*	1.38	6.08

Products	Time in Warehouse	Cost per m^3 per month (₹)	Total Cost (₹)
Butter Jelly	1 Month	7.46 (1.38 + 6.08)	7.46
Fruits & Nuts	1.5 Months	1.38	2.07
Icy-cool	0.5 Months	7.46 (1.38 + 6.08)	3.73

(2) Retail Stores Related Costs

	General Costs (₹)	Cost Related with Refrigerated Goods (₹)
Labour Related Costs	33,000	---
Refrigeration Costs	---	1,09,000
Other Costs	47,000	---
Total	80,000	1,09,000
Volume of Goods Sold	40,000 m^3	25,000 m^3
Cost *per* m^3 *per month*	2.00	4.36

Products	Time in Retail Stores	Cost *per m³ per month*	Total Cost
Butter Jelly	1 Month	₹6.36 (₹2.00 + ₹4.36)	₹6.36
Fruits & Nuts	2 Months	₹2.00	₹4.00
Icy-Cool	1 Month	₹6.36 (₹2.00 + ₹4.36)	₹6.36

(3) Transportation Costs

	Normal Van Costs	Refrigerated Van Costs
Cost *per trip*	₹3,200	₹4,900
Volume of Van	64 m^3	64 m^3
Cost *per m^3 per trip*	₹50.00	₹76.56

(4) No. of Items *per m^3*

Products	No. of Cartons/ m^3	No. of Items *per Cartons* (units)	No. of Items *per m^3*
Butter Jelly	42	300	12,600 (42 × 300)
Fruits & Nuts	28	144	4,032 (28 × 144)
Icy - Cool	40	72	2,880 (40 × 72)

2. Customer Profitability Analysis

In many organisations, it is just as important to cost customers as it is to cost products. Different customers or groups of customers differ in their profitability. This is a relatively new technique that ABC makes possible because it creates cost pools for activities. Customers use some activities but not all, and different groups of customers have different 'activity profiles'.

Service organisations, such as a bank or a hotel, in particular need to cost customers. A bank's activities for a customer will include the following types of activities:

- Withdrawal of cash
- Unauthorised overdraft
- Request for a statement
- Stopping a cheque
- Returning a cheque because of insufficient funds

Different customers or categories of customers will each use different amounts of these activities, so customer profitability profiles can be built up and customers can be charged according to the cost to serve them. A hotel may have activities that are provided for specific types of customers, such as well laid-out gardens, a swimming pool, and a bar. Older guests may appreciate and use the garden, families use the swimming pool, and business guests use the bar. If the activities are charged to the relevant guests, the correct cost per bed occupied can be calculated for this type of category. This will show the relative profitability and lead to strategies for encouraging the more profitable guests.

Even a manufacturing organization can benefit from costing its customers. Not all customers cost the same to serve, even if they require the same products. Some customers may be located a long way from the factory, and transport may cost more. Other customers may be disruptive and place rush orders that interrupt production scheduling and require immediate special transport. Some customers need after-sales service and help with technical matters, etc.

2.1 Benefits of Customer Profitability Analysis

- It helps the supplier to identify which customers are eroding overall profitability and which customers are contributing to it.
- It can help to provide a basis for constructive dialogue between buyer and seller to improve margins.

Illustration 3

A and B are two customers of XYZ Electronics Ltd., a manufacturer of audio players. The selling price per unit is ₹ 5,400. Its cost of production per unit is ₹ 4,420.

Additional costs are:

Order Processing Cost.....₹ 2,000 per order

Delivery Costs.....₹ 3,500 per delivery

Details of customers A and B for the period are given below:

	Customer A	Customer B
Audio Players purchased (nos.)	*350*	*500*
No. of orders	*5 (each of 70 units)*	*10 (each of 50 units)*
No. of deliveries	*5*	*0*

The company's policy is to give a discount of 5% on the selling price on orders for 50 units or more and to further give an 8% discount on the undiscounted selling price if a customer uses his own transport to collect the order. Assume that production levels are not altered by these orders.

Required

(i) ANALYSE the profitability by comparing profit per unit for each customer.

(ii) COMMENT on the discount policy on delivery.

Solution

(i) Customer's Profitability Statement

Particulars	Customer- A	Customer- B
Sales (units)	**350**	**500**
	(₹)	(₹)
Selling Price *per unit*	5,400	5,400
Less: Discount (Quantity)	270 (₹5,400 × 5%)	270 (₹5,400 × 5%)
Less: Discount (Delivery)	---	432 (₹5,400 × 8%)
Selling Price (Net of Discounts) *per unit*	5,130	4,698
Less: Variable Cost *per unit*	4,420	4,420
Contribution *per unit*	710	278
Total Contribution	2,48,500 (₹710 × 350 units)	1,39,000 (₹278 × 500 units)
Less: Additional Overheads		
Delivery Cost	17,500 (5 × ₹3,500)	---
Order Processing Cost	10,000 (5 × ₹2,000)	20,000 (10 × ₹2,000)
Profit *per customer**	2,21,000	1,19,000
Profit *per customer per unit*	631.43	238.00

Analysis

Even though A has a lower sales volume (30% less than B), it is contributing almost double the profit that is being contributed by B, as the overall discount offered to customer A is quite low.

(ii) Comments on the "Discount Policy on Delivery"

The discount on delivery offered to customer B is ₹432 *per unit*. If transport for delivery is provided to customer B, then the cost would have been ₹70 *per unit* (10 deliveries × ₹ 3,500 / 500 units), which is less than by ₹362. It may also be noted that the delivery cost for customer A is only ₹50 per unit (₹17,500 ÷ 350 units). Hence, the company needs to review its discount policy on delivery, but the significance of profitability for customer B should also be kept in mind while doing so.

C. ABC, ABM, ABB

1. ABC in Advanced Manufacturing Environment

The striking question is: What has changed between the manufacturing environment then and now, and how could ABC help to fill the gap? The change in the workplace/ manufacturing environment is mainly attributed to two of the below factors -

Global Competitiveness: Today, every industry, be it small or large, faces intense competition both at the national and international level with the advent of internet technology. The Internet has put an end to geographical barriers, due to which every consumer is now free to choose among products that meet their quality expectations and are priced reasonably. Therefore, the traditional approach of estimating demand and producing accordingly does not go a long way. As a resolution to this situation, organizations have increasingly started adopting a **just in time manufacturing** approach and implementing advanced manufacturing technology. More relevant and timely information is required for these organizations to build a sustainable, long-term competitive advantage. Organizations must ***improve the value received*** by their customers while increasing their own profits simultaneously. ABC supports the *continuous improvement process* by allowing management to gain new insights into activity performance, by focusing attention on the sources of demand for activities, and by permitting management to create a behavioral incentive to improve one or more aspects of manufacturing. *Better assessment of cost behavior, increased accuracy in product costing, and an attempt to achieve continuous cost improvement are all critical for an advanced manufacturing environment.*

Workplace Automation: In this age of industrial revolution, the computer age has overridden labor power. Things like computer aided design, computer aided manufacturing, and robotics have allowed flexible manufacturing, which was not possible in a labor-intensive scenario. Therefore, a drastic switch in cost structure has also taken place. In a labor-intensive phase, labor costs used to be the major direct product cost which is now replaced by indirect equipment cost and support overheads on personnel that support the machine activity. ABC provides more *realistic* and accurate *product costing*, as the traditional volume-based costing system does not take into account *Non-unit Level Overhead Costs* such as Setup Cost, Inspection Cost, and Material Handling Cost, etc. Cost Analysis under the ABC system shows that while these costs are largely fixed with respect to sales volume, they are not fixed with other appropriate cost drivers.

The concepts underlying a relevant costing analysis continue to be completely valid in an advanced manufacturing setting and in a situation where activity- based costing is used.

Further, it is pertinent to mention that ABC offers no increase in product-costing accuracy for single-product setting.

2. Activity Based Cost Management (ABM)

Empirical studies of ABC implementation have frequently shown that the greater benefit derived from its adoption is in Cost Management rather than in providing accurate product cost. The term Activity based management (ABM) is used to describe the ***Cost Management application of ABC***. The use of ABC as a costing tool to manage costs at the activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC. Through various different types of analysis, ABM manages activities rather than resources. It determines what drives the activities of the organisation and how these activities can be improved to increase profitability.

The Consortium for Advanced Management International (CAM) defines ABM as "adds a dynamic, continuous improvement dimension to the more static ABC model".

CAM-1 defines ABM as: "A discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value. This discipline includes cost driver analysis, activity analysis, and performance measurement. Activity-Based Management draws on Activity-Based Costing as its major source of information."

Interestingly, it has been observed that Japanese accountants began exploring activity-based techniques in the early 1990s, the following movement in the United States towards the ABM model.

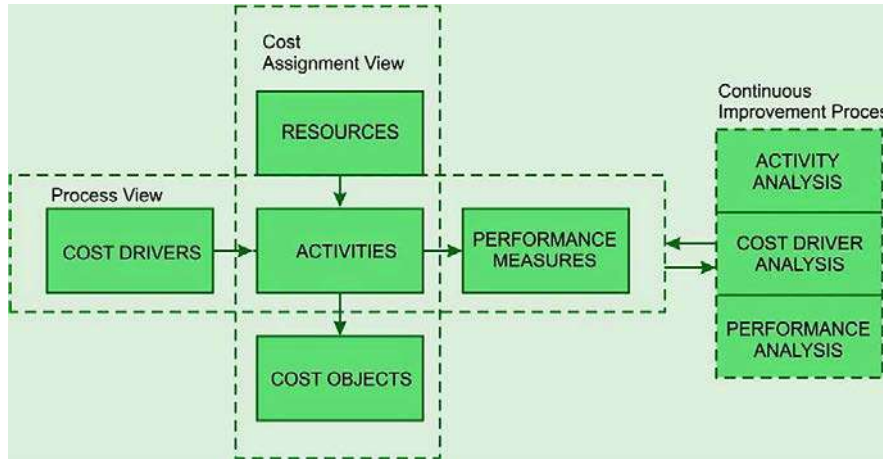


Figure C.1 – *Activity Based Management Model*[1]

The figure given above represents the ABM model in a chart developed for CAM-1. In commenting on this model, one of its co-developers stated, "*ABC supplies the information, and ABM uses this information in various analyses designed to yield continuous improvement."*

[1] CAM-I Glossary of Activity-Based Management, Edited by Norm Raffish and Peter B. B. Turney, (Arligton: CAM-I, 1991)

2.1 Designing and Implementing ABM

2.1.1 Cost Driver Analysis

Identification and analysis of cost drivers is a necessary **first step** towards improving the cost-effectiveness of activities and cost management through ABM. A cost driver is any factor that causes a change in the cost of an activity. For example, the quality of parts received by an activity, for example, the percentage of defective parts is a determining factor in the work required by that activity because the quality of the parts received affects the resources required to perform the activity. An activity may have multiple cost drivers associated with it[2].

2.1.2 Activity Analysis

To meet the goal of drastic cost reductions and value enhancement, we need something beyond just performing cost driver analysis. Here, comes into play the **second step** of ABM, which is activity analysis, which necessarily deals with eliminating non-value-added activities and thus reducing the total number of activities to be performed. It is a process of analyzing each key activity individually and placing each of them into one of the two categories, which are Value-Added Activity and Non-Value-Added Activity. Further activity analysis also involves the identification of activities and grouping them into various activity centres (or activity cost pools) that should be used in an ABC system. The degree to which activities are grouped together into activity centres depends on the costs and benefits of the alternatives. The number of activity centres is likely to change over time as organisational needs for activity information evolve. For example, only a few activity centres may be used in an initial ABC pilot study. As managers become more accustomed to the initial ABC system and find the output useful, they may request a more detailed and refined ABC model.

2.1.3 Performance Analysis

Organizations perform hundreds of activities, out of which significant activities must be identified for the purpose of performance analysis. This analysis focuses managers' attention on those activities that have the most potential for performance improvement. This analysis is carried out from either of the two aspects below–

Analysis based on expected cost: The activity rates identified by the ABC system provide prima facie insight into which activities cost more than benchmarks set by comparing the actual activity rates to perform key activities and the industry activity rates. This can provide managers with incentives to improve operations. Alternatively, managers might decide to outsource some activities to an outside firm that does the task more cost effectively[3].

Analysis based on time spent: However, sometimes knowing and comparing the activity rates by itself is insufficient to measure activity performance. Activity measures of quality, cycle time, productivity, and customer service may also be required to judge activity performance[4]. For example, comparing the actual processing time of a product with the processing time of similar products of other firms in the industry can indicate if any scope exists to improve such activity on our end.

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[2] Technical Briefing, Developing and Promoting Strategy, Activity-based Management – An Overview, April 2001

[3] https://baelearn.uncg.edu/wordpress/scm432/week-three-scm-652/activity-based-costingactivity-based-management

[4] *Supra* See note 2

Measuring the performance of activities provides a scorecard to report how well improvement efforts are working and is an integral part of continuous improvement[5]. This analysis can produce **performance reports** indicating the performance of activity centres or other organisational units, consistent with each unit's goals and objectives.

2.2 Value Added (VA) Activities / Non-Value Added (NVA) Activities

ABM views the business as a set of linked activities that ultimately add *value to the customer*. Managers who want to enhance customer value and manage costs must manage the underlying activities. ABM is based on the premise that activities consume costs. Therefore, by managing activities, costs will be managed in the long term. Activities may be grouped in such a way as to describe the total process. For example, serving a particular customer involves a number of discrete activities, but the sum total of these activities represents the process by which the client is serviced. ABM classifies each activity within a process as either value added, or non-value added.

2.2.1 Value-Added Activities

The VA activities are those activities which are indispensable in order to complete the process. The customers are usually willing to pay (in some way) for these services. For example, polishing furniture by a manufacturer dealing in furniture is a value added activity.

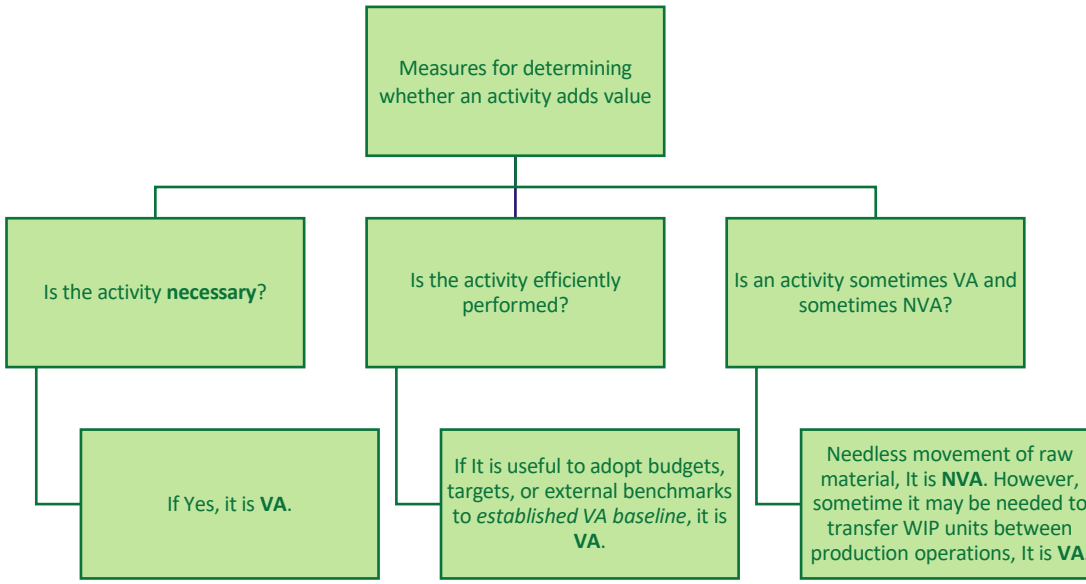

Figure C.2 *– Measures for determining whether an activity adds value*[6]

[5] *Supra* See note 3

[6] Managerial Accounting 7E By Hilton, Cost Management Systems, p.222

2.2.2 Non-Value-Added Activities

The NVA activity represents work that is not valued by the external or internal customer. NVA activities do not improve the quality or function of a product or service, but they can adversely affect costs and prices. Non-Value-Added activities create waste, result in delays of some sort, add costs to the products or services, and for which the customer is not willing to pay. Moving materials and machine set up for a production run are examples of NVA activities.

In the manufacturing operation, five major activities are often cited as wasteful and unnecessary:

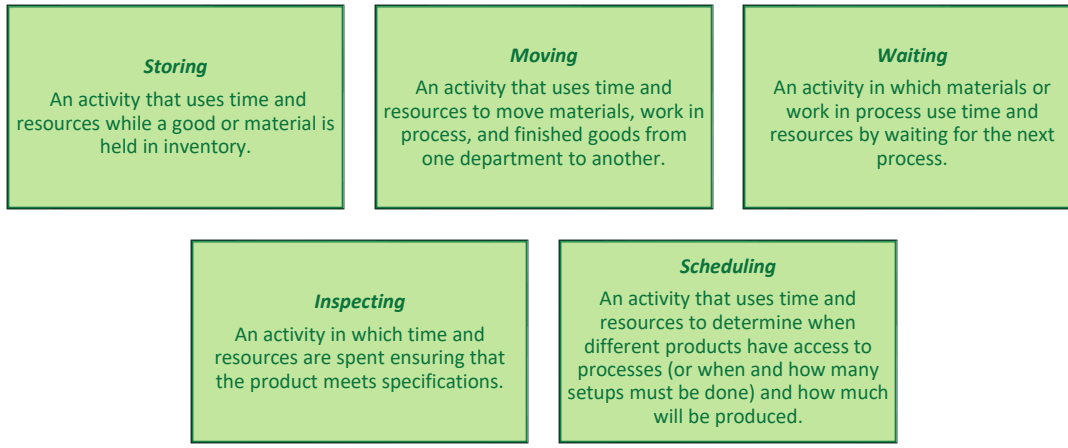

Figure C.3 – Unnecessary Activities

None of these activities adds any value to the customer. Scheduling, for example, is not necessary if the company has learned how to produce on demand. Similarly, inspecting would not be necessary if the product was produced correctly the first time[7].

Test Your Understanding

A wine manufacturer stores wine, the manufacturing of which is already complete, but which needs to be stored for a specific period to meet the quality standard specified by the customer. You are required to identify value-added and non- value-added activities.

Hint

If a wine manufacturer stores a wine, the manufacturing of which is already complete, but which needs to be stored for a specific period to meet quality standards specified by the customer, such storing time would be considered value-added activity since, without this storing activity, the manufacturing of wine of specified quality would not be complete.

Note: The quality and price of wine enhances as it grows older.

[7] Cost Management Accounting and Control 6E By Hansen, Mowen & Guan (2009); Activity Based Management; p.433

By measuring activities rather than traditional departmental costs, business can focus on cross functional processes in order to identify NVA activities and pinpoint the ***time drives of cost*** at each stage.

NVA costs should be reported in activity center cost reports. One approach that management accountants find useful in identifying NVA activities is to classify the ways in *which time is spent in a manufacturing process*.

In most operations, time is spent in the following ways:

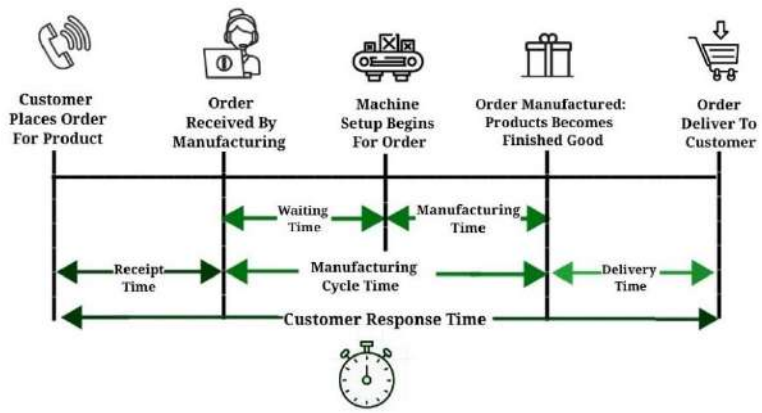

Figure C.4 – An Overview of Customer Response Time and Manufacturing Cycle Time[8]

Receipt Time is how long it takes the marketing department to specify to the manufacturing department the exact requirement in the customer's order.

Manufacturing/ Process Time – The time during which a raw material/ WIP is undergoing conversion activity, *or* the amount of time work is actually done on the product.

Manufacturing Cycle Time (MCT) – How long does it take to manufacture the finished goods from the time an order is ***received by the manufacturing department*** (also called manufacturing **lead time**)? Manufacturing cycle time includes all forms of time a product spends (in the manufacturing department), including due to standing in queue or during the time they were moved between operations; waiting for parts or due to machine set up. However, it does not include the waiting time (i.e., receipt time) before the order is received by the manufacturing department. Similarly, MCT does not include delivery time as it is related to the period after the manufacturing of the product has been completed.

[8] Cost Accounting 13E By Charles T. Horngren

Concept Insight

Value added manufacturing activities are tasks that, if eliminated, would reduce the actual or perceived value or utility the customer receives from using the product, such as time actually spent on the product. The rest of the MCT represents non-value-adding activities that, if eliminated, would not reduce the actual or perceived value or utility customers obtained from using the product. Examples of non-value-added cycle time include the time the product spends waiting for parts or for the next stage in the production process, being inspected or repaired, and being moved. By identifying and minimizing the sources of non-value-added cycle time, companies can increase customer responsiveness while reducing costs[9].

Cycle Time – The length of time from ordering to selling an item in a retail environment is called cycle time. NVA activities in retail include shipping time from supplier, delays in receiving department in order to count the merchandise, and any storage time between receipt and sale. In a service company, cycle time refers to the time between service order and service completion. All time spent on activities that do not enhance service performance, such as delays in starting work on service orders, is considered NVA[10].

Concept Insight

Companies that can eliminate waiting time for a service will find it easier to attract customers. The time taken to process mortgage and loan applications by financial institutions can involve a considerable amount of non-value-added waiting time. Thus, reducing the time to process the applications enhances customer satisfaction and creates the potential for increasing sales revenues[11].

Delivery Time is how long it takes to deliver a completed order to a customer[12].

Customer Response Time is how long it takes from the time a customer places an order for a product or service to the time product or service is delivered to the customer[13].

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[9] Cost Accounting 13E By Charles T. Horngren, Customer Response Time, p. 806 (*Horngren*)

[10] Cornerstones of Managerial Accounting 1E (Canadian) By Mowen, George Gekas, Hansen, Heitger, Activity Based Costing and Management, p. 310

[11] Management and Cost Accounting 10E By Drury, The Balanced Scorecard, p.569

[12] *Supra* note 9

[13] *ibid*

Concept Insight

Application of MCE in reducing Non- Value- Added Activities

To reduce or eliminate non-value-added activities, *inspection time* can be reduced by developing the concepts of total quality control (TQC) and zero-defect manufacturing. *Moving time* can be reduced by developing the concept of cellular manufacturing. *Waiting time* and *storage time* can be reduced by developing the concept of JIT inventory systems (Mulyadi 2003).

Just-in-time methods eliminate a significant amount of idle time (especially storage) and increase MCE. JIT also has a positive impact on engineering, purchasing, receiving, warehousing, accounting, human resources, and marketing[14].

Manufacturing Cycle Efficiency (MCE) = The term "Efficiency" can be interpreted to mean "manufacturing related Value Addition". So, MCE is the ratio of value addition time to the total time taken to manufacture a product.

Therefore, MCE= Processing Time/ Manufacturing Cycle Time

A Perfect MCE would yield a ratio equal to 1 i.e., all processing time would be value-added. While such a result is not likely to occur, managers should always strive to raise the ratio in that direction. Any non-value-added time results in an MCE of less than 1.

An MCE of 0.5, for example, would mean that half of the total production time consists of inspection, moving, and similar non-value-added activities. In many manufacturing companies, the MCE < 0.1 which means that 90% of the time a unit is in process is spent on activities that do not add value to the product. MCE helps companies to reduce non-value-added activities and thus get products into the hands of customers more quickly and at a lower cost[15].

Example[16]

Consider a 50-minute doctor's office visit. Suppose a patient spends 10 of those minutes on administrative tasks such as filling out forms, 25 minutes waiting in the reception area and examination room, and 15 minutes with a nurse or doctor. The service cycle efficiency for this visit equals 15/50, or 0.30. In other words, only 30% of the 50 minutes added value to the patient/ customer. Minimizing their non-value-added service times has allowed doctors to treat more patients in less time.

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[14] *Supra* note 10

[15] Managerial Accounting 14E By Garrison, Noreen, Brewer, Performance Measurement in Decentralised Organisation, p.483

[16] *Supra* note 9

Illustration 4

Queenstown Furniture (QF) has been manufacturing high-quality wooden doors within the forests of Queenstown since 1952. Management is having emphasize on creativity, engineering, innovation, and experience to provide customers with the door they desire, whether it is a standard design or a one-of-a-kind custom door. The following information pertains to operations during April:

Processing time	*9.0 hrs.**	*Waiting time*	*6.0 hrs.**
Inspection time	*1.5 hr.**	*Move time*	*7.5 hrs.**
Units per batch	*60 units*		

(*) average time per batch

Required

COMPUTE the following operational measures:

(i) Average non-value-added time per batch

(ii) Average value-added time per batch

(iii) Manufacturing cycle efficiency

(iv) Manufacturing cycle time

Solution

(i) Average Non-Value-Added Time *per batch* = Inspection Time + Waiting Time + Move Time

= 1.5 hr. + 6.0 hrs. + 7.5 hrs. = 15 hrs.

(ii) Average Value-Added Time *per batch* = Processing Time = 9 hrs.

(iii) Manufacturing Cycle Efficiency =

$$\frac{\text{Processing Time}}{\text{Processing Time + Inspection Time + Waiting Time + Move Time}}$$

$$= \frac{9.0\text{ hrs.}}{9.0\text{ hrs.} + 1.5\text{ hr.} + 6.0\text{ hrs.} + 7.5\text{ hrs.}} = 37.5\%$$

(iv) Manufacturing Cycle Time $= \frac{\text{Total Production Time}}{\text{Units per Batch}}$

$$= \frac{24\text{ hrs.}}{60\text{ units}} = 0.40\text{ hrs. per unit}$$

2.3 Business Applications of ABM

The goal of the ABCM is to satisfy customer needs while making fewer demands for resources. Current research suggests that customers have perceived needs in four areas, all of which must be satisfied simultaneously.

The customers require- lower costs, higher quality, faster response time and greater innovation.

To satisfy these needs, ABM is currently being used for a variety of business applications. Such as:

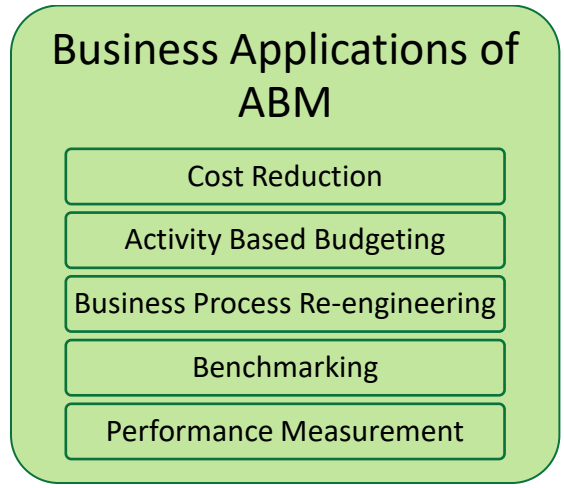

Figure C.5 – Business Applications of ABM

2.3.1 Cost Reduction

ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added. It is particularly useful in identifying and quantifying process waste and providing vehicle for continuous process improvement through continuous cost reduction.

2.3.2 Activity Based Budgeting (ABB)

ABB analyses the resource input or cost for each activity. It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. Actual results can be compared with budgeted results to highlight, both in financial and non-financial terms, those activities with major discrepancies from the budget for a potential reduction in the supply of resources. It is a planning and control system which seeks to support the objectives of continuous improvement. It means planning and controlling the expected activities of the organization to derive a cost-effective budget that meets the forecast workload and agreed strategic goals. The three key elements of activity-based budgeting are as follows:

- Type of work to be done
- Quantity of work to be done
- Cost of work to be done

2.3.3 Business Process Re-engineering

Business Process Re-engineering involves examining business processes and making substantial changes to how the organisation currently operates. ABM is a powerful tool for measuring business performance, determining the cost of business output, and identifying opportunities to improve process efficiency and effectiveness. A business process consists of a linked set of activities.

For example, the purchase of materials might be considered a business process consisting of activities such as receiving a purchase request, identifying supplies, preparing purchase orders, mailing purchase orders, and performing follow up. One way the process might be reengineered is by sending the production schedule directly to the suppliers and entering into a contractual agreement to deliver materials according to the production schedule. The end result might be a permanent reduction or elimination of some activities, like raising a requisition every time if there is a need for materials, identifying potential suppliers each time, and waiting for their bid, which may result in a delay in the production process and thereby hamper the organisation's goals.

2.3.4 Benchmarking

Benchmarking is the process of comparing the ABC derived activity costs of one segment of a company with those of other segments. It requires uniformity in the definition of activities and the measurement of their costs.

2.3.5 Performance Measurement

Many organisations are now focusing on activity performance as a means of facing competitors and managing costs by monitoring the efficiency and effectiveness of activities. Activity performance measures consist of measures relating to costs, time, quality, and innovation. For instance, in the current era of globalisation, the overall goal for any company is to produce a quality product at a competitive price. But quality is not something which one can apply somewhere in the production process or assume will happen automatically. Product quality starts with the correct design. The next stages are high quality raw material inputs, quality processing and work, proper handling and packaging, etc. The various performance measures of quality are:

Area	Measures
Quality of the Purchased Component	Zero Defects
Quality of Output	% Yield
Customer Awareness	Orders; Number of Complaints

For a long time, ABM was observed as relevant to manufacturing. Experience has demonstrated that activities are universal to all organisations, including *service* and *non-profit organisations*. To varying degrees, every organisation has processes and activities in place to convert capital, materials, and purchased services into products/ services required by its customers and users. Regardless of industry, activities represent the fundamental of what the organisation does to create *value* for its customers and shareholders[17].

[17] Technical Briefing Activity-based Management – An Overview, Developing, and Promoting Strategy CIMA, April 2001

2.4 Implementing ABM[18]

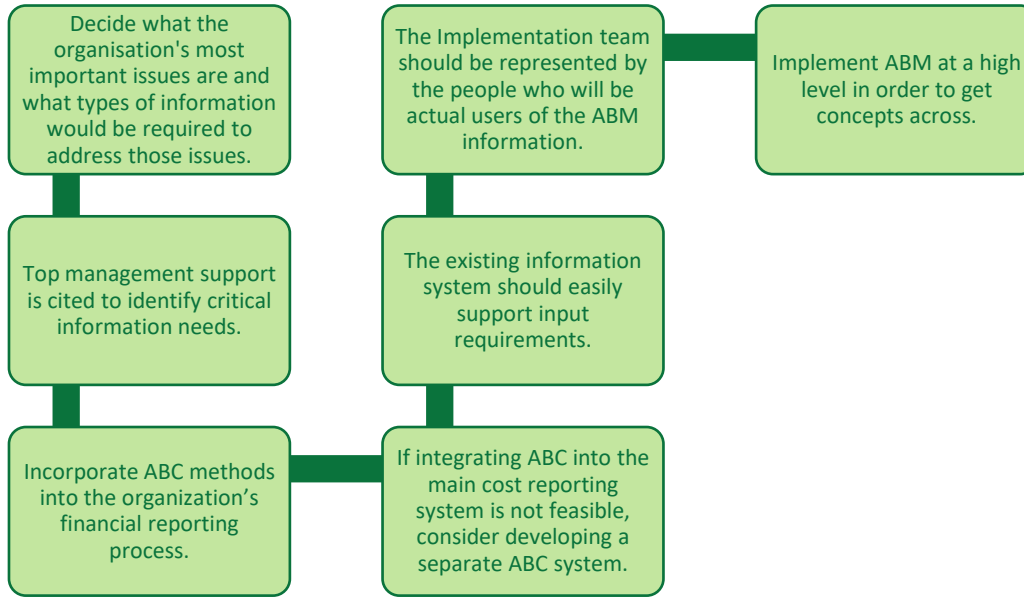

Figure C.6 – Implementation of ABM

2.5 Benefits of Activity Based Cost Management

- Provision of excellent basis and focus for **cost reduction**.
- Provides operational management with a clear view of HOW to implement an **Activity Based Budget**?
- Provision of clear understanding of the underlying causes of business processing costs. **(process improvement)**
- Provision of excellent basis for the effectiveness of **management decision making**.
- Identification of key process waste elements, permit management prioritization, and leverage of key resources. **(key resource management)**

2.6 Differences between ABC and ABM

The ABC refers to the technique for determining the cost of activities and the output which those activities produce. It is the logical distribution of overhead, i.e., overhead should be distributed based on the consumption of resources by goods and services. The aim of ABC is to generate improved cost data for use in managing a company's activities.

The ABM is a much broader concept. It refers to the management philosophy that focuses on the planning, execution, and measurement of activities as the key to *competitive advantage*.

[18] *Supra* note 17

3. Activity Based Budgeting (ABB)[19]

Activity Based Budgeting is a process of planning and controlling the expected activities for the organisation to derive a *cost-effective budget* that meets the forecast workload and agreed strategic goals. An activity-based budget is a quantitative expression of the expected activities of the firm, reflecting management's forecast of workload and financial and non-financial requirements to meet agreed strategic goals and planned changes to improve performance.

Thus, the key elements of ABB are:

- Type of work/ activity to be performed;
- Quantity of work/ activity to be performed; and
- Cost of work/ activity to be performed.

ABB focuses on the activity/ business processes. Resources required are determined by the expected activities and workload. The objective is to bring efficiency into the system. So, in the process of budget preparation, many key questions need to be addressed and properly answered.

ABB is a technique for enhancing the accuracy of financial forecasts and increasing management understanding. When automated, ABB can rapidly and accurately produce financial plans and models based on varying levels of volume assumptions. Also, ABB eliminates much of the needless rework created by traditional budgeting techniques.

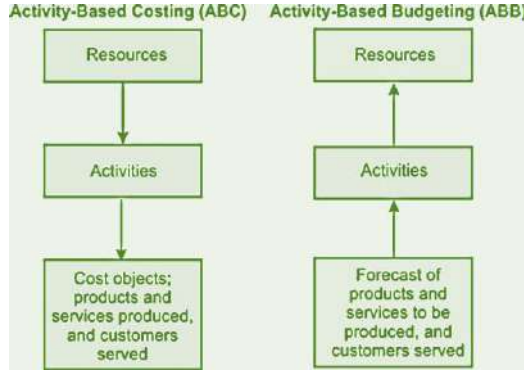

Figure C.7 – ABC vs ABB[20]

ABB analyses the products or services to be produced, what activities are required to produce those products or services, and finally what resources need to be budgeted to perform those activities. Simply said, ABB is the reversal of the ABC process to produce financial plans and budgets.

Traditional, functional- based budgeting is concerned with budgeting the costs of resources associated with organizational units, such as departments and plants. Firms that have implemented an activity-based costing system may also wish to install an activity-based budgeting system.

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[19] Cost Accounting: A Managerial Emphasis, 13/e By Charles T. Horngren; Cost Management: Accounting and Control By Don Hansen, Maryanne Mowen, Liming Guan; Cornerstones of Financial and Managerial Accounting By Jay Rich, Jeff Jones, Dan L. Heitger, Maryanne Mowen, Don Hansen

[20] Robert S. Kaplan and Robin Cooper, Cost and Effect (Boston: Harvard Business School Press, 1998), p.303

A budgetary system at the activity level can be a useful approach to support *continuous improvement* and process management. Furthermore, because activities are what consume resources and, thus, are the causes of costs, activity-based budgeting may prove to be a much more powerful planning and control tool than the traditional, *functional-based budgeting* approach.

An activity-based budgetary approach can be used to emphasize *cost reduction* through the elimination of wasteful activities and improving the efficiency of necessary activities.

As with traditional, functional-based budgeting, ABB begins with sales and production budgets. Direct materials and direct labor budgets are also compatible with an ABC framework because these production inputs are directly traceable to the individual products. The major differences between functional and activity-based budgeting are found within the overhead and selling and administration categories. In a functional- based approach, budgets within these categories are typically detailed by cost elements. These cost elements are classified as variable or fixed, using production or sales output measures as the basis for determining cost behavior. ABB, on the other hand, identifies the overhead, selling, and administrative activities and then builds a budget for each activity based on the resources needed to provide the required activity output levels. Costs are classified as variable or fixed with respect to the activity output measure.

Activity Flexible Budgeting

The ability to identify changes in activity costs as activity output changes allows managers to more carefully plan and monitor activity improvements. Activity flexible budgeting is the prediction of what activity costs will be as activity output changes. *Variance analysis within an activity framework makes it possible to improve traditional budgetary performance reporting.* It also enhances the ability to manage activities. Activity flexible budgets differ from traditional flexible budgets because the *cost formulas are based on the activity drivers* for the respective activities rather than being based only on a single unit-based driver, such as direct labor hours.

Illustration 5

6-Twelve is an Indian – Japanese international chain of convenience stores for food, snacks, hot and cold beverages is formulating its activity-based budget for January 2024. 6-Twelve has only three product types: Soft Drinks, Fresh Drinks, and Ready to Eat Food. The budgeted data relating to three products are as under:

Activity and Driver	Cost Driver Rates		Jan 2024 Budgeted		
	2023	Jan 2024	Amount of Driver Used		
	Actual Rate (₹)	Budgeted Rate (₹)	Soft Drinks	Fresh Drinks	Ready to Eat Food
Ordering (per purchase order)	5,000	4,500	16	20	16
Delivery (per delivery)	4,000	4,100	13	60	20
Shelf-Stocking (per hour)	1,000	1,050	15	170	93
Customer Support (per item sold)	10	9	4,500	34,600	10,500

6-Twelve has a continuous improvement system to budgeting monthly activity costs for each month of 2024. February's budgeted cost-driver rate is 0.996 times the budgeted January 2024 rate. March's budgeted cost-driver rate is 0.996 times the budgeted February 2024 rate and so on.

Required

(i) COMPUTE total budgeted cost for each activity in January 2024.

(ii) DISCUSS advantages might 6-Twelve gain by using an activity-based budgeting approach over, say, an approach that allocates the cost of these activities to products as a percentage of the cost of goods sold.

(iii) COMPUTE total budgeted cost for each activity in March 2024 if March 2024 has the same budgeted amount of cost-driver usage as January 2024.

(iv) STATE benefits of 6-Tweleve adopting a kaizen budgeting approach. IDENTIFY limitations?

Solution

(i) Calculation of Total Budgeted Cost for Each Activity

Activity	Cost Hierarchy	Soft Drinks	Fresh Drinks	Ready to Eat Food	Total (₹)
Ordering (₹4,500 × 16; 20; 16)	Batch-Level	72,000	90,000	72,000	2,34,000
Delivery (₹4,100 × 13; 60; 20)	Batch-Level	53,300	2,46,000	82,000	3,81,300
Shelf stocking (₹1,050 × 15; 170; 93)	Output Unit Level	15,750	1,78,500	97,650	2,91,900
Customer support (₹9 × 4,500; 34,600; 10,500)	Output Unit Level	40,500	3,11,400	94,500	4,46,400
Total Budgeted Costs		1,81,550	8,25,900	3,46,150	13,53,600

(ii) An Activity Based Budgeting approach identifies how different products require different mixes of support activities. The relative percentage of how each product area uses the cost driver at each activity area is:

Activity	Cost Hierarchy	Soft Drinks (%)	Fresh Drinks (%)	Ready to Eat Food (%)	Total (%)
Ordering	Batch-Level	30.77	38.46	30.77	100.0
Delivery	Batch-Level	13.98	64.52	21.50	100.0
Shelf Stocking	Output Unit Level	5.40	61.15	33.45	100.0
Customer Support	Output Unit Level	9.07	69.76	21.17	100.0

By identifying these differences, 6-Tweleve managers are better able to budget for different unit sales levels and different mixes of individual product-line items sold. Using a single cost driver such as 'Cost of Goods Sold' considers similarity in the use of indirect costs (support activities) across product lines which does not occur at 6-Twelve.

Other benefits cited by managers include:

(1) Better identification of resource needs.

(2) Clearer linking of costs with staff responsibilities, and

(3) Identification of budgetary slack.

(iii) March 2024 Rates (₹)

Activity	Cost Hierarchy	January	February	March
Ordering	Batch-Level	4,500.00	4,482	4,464.07
Delivery	Batch-Level	4,100.00	4,083.60	4,067.27
Shelf-stocking	Output Unit Level	1,050.00	1,045.80	1,041.61
Customer support	Output Unit Level	9.00	8.96	8.93

These March 2024 rates can be used to compute the total budgeted cost for each activity area:

Activity	Cost Hierarchy	Soft Drinks	Fresh Drinks	Ready to Eat Food	Total (₹)
Ordering (₹4,464.07 × 16; 20; 16)	Batch-Level	71,425	89,281	71,425	2,32,131
Delivery (₹4,067.27 × 13; 60;20)	Batch-Level	52,875	2,44,036	81,345	3,78,256
Shelf-Stocking (₹1,041.61 × 15; 170; 93)	Output Unit Level	15,624	1,77,073	96,870	2,89,567
Customer support (₹8.93 × 4,500; 34,600; 10,500)	Output Unit Level	40,185	3,08,978	93,765	4,42,928
Total Budgeted Costs		1,80,109	8,19,368	3,43,405	13,42,882

(iv) A kaizen budgeting approach indicates management's commitment to organized cost reduction. Compare the budgeted costs from previous part.

	Ordering	Delivery	Shelf-Stocking	Customer Support
Part (i)	2,34,000	3,81,300	2,91,900	4,46,400
Part (iii)	2,32,131	3,78,256	2,89,567	4,42,928

The kaizen budget number will show unfavorable variances for managers whose activities do not meet the required monthly cost reductions. This likely will put more pressure on managers to creatively seek out cost reductions by working 'better' within 6-Twelve.

One limitation of kaizen budgeting, as illustrated, is that it considers minor incremental improvements each month. It is possible that some cost improvements arise from irregular fluctuations in operating processes, supplier networks, or customer interactions. Companies need to highlight the importance of seeking these improvements as well as the minor incremental improvements.

4. ABC: A Decision - Making Tool

It is a useful tool for many of the management decisions facing companies today. It can bring a picture of the operation to light that may not be obvious through other analysis tools. Specifically, ABC is useful in analyzing specific segments of an organization. This might include a market line, a group of products (even a single product), a customer, or an employee. The ABC is implemented in the following decisions:

- ABC is a complement to total quality management (TQM). It provides quantitative data that can track the financial impact of improvements implemented as part of the TQM initiative. Some have even suggested that ABC is the most important concept introduced since TQM. There are several companies that have utilized the ABC/ TQM modeling concept to improve performance and profitability.
- Wholesale distributors can gain a significant advantage in the decision-making process through the implementation of ABC concepts. The expansion of line offerings has brought about difficult decisions for the distributor. Using traditional financial data, the overhead burden is distributed equally across the product line. Introduction of new products or vendors might also introduce variance to the overhead. For instance, the need to support a special storage area for control or environmental reasons, or the need for new handling equipment will increase overall operational costs. These costs will be spread over the product line, reducing the margin on existing products and reducing the cost impact of the new items.

  ABC models the costs back to the activity. The burden created by the new product is correctly reflected. This allows the existing merits while leaving the new line to justify itself.
- Other decisions that can be assisted by ABC include facility and resource expansion. Often, the basis for relocation or the opening of a new distribution center is based on cost associations. A reduction in freight or other logistics costs can offset the expense of the new facility, staff, or equipment. When the numbers used are enterprise-based, the return might not develop as expected. The ABC model can identify the specific cost elements being targeted, providing a much clearer picture of which management can act.
- Decision support for human resources can be augmented by ABC. Where activity, and therefore cost, can be associated to an individual, new levels of financial performance can be determined. This might be appropriate in cases of branch management or sales. Adding or deleting resource slots can be determined based on the costs of activities as well. The added data provided through ABC can present a number of options, including outsourcing, productivity improvements through automation, and a determination of employee/revenue ratios.
- Companies that wish to determine price based on cost plus markup basis, find the ABC method of costing very relevant and are able to determine competitive prices for their products.
- Using traditional absorption costing, overheads may be distributed equally across all product lines. ABC traces costs back to the activity and the consumption of resources by each product. Thus, product line profitability can be determined in more realistic terms.

In summary, activity-based costing is a management decision-making tool. It provides financial support data structured in a fashion fundamentally different from accounting data provided in the general ledger. By associating cost to the activity, a clear relationship can be established between the sources of activity demand and the related costs. This association can benefit the distributor in determining where costs are being incurred, what is initiating the costs, and where to apply efforts to curb inflationary costs. This can be of particular value in tracking new products or customers. It can also provide tracking of logistics costs, one of the fastest growing areas of expense to the distribution operation.

Practical Insight

ABC Practices

A reputed Beverage Company in Belgium (BCB) produces, distributes, and sells the different brands of the global parent company. In the field of distribution, it is also this Belgium Company that services the entire Belgian and Luxembourg markets. BCB is present in more than 85,000 points of sale (supermarkets, grocery stores, companies, hospitals, cinemas, amusement parks, sports centers). By the end of 2009, BCB employed more than 2,500 employees in Belgium and Luxembourg with revenue of €1.1 billion.

Like many other companies, this Belgium Company was confronted with an increasing Cost to Serve (CTS) due to a changing customer landscape. This created a challenge to which BCB needed to formulate decisive answers to stay on track towards achieving their growth path and their company objectives.

When companies are confronted with increasing CTS, it is essential to analyse the organisation, its revenues and costs and its processes down to the most detailed level of information. It is this data that gives the true reasons behind certain evolutions so that management can take fact-based decisions. When having such a challenge at hand, Activity Based Costing is the most advanced and complete method to gain this information. Thus, BCB wanted to use the information from the ABC analysis to formulate:

- Cost/ Profit Modeling
- Performance Modeling and
- Set-up an Internal Recharge Mechanism to Sales

By implementing Activity-Based Costing, BCB obtained the right information that enabled them to harmonize and streamline the processes of their different distribution centers.

This made it possible for BCB to calculate the costs in a fair and transparent way, so that the sales force is charged correctly according to the complexity that Supply Chain had to deal with. From the capacity insights that BCB got from Activity-Based Costing, multiple initiatives were derived that ultimately led to the redesign of the regional distribution strategy, including:

- Optimizing efficiency and capacity within the logistic department.
- Designing the most efficient processes based on the time equations from ABC Analysis.
- Implementing "best practice" processes in the BCB distribution centers

These actions successfully reduce their Cost to Serve and are still in line with the new corporate strategy.

D. PARETO ANALYSIS

The key feature of any strategy is achieving the objectives with a scarce set of resources. Hence, in all circumstances, it is important to prioritise the application of the resource (effort) to those causes which has higher significance. For example, if any company wishes to be a market leader but is fighting against poor quality, then it must start its quality improvement drive with a focus on significant (vital) causes of quality failure, not all because resource availability may be scarce.

But a question arises here → is focusing only on 'Vital Few' will solve the problem to a larger or acceptable level?

Answer rests in the Pareto Principle, which was developed by the Italian economist Vilfredo Pareto in 1896 when he noticed a great inequality in the distribution of wealth during his initial work, ***Cours d'économie politique*** at the University of Lausanne. **Pareto showed that approximately 80% of the land in Italy was owned by 20% of the population,** and this phenomenon gained popularity as the '**80:20 rule**'

But another question may arise here → Is such an 80:20 rule applicable to cost management?

The answer lies in suggestions given by Joseph M. Juran, who is an Engineer apart from being a management consultant.

Note- *Juran found that this phenomenon of the 'vital few and the trivial many' applied to many areas of Statistical Process Control. He coined the concept of* ***Pareto analysis*** *(as an application tool) and* ***Pareto Chart*** *(as a presentation tool to graphically show the application) in the context of quality control and improvement. Juran suggested the bulk of the quality problems are due to a few of the possible sources (such can be identified with* ***Pareto analysis*** *and graphically shown through* ***the Pareto Chart).*** *Hence, correction of the same after isolation can help organisations to attain significant improvement in quality (because they have a higher probability of payoff).*

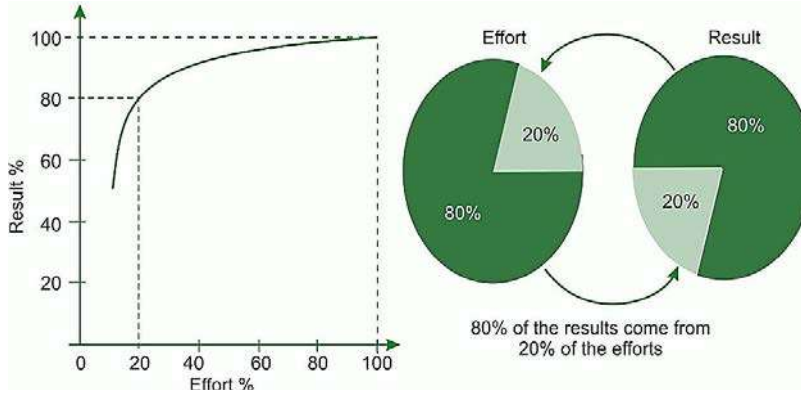


Figure D.1 – Pareto's Law

So, Pareto's 80:20 rule simply states that 80 percent of the results come from only 20 percent of effort (**vital few**), while the remaining 20 percent of results are achieved by 80 percent of effort (**trivial many**). *Or* alternatively, 20 percent of the sources cause 80 percent of the problems.

Test Your Understanding

Can you mention some business functions of the 80:20 Pareto Principle?

Hint

- 20% of customers generate 80% of the revenue of a company.
- 20% of suppliers furnish 80% of the value of supplies to a company.
- 20% of products generate 80% of the production costs.
- 20% of the products generate 80% of the profits.
- 20% of quality defects, errors, or causes of breakdowns lead to 80% of the rejects, failures, delays, etc.

1. Pareto Analysis as Management Tool

The management can use Pareto Analysis in different circumstances to focus on key areas as a control mechanism. Pareto Analysis is really useful in defining the top priorities because it essentially uses the **law of diminishing returns** (pick the low-hanging fruit first).

Pareto Analysis ranks the causes in descending order of value index (effect), hence helping to identify the pay-off. It's obvious that the focus is on items at the top (vital few) of the list because these have a higher probability of payoff.

Note- *Pareto Analysis can be combined with other analytical tools such as Fault Tree Analysis, Scatter Diagram, Fishbone diagrams, and Run Charts in order to correctly identify critical areas (vital few).*

Illustration 6

The following information is given about the type of defects during a production period and the frequencies of their occurrence in a spectacle manufacturing company:

Defect	*No. of Instances*
End Frame not equidistant from the center	*10*
Non-uniform grinding of lenses	*60*
Power mismatches	*20*
Scratches on the surface	*110*
Spots / Stains on lenses	*5*
Rough edges of lenses	*70*
Frame colour-shade differences	*25*

Required

PREPARE a frequency table to construct Pareto Chart for the defect type. Also, IDENTIFY key areas (vital few) of focus and highlight them in the graph too.

Solution

Statement Showing "Pareto Analysis of Defects"

Defect Type	No. of Instances	% to total Defects	Cumulative Defects
Scratches on the surface	110	36.67%	36.67%
Rough edges of lenses	70	23.33%	60.00%
Non-uniform grinding of lenses	60	20.00%	80.00%
Frame colours-shade differences	25	8.33%	88.33%
Power mismatches	20	6.67%	95.00%
End frame not equidistant from the center	10	3.33%	98.33%
Spots/ Strain on lenses	5	1.67%	100.00%
	300	100.00%	

The company should focus on the elimination of scratches on the surface, rough edges of lenses, and non-uniform grinding of lenses (**in priority order**), because they constitute 80% of instances when defect found in any item.

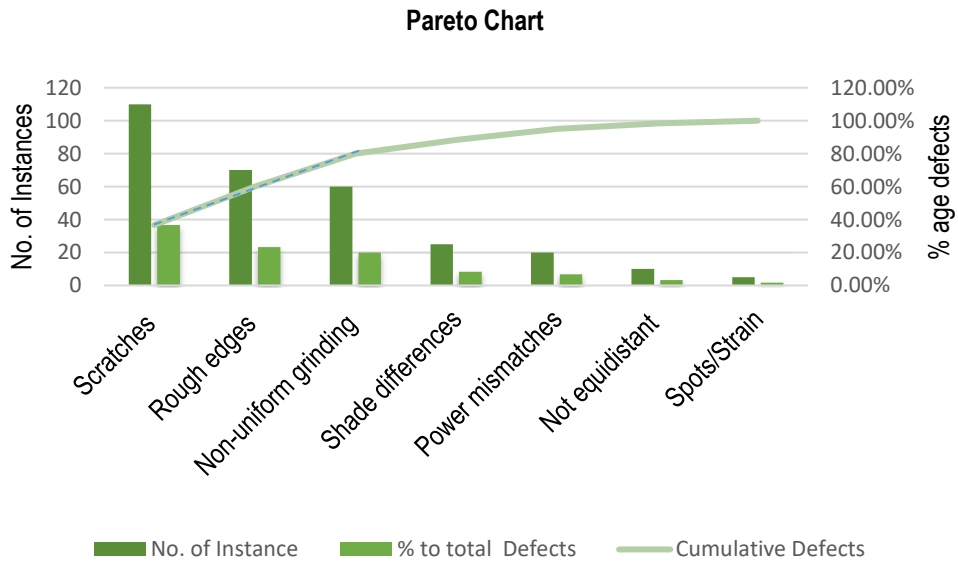


Figure D.2 – Pareto Chart

In the above **Pareto Chart**, till the point where the line (cumulative defects) is dotted, the causes are **Vital (but Few)** and the remaining causes falling thereafter shall be classified as **trivial many**. The curve is steep until it is dotted (the first three causes account for 80% of defect instances), then it falters, indicating less importance.

2. Pros and Cons of Pareto Analysis

2.1 Pros – Pareto Analysis is a control mechanism. It is a creative way of looking at the causes of problems to clearly establish top priorities and to identify targets along with its pay-off. One can advocate the use of Pareto analysis due to the following benefits-

- Breakdown a big problem into smaller pieces by looking at different sort of root causes.
- Identification of significance of each cause/ factor.
- Prioritise where to focus and apply efforts.
- Ensure optimal use of scarce resources.
- Act as a control mechanism.

2.2 Cons – Pareto Analysis involves data and its classification, presentation, and analysis; these factors itself become the sources of shortcoming. Major limitations are-

- Possibility of exclusion of important problems which may be small initially (now) but may grow with time.
- Lack of understanding of 'how it should be best applied to particular problems' is simply the wrong identification of causes.
- Effectiveness of Pareto Analysis is purely based on the data/ information.

3. Applications of Pareto Analysis

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

Figure D.3 – Applications of Pareto Analysis

3.1 Pricing of a Product

- In the case of a firm dealing with multiple products, it would not be possible for it to analyse cost-profit-price-volume relationships for all of them. Pareto Analysis is used for analysing the firm's estimated sales revenues from various products, and it may indicate that approximately 20% of products contribute about 80% of total sales revenue.

Practical Insight

Product Significance (at Parle Agro)

Parle registered an astonishing growth in market share during COVID (especially the lock-down stage). The importance of a single product can be understood from the following statement. "We have grown our overall market share by nearly 5%..., and 80– 90% of this growth has come from the Parle-G sales. This is unprecedented," said category head at Parle Products.

The above statement is extracted from The Economic Times story '82-year-old Parle-G books 'best sales' in COVID times'[21].

- Such analysis helps the top management to delegate the pricing decisions for approximately 80% (**trivial many**) of its products to the lower levels of management, thus freeing themselves to concentrate on the pricing decisions for approximately 20% (**vital few**), which are essential for the company's survival.
- Thus, a firm can adopt more sophisticated pricing methods for a small proportion of products that jointly account for approximately 80% of total sales revenue. For the remaining, the firm may use a cost-based pricing method.

3.2 Customer Profitability Analysis

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

3.3 ABC Analysis- Stock Control

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

[21] https://economictimes.indiatimes.com/industry/cons-products/fmcg/82-year-old-parle-g-books-best-sales-in-covid-times/articleshow/76275237.cms?from=mdr

3.4 Application in Activity Based Costing

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

3.5 Quality Control

- Pareto analysis seeks to discover from an analysis of defect reports or customer complaints which "vital few" causes are responsible for most of the reported problems.
- Often, 80% of reported problems can usually be traced to 20% of the various underlying causes. By concentrating efforts on rectifying the vital 20%, one can have the greatest immediate impact on product quality.

Concept Insight

- If the categories of possible causes include 'others', make sure that this 'others' category does not become too large. If the 'others' accounts for a significant percentage, such as 10% to 25% (depending upon process maturity), it should be broken down further.
- The result of the Pareto Analysis may not be exactly 20% and 80%. The purpose is to identify the categories causing the majority of the results, and then tools like Fishbone can be used to identify the root causes of the problems.
- Periodical reviews of the Pareto distribution are required to keep a watch on the progress of the elimination of the problem causes identified earlier and to define what new failures have come over the horizon that requires immediate attention.

SUMMARY

- Strategic Profitability Analysis – Operating Profit of a firm is affected by various components which are responsible for changes in the revenue and costs. Majorly there are three components –
  - (i) *Growth Component* measures the change in the quantity of output sold. The growth component of the change in the operating income measures the increase/ decrease in revenue and in costs due to selling more/ less quantity units from the previous period.
  - (ii) Price Recovery Component of change in operating income measures the changes in the revenue and costs solely due to changes in prices.
  - (iii) Productivity Component measures the change in the operating income due to changes in the product mix and/ or yield of inputs as compared with the last year. This component uses current year's prices of input to measure the changes in costs only.

- Profitability Analysis Through Activity Based Costing –
  (i) Activity Based Costing (ABC) which has become an important aspect of manufacturing or service organizations can be defined as a methodology that means the cost and performance of activities, resources, and cost objects.
  (ii) It acts as an aid to management evaluation and decision making.
  (iii) In service sector, direct costs are generally low and overheads tend not to be volume related or capable of being easily attributed to product/ service/ customer being supplied. ABC helps cost to identify more easily and managed more effectively.
  (iv) The resource consumption by different products, customers, or segments of the business is more accurately measured, activity-based profitability analysis is likely to provide more useful information to management.
- Direct Product Profitability (DPP) – DPP "used primarily within the retail sector, DPP involves the attribution of both the purchase price and other indirect costs (for example distribution, warehousing, and retailing) to each product line. Thus, a net profit, as opposed to a gross profit, can be identified for each product. The cost attribution process utilizes a variety of measures (for example warehousing space and transport time) to reflect the resource consumption of individual products."
- Benefits of DPP – Cost analysis, pricing decisions, management of stores and warehouse space, rationalization of product ranges.
- Direct Product Profitability Statement – Indirect costs, for DPP may be analysed into basic cost categories as follows:
  (i) Overhead Cost: This is incurred through an activity that is not directly linked to a particular product.
  (ii) Volume Related Cost: The cost is incurred in relation to the space occupied by products. This includes storage and transport costs.
  (iii) Product Batch Cost: This cost is often a time-based cost. If product items (that is a number of identical products which are handled together as a batch) are stocked on shelves a labour time cost is incurred.
  (iv) Inventory Financing Costs: This is the cost of tying up money in stock and is the cost of the product multiplied by interest rate per day or per week.

  Direct Product Profit can be derived as shown below:

Sales	xx
Less: Cost of Goods Sold	xx
Gross Margin	xx
Less: Direct Product Costs (Warehouse, Transportation, Store etc.)	xx
Direct Product Profit	xx

- Customer Profitability Analysis – In many organizations, it is just as important to cost customers as it is to cost products. Different customers or groups of customers differ in their profitability. Not all customers cost the same to serve even if they require the same products. Some customers may be located a long way from the factory and transport may cost more.

- Activity Based Costing in Advanced Manufacturing Environment – In advanced manufacturing environment, where support function overheads constitute a large share of total costs, ABC provides more realistic and accurate product costing.
- Activity Based Cost Management (ABM) – A discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value. This discipline includes cost driver analysis, activity analysis, and performance measurement.
- Value-Added Activities (VA) – The VA activities are those activities which are indispensable in order to complete the process. The customers are usually willing to pay (in some way) for these services. Eg. polishing furniture by a manufacturer dealing in furniture is a value- added activity.
- Non-Value-Added Activities (NVA) – The NVA activity represents work that is not valued by the external or internal customer. NVA activities do not improve the quality or function of a product or service, but they can adversely affect costs and prices. Non-Value Added activities create waste, result in delay of some sort, add costs to the products or services and for which the customer is not willing to pay. Moving materials and machine set up for a production run are examples of NVA activities.
- Activity Based Budgeting (ABB) – Activity Based Budgeting is a process of planning and controlling the expected activities for the organisation to derive a cost-effective budget that meets forecast workload and agreed strategic goals.
- Pareto Analysis– Pareto Analysis is a rule that recommends focus on the most important aspects of the decision making in order to simplify the process of decision making. It is based on the 80: 20 rule where it is believed that 80% of the profits of an organisation relates to 20% of the customers. It helps to clearly establish top priorities and to identify both profitable and unprofitable targets.

TEST YOUR KNOWLEDGE- MCQS

MCQ 1

Pareto principle based upon the law of –

Options

a. Diminishing returns

b. Variable returns

c. Increasing returns

d. Stable returns

Key – a

Reason - Pareto Analysis ranks the causes (reasons) in descending order of effect. Hence help to identify pay-off. It's obvious that focus is on items at the top (vital few) of the list because these have a higher probability of payoff. Hence the law of diminishing returns (pick the low hanging fruits first) applies here.

MCQ 2

Pareto principle can't be applied to –

Options

a. Inventory control

b. Quality control

c. Customer profitability analysis

d. None of the above

Key – d

Reason – Pareto analysis can be applied in Inventory Control, Pricing the products, Customer profitability analysis, ABC analysis, and Quality control etc.

MCQ 3

Pareto analysis shall be performed –

Options

a. Periodically

b. Continuously

c. Occasionally

d. Quarterly

Key – a

Reason – To keep check, that trivial should not become vital (and if turning to vital can be responded early one) and to check that effort done by management eliminate or reduce the impact of vital root-causes.

MCQ 4 – Which one need to be responded first –

Options

a. Trivial many

b. Vital few

c. Both

Key – b

Reason – Pareto is one of 7QC tools which help the management as control mechanism to prioritize, in term of root causes that need to be responded first. Vital few causing significant impact hence to offer higher payoff.

TEST YOUR KNOWLEDGE

Manufacturing Cycle Efficiency

1. "W" specialises in engineering design and manufacture in the automotive and motorsport industry. "W"'s design team has many years' experience in the design and development of engine components for the market and high performance engines. Though "W" is performing well, but many a times, the customers complained that they had to wait for long after placing the orders. "W" is interested in cutting the amount of time between when a customer places an order and when the order is completed. For the last year, the following data were reported in respect of Division "D":

Inspection time = 0.5 days per batch
Process time = 2.8 days per batch
Wait time = 16.0 days per batch
Queue time = 4.0 days per batch
Move time = 0.7 days per batch

Required

(i) CALCULATE Manufacturing Cycle Efficiency (MCE) and INTERPRET the result.

(ii) STATE what percentage of the production time is spent in non-value-added activities.

(iii) CALCULATE the delivery cycle time.

(iv) CALCULATE the new MCE if by using Lean Production all queue time can be eliminated.

Profitability Analysis

2. ABC Airlines has two divisions organised as profit centres, the Passenger Division and the Cargo Division. The following divisional informations were given for the year ended 31st March 2024:

Particulars	Cargo Division	Passenger Division	Total
Number of personnel trained	200	800	1,000
Number of flights	350	250	600
Number of reservations requested	Nil	7,000	7,000
Revenue	₹42,00,000	₹42,00,000	₹84,00,000
Operating Expenses (excluding service department charges)	₹36,00,000	₹28,50,000	₹64,50,000
Service Department Charges			
Training	₹3,20,000	₹3,20,000	₹6,40,000
Flight Scheduling	₹1,50,000	₹1,50,000	₹3,00,000
Reservations	₹1,05,000	₹1,05,000	₹2,10,000

The service department charge rate for the service department costs was based on revenue. Since the revenue of both the divisions were the same, the service department charges to each division were also the same.

Required

(i) COMMENT on whether the income from operations for the two divisions accurately measures performance.

(ii) PREPARE the divisional income statement using the activity bases provided above in revising the service department charges.

Direct Product Profitability (DPP)

3. XYZ Ornamental Company has been a name to count on for quality and service. It has been designing wide range of ornamental products for more than two decades using the highest-quality standard. Such quality is achieved through years of experience and the integrity that is maintained by its employees. They are known for their perfection. VGG approached XYZ to make an inquiry of two products. The two products are indoor fountain known as 'The Star' and a large gnome known as 'Dwarfs' for garden. Mr. Bob, the management accountant of XYZ, has estimated the variable costs per unit of 'The Star' and 'Dwarfs' as being ₹622.50 and ₹103.75 respectively. He estimated his calculations based on the following information:

(1) Products Data

	The Star	Dwarfs	Other Products
Production/ Sales (units)	10,000	20,000	80,000
Total Direct Material Costs	₹22,50,000	₹7,50,000	₹60,00,000
Total Direct Labour Cost	₹15,00,000	₹5,00,000	₹60,00,000

(2) Total variable overheads for XYZ are ₹1,20,00,000 out of which 30% belong to the procurement, warehousing and use of direct materials. While all other variable overheads are related to direct labour

(3) XYZ presently allocates variable overheads into products units using percentage of total direct material cost and total direct labour cost.

(4) VGG is willing to purchase 'The Star' at ₹740 per unit and 'Dwarfs' at ₹151 per unit.

(5) XYZ will not accept any work yielding an estimated contribution to sales ratio less than 28%.

The directors of XYZ are considering switching to an activity-based costing system and recently appointed a management consultants' firm to undertake an in-depth review of existing operations. As result of that review, the consultants concluded that estimated relevant cost drivers for material and labour related overhead costs attributable to 'The Star' and 'Dwarfs' are as follows:

	The Star	Dwarfs	Other Products
Direct Material Related Overheads: (The volume of raw materials held to facilitate production of each product is the cost driver.)			
Material Ratio *per product unit*	5	8	5
Direct Labour related overheads: (The number of labour operations performed is the cost driver.)			
Labour Operations *per product unit*	7	6	5

Required

(i) Give a financial ANALYSIS of the decision strategy which XYZ may implement about the manufacture of each product using the unit cost information available.

(ii) DISCUSS whether activity-based management should be adopted in companies like XYZ.

Customer Profitability Analysis (CPA)

4. **Jawahar Stationary Mart** (JSM) is located in centre of city "X" and popular for wide range of stationary products at competitive rate. Box files and cobra files are among the major products of JSM. JSM clients majorly, include medium and large corporate offices apart from reasonable base of retail clients. Mr. Ronit who done his masters in operations and marketing, recently join the family business (JSM). Mr. Ronit during first week itself, identify there are regular complaints from corporate clients regarding 'delivery of items, which are different from what is ordered' and 'for not meeting the requirements'. Mr. Ronit understands consumer behavior is very critical in nature, if understood well and used through-out the business operation; then can be key success factors. Hence with intent to establishing the integrated relations with customers at JSM, Mr. Ronit advise marketing team to start recording the date regarding customer in systemic manner and reporting of same.

Following is information regarding five major customers, who are regularly orders printed cobra files (Product code – J-Cobra 10) from JSM.

Particulars	A	B	C	D	E
No. of units sold	6,000	8,000	10,000	7,000	8,000
Margin per unit (₹)	6	7.5	7	8	10
No. of purchase order	10	30	25	20	10
No. of deliveries (normal)	3	4	6	4	5
Kilometers per delivery	100	185	50	250	50

Cost of processing the order is ₹2,000 per order and cost of handling material is ₹0.15 per item, whereas transport cost is ₹3 per kilometer for delivery of goods. 3 rushed deliveries made to 'B', cost for rush delivery is ₹800 per delivery.

Required

(i) ANALYZE customer profitability for JSM.

(ii) EXPLAIN three fundamental aspects of CRM to facilitate building relationship with profitable customer/(s).

5. ANCA Limited has decided to analyse the profitability of its four retail customers. It buys product 'Bio-aqua' at ₹218 per case and sells to them at list price less discount. The data pertaining to four customers are:

Particulars	Customer			
	A	B	C	D
No. of cases sold	7,580	38,350	78,520	15,560
List selling price	₹250	₹250	₹250	₹250
Actual selling price	₹245	₹236	₹228	₹232
No. of sale visits	6	12	16	10
No. of purchase orders	12	18	35	24
No. of delivery kilometres	280	350	450	400

It's four activities and cost drivers are:

Activity	Cost Driver Rate
Sale visits	₹750 per sale visit
Order taking	₹800 per purchase order
Deliveries	₹10.50 per delivery km travelled
Product handling cost	₹2.50 per case sold

Required

(i) COMPUTE the customer level operating income.

(ii) ANALYZE the profitability for each customer.

6. Bookmark LLP is a publishing firm that started operations very recently. The firm has published "Advanced Learner's Dictionary" this first year, that have been sold to 3 distributors PER, MGH and WLY. The firm's financials reflect profits in its first year of operations. The management is pleased with the results. However, they are interested in finding out how profitable each customer is. This would help them formulate their sales strategy.

Particulars	PER	MGH	WLY
Sales units p.a.	1,000	950	1,250
Sale price (gross)	250	250	250
Payment terms	3/10 net 30	net 30	3/10 net 30
Sales returns	0.5%	0%	10%
Delivery terms	FOB destination	FOB destination	FOB shipping point

In order to get market share, PER and WLY have been extended credit terms to avail discount if payment is made within 10 days. Customer MGH does not have much bargaining power and hence has been allowed only 30 days' credit period without any benefit of availing discount for early payment. Both PER and WLY have made payments within 10 days to avail of the discount extended.

On the cost front, variable cost of goods sold attributable to the net sales to customers PER, MGH and WLY are ₹1,50,000, ₹1,42,500, and ₹1,87,500 respectively. Key metrics of customer assignable marketing, administrative and distribution costs are as below:

Activity	Activity Driver	No. of Units of Activity Driver			Cost Driver Rate (₹)
		PER	MGH	WLY	
Order taking and processing	# of orders	4	2	15	300
Expedited / rush orders	# of orders	1	-	5	250
Delivery costs	# distance in km.	100	50	-	80
Sale return processing	# of returns	1	-	8	150
Billing cost	# of invoices	4	2	15	50
Customer visit	# of visits	1	-	5	800
Inventory carrying cost *	# 1 per unit	1,000	950	1,250	10

** Assume no opening and closing stock*

Fixed cost that are not assignable to any customer is ₹1,00,000 p.a.

Required

(i) PREPARE the customer wise profitability statement as also the overall profitability statement of Bookmark LLP.

(ii) RECOMMEND a strategy for Bookmark LLP regarding its customers.

Pareto Analysis

7. Generation 2050 Technologies Ltd. develops cutting-edge innovations that are powering the next revolution in mobility and has nine tablet smart phone models currently in the market whose previous year financial data is given below:

Model	Sales (₹'000)	Profit-Volume (PV) Ratio
Tab - A001	5,100	3.53%
Tab - B002	3,000	23.00%
Tab - C003	2,100	14.29%
Tab - D004	1,800	14.17%
Tab - E005	1,050	41.43%
Tab - F006	750	26.00%
Tab - G007	450	26.67%
Tab - H008	225	6.67%
Tab - I009	75	60.00%

Required

(i) Using the financial data, carry out a Pareto ANALYSIS (80/20 rule) of Sales and Contribution.

(ii) DISCUSS your findings with appropriate RECOMMENDATIONS.

8. The information given below pertains to ABC Enterprises, a specialized car garage door installation company. ABC Enterprises use to get multiple service calls from the customers with variety of requirements. They may have to Install, Replace, Adjust or Lubricate some part or other to make the door functional. They work with 5 major parts as given in the table, namely Door, Motor, Track, Trimmer and T -Lock.

Sr.No.	Parts	Type of Service				Total
		Install	Replace	Adjust	Lubricate	
1	Door	2	5	1	0	**8**
2	Motor	3	2	16	9	**30**
3	Track	5	0	6	6	**17**
4	Trimmer	14	6	0	0	**20**
5	T-Lock	5	0	1	0	**6**
6	Miscellaneous	0	2	1	1	**4**
	Total	**29**	**15**	**25**	**16**	**85**

Required

(i) Using the above data, carry out a Pareto Analysis (80/20 rule) of Total Parts.

(ii) Using the same data carry out the second level Pareto Analysis on the type of services with respect to Motors only.

(iii) Give your RECOMMENDATIONS on the basis of your calculations in (i) and (ii) above.

(Do calculations to two decimals only)

ANSWERS/ SOLUTIONS

1. (i) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Processing Time}}{\text{Inspection Time + Process Time + Queue Time + Move Time + Wait Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days} + 16.0 \text{ days}} = 11.67\%$$

Interpretation

In AKG, the MCE is 11.67%, which means that 88.33% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non -value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(ii) Percentage of Time Spent on Non- Value Added Activities

= 100% -11.67%

= 88.33%

(iii) Delivery Cycle Time

= 0.5 days + 2.8 days + 4.0 days + 0.7 days + 16 days

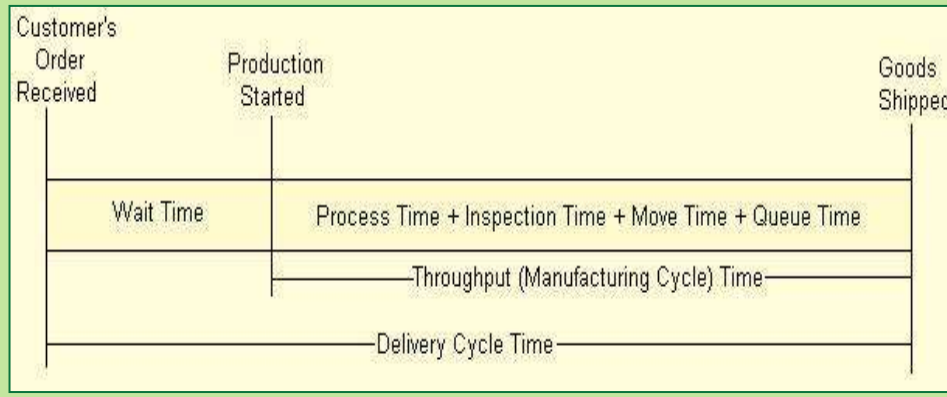
= 24 days

(iv) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 0 \text{ days} + 0.7 \text{ days} + 16 \text{ days}}$$

= 14%

Alternative



(i) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Value Added Time (Processing Time)}}{\text{Throughput (Manufacturing Cycle) Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days}}$$

= 35%

Interpretation

In AKG, the MCE is 35%, which means that 65% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non -value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(ii) Percentage of Time Spent on Non- Value Added Activities

= 100% -35%

= 65%

(iii) Delivery Cycle Time

= 0.5 days + 2.8 days + 4.0 days + 0.7 days + 16 days

= 24 days

(iv) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 0 \text{ days} + 0.7 \text{ days}}$$

= 70%

Note that MCT does not include the *waiting time* before the "order is received by manufacturing" (**i.e. receipt time**).

Examples of non value added cycle time include the time the product spends waiting for parts or for the next stage in the production process, being inspected or repaired or being moved.

This question has been solved in two different ways

Wait time: from start of production to completion.

In the first way, "Waiting Time" has been considered as the time product spends waiting for parts etc. from the start of production to completion i.e. in the *production process*. In this case "Waiting Time" is a non- value- added activity and part of MCT and will reduce MCE.

Wait time: from order being placed to start of production.

In second way, "Waiting Time" has been considered as the time between 'customer places order' and 'order received by manufacturing department', in other words it is the time product spends *before the production process starts*. MCT does not include the *waiting time* before the 'order is received by manufacturing department'. Therefore, the same has not been considered for the MCE calculations.

2. (i) The reported income from operations does not accurately measure performance because the service department charges are based on revenue. Revenue is not associated with the profit centre manager's use of the service department services. For example, the Reservations Department serves only the Passenger Division and number of reservations requested by Cargo Division is NIL. Thus, by charging this cost based on revenue, these costs are incorrectly charged to the Cargo Division. Further, the Passenger Division requires additional personnel. Since these personnel must be trained, the training costs assigned to the Passenger Division should be greater than the Cargo Division.

(ii)

ABC Airlines
Divisional Income Statement
For the Year Ended March 31, 2024

Particulars	Cargo Division (₹)	Passenger Division (₹)	Total (₹)
Revenue	42,00,000	42,00,000	84,00,000
Less: Operating Expenses (excluding service department charges)	36,00,000	28,50,000	64,50,000
Gross Margin	6,00,000	13,50,000	19,50,000
Less: Service Department Charges			
Training	1,28,000 $\left(\frac{200}{1,000}\times₹6,40,000\right)$	5,12,000 $\left(\frac{800}{1,000}\times₹6,40,000\right)$	6,40,000
Flight Scheduling	1,75,000 $\left(\frac{350}{600}\times₹3,00,000\right)$	1,25,000 $\left(\frac{250}{600}\times₹3,00,000\right)$	3,00,000
Reservation	NIL	2,10,000 $\left(\frac{7,000}{7,000}\times₹2,10,000\right)$	2,10,000
Operating Income	**2,97,000**	**5,03,000**	**8,00,000**

3. (i) Analysis

The product costs per unit along with the respective contribution per unit may be calculated either by employing an ABC approach or alternatively by using the existing basis for the allocation of variable overhead cost.

The current scenario of product costing suggests that 'Dwarfs' should be produced as per the request of VGG because the contribution to sales ratio is 31.29%. However, the current scenario of product costing also suggests that XYZ should not undertake production of 'The Star' at a selling price of ₹740 per unit since the estimated contribution to sales ratio is 15.88% is lower than the desired contribution to sales ratio of 28%.

Activity based costing approach ensures greater accuracy by using multiple cost drivers and determines areas generating the greatest profit or loss. Table [(d)] shows how much the contribution to sales (%) for each product changes when the overhead allocation method changes to ABC. As shown in Table, contribution to sales ratio on 'The Star' increased to 31.87% from 15.88% while contribution to sales ratio on 'Dwarfs' reduced from 31.87% to - 29.23%.

Thus, XYZ should opt to produce 'The Star' for VGG as contribution to sales ratio is 31.87 which is higher than the desired one.

(ii) The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers and to improve strategic and operational decisions in an organisation. Kaplan and Cooper divide ABM into Operational and Strategic.

Operational ABM covers the actions that increase efficiency, lower cost (i.e. reduce the cost driver rate of activities) and lead to higher revenue through better resources utilisation- in short, the action required to do things right. In other words, it is all about *'doing things right'*, using ABC information to improve efficiency. It also helps in identifying and improving value added activities and removing non-value-added activities as to reduce cost without distorting product value.

Strategic ABM is about *'doing the right things'*. It uses ABC information to determine which products is to be manufactured and which activities is to be used. XYZ can also use this for customer profitability analysis, identifying that which customers are the most profitable and focusing on them more.

A risk with ABM is that some activities have an implicit value are not reflected in a financial value added to any product. For example, a good and pleasant working environment can attract and retain the best human resources, but might not be identified as value added activities in operational ABM.

ABM provides managers an understanding of costs and helps teams to make certain decisions that benefit the whole organizations and not just their own activities.

Therefore, some companies like XYZ may adopt ABM to improve their operations and obtain useful activity information.

Workings

(a) Direct Material Cost per unit

	The Star	Dwarfs
Total Costs (₹)	22,50,000	750,000
Production units	10,000	20,000
Cost per unit (₹)	225.00	37.50

(b) Direct Labour Cost per unit

	The Star	Dwarfs
Total Costs (₹)	15,00,000	5,00,000
Production units	10,000	20,000
Cost per unit (₹)	150.00	25.00

(c) Variable Overheads

Material Related

Overhead Cost = 30% × ₹120,00,000 = ₹36,00,000

Total Volume Factor

Particulars	Units	Required per unit	Total Volume
The Star	10,000	5	50,000
Dwarfs	20,000	8	1,60,000
Other	80,000	5	4.00,000
Total Volume Factor			6,10,000

Overhead *per unit of volume* = ₹36,00,000/ 6,10,000 = ₹5.90.

Therefore, Overhead Cost *per product unit* will be as follows:

The Star	5	₹5.90	29.50
Dwarfs	8	₹5.90	47.20

Labour Related

Overhead Cost = 70% × ₹120,00,000 = ₹84,00,000

Total Operations Factor

Particulars	Units	Required per unit	Total Volume
The Star	10,000	7	70,000
Dwarfs	20,000	6	1,20,000
Other	80,000	5	4,00,000
Total Operations Factor			5,90,000

Overhead *per operation* = ₹84,00,000/ 5,90,000 = ₹14.24.

Therefore, Overhead Cost *per product unit* will be as follows:

The Star	7	₹14.24	99.68
Dwarfs	6	₹14.24	85.44

(d) Product Information (by unit) is as follows:

Particulars	The Star		Dwarfs	
	Current Scenario	ABC Basis	Current Scenario	ABC Basis
Selling Price ...(A)	740.00	740.00	151.00	151.00

Direct Material Cost	225.00	225.00	37.50	37.50
Direct Labour Cost	150.00	150.00	25.00	25.00
Variable Overhead Cost:				
Material Related	90.00	29.50	15.00	47.20
Labour Related	157.50	99.68	26.25	85.44
Total Variable Cost …(B)	622.50	504.18	103.75	195.14
Contribution …(A) - (B)	117.50	235.82	47.25	(44.14)
Contribution to Sales (%)	15.88	31.87	31.29	(29.23)

Total Variable Overheads are 120L. Out of which 30% i.e. 36L relates to material and 70% i.e. 84L relates to Labour. Now allocate variable overheads into product units using % of total direct material cost and total direct labour cost.

VO Material Related 40% of Material Cost

₹{36L/ (22.5L + 7.5L + 60L)}

VO Labour Related 105% of Labour Cost

₹{84L/ (15L + 5L + 60L)}

The Star & Dwarf

VO Material Related ₹90 = 40% of ₹225;

₹15 = 40% of ₹37.5

VO Labour Related ₹157.5 = 105% of ₹150;

₹26.25 = 105% of ₹25

4. (i) Statement of the Customer Profitability at JSM

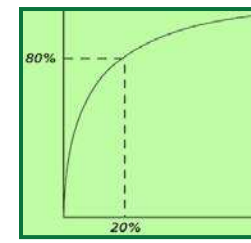
Particulars	A (₹)	B (₹)	C (₹)	D (₹)	E (₹)
Margin …(A) (no. of units sold × margin per unit)	36,000	60,000	70,000	56,000	80,000
Customer Attributable Costs:					
Cost of Processing Purchase Orders (no. of purchase order × cost of processing the order)	20,000	60,000	50,000	40,000	20,000
Product Handling Cost (no. of units sold × cost of handling per item)	900	1,200	1,500	1,050	1,200

Delivery Cost (no. of deliveries × km per delivery × cost per km)	900	2,220	900	3,000	750
Cost of Rush Deliveries (no. of rush deliveries × cost per rush delivery)	---	2,400	---	---	---
Total …(B)	21,800	65,820	52,400	44,050	21,950
Profit (or Loss) …(A) – (B)	14,200	–5,820	17,600	11,950	58,050
Profit/ Net Revenue (in % age)	39.44%	–9.7%	25.14%	21.34%	72.56%

Analysis

From the above, it can be concluded that customer A, C, and D are less profitable than customer E; whereas customer B is causing losses. Customer B provides a positive operating margin but is unprofitable when customer attributable costs are considered. This is because customer B requires more sales orders than the other customers. In addition, the customer has rush delivery costs.

This analysis can make sense, if interpreted, considering the 'Pareto Analysis'. Pareto Analysis named after economist Vilfredo Pareto, who specifies that 80% of consequences come from 20% of the causes i.e. 20% of customer provide 80% of the profit. Means input and output may not be balanced. (Curve of revenue, as shown in figure; represent that initially large amount of revenue comes from small portion of sales/customers only - such small proportion of customers is critical to success of entity).



Although here proportion of 80:20 don't hold truth, but for JSM; major portion of profit (around 60%) coming from customer E only, therefore, customer E is critical to JSM. Special attention can then be given to enhancing the relationships with the customer E to ensure that customer E cannot migrate to other competitors. In addition, greater emphasis can be given to attract new customers that have the same attributes as the most profitable customer E.

Further, there is no point in serving customer B, but instead of refusing to trade with customer B, if possible; it may be better to turn it into profitable customer. Customer B can be made profitable if action is taken to convince the customer B to place a smaller number of larger quantity orders and avoid rush deliveries. If customer B cannot be convinced to change its buying behavior, selling prices should be increased to cover the extra resources consumed.

(ii) Supply chain management is the technique to integrate the supplier, manufacturing, store, and distribution function efficiently; in order to procure, produce and distribute at/in right time, quantity and place respectively. For effective distribution, CRM can be enabling tool. CRM is an integrated approach to manage and coordinate customer interactions to

identifying, acquiring, and retaining customers. CRM enables businesses to understand and retain customers (through better customer experience) apart from attracting new customer, in order to increase profitably and decrease customer management costs. CRM system, comprises following three fundamental aspects to facilitate building relationship with profitable customers –

- **Operative CRM** takes care of individual transactions and is used by operational team. Interactions by customers are kept in the data base and are used later by the service, sales, and marketing team for operational decisions. In JSM, the staff who is responsible to deal with customer must be given access to customer's details including all the information of activities performed earlier. This will enhance the JSMs' staff's efficiency to deal with customer-facing processes in a better way.
- **Analytical CRM** analyses the data created on the operational side of the CRM effort for evaluation and prediction of customer behavior. In JSM, analytical CRM can highlight the patterns in customers' behavior which will help sale team while pitching the product at JSM.
- **Collaborative CRM** ensures that information about customer must flow seamlessly throughout the supply chain, majorly distribution channel; in form of collaborative effort by all associated department of JSM to increase the quality of services provided to customers. Increase in utility at customer end will result in increased loyalty. Collaborative CRM comprises interactive technology like email, digital media to simplify the communications between customers and staff which would help in building relationships.

5. (i) Customer's Profitability Statement

Particulars	Customer- A	Customer- B	Customer- C	Customer- D
Sales (cases)	**7,580**	**38,350**	**78,520**	**15,560**
	(₹)	(₹)	(₹)	(₹)
List Price *per case*	250	250	250	250
Less: Discount	5 (₹250 × 2%)	14 (₹250 × 5.6%)	22 (₹250 × 8.8%)	18 (₹250 × 7.2%)
Actual Selling Price (Net of Discounts) *per case*	245	236	228	232
Less: Variable Cost *per unit*	218	218	218	218
Contribution *per unit*	27	18	10	14
Total Contribution	2,04,660 (₹27 × 7,580 units)	6,90,300 (₹18 × 38,350 units)	7,85,200 (₹10 × 78,520 units)	2,17,840 (₹14 × 15,560 units)

Less: Additional Overheads				
Visit Cost	4,500 (6 × ₹750)	9,000 (12 × ₹750)	12,000 (16 × ₹750)	7,500 (10 × ₹750)
Order Processing Cost	9,600 (12 × ₹800)	14,400 (18 × ₹800)	28,000 (35 × ₹800)	19,200 (24 × ₹800)
Delivery Cost	2,940 (280 × ₹10.50)	3,675 (350 × ₹10.50)	4,725 (450 × ₹10.50)	4,200 (400 × ₹10.50)
Product Handling Cost	18,950 (7,580 × ₹2.50)	95,875 (38,350 × ₹2.50)	1,96,300 (78,520 × ₹2.50)	38,900 (15,560 × ₹2.50)
Profit *per customer*	1,68,670 (11.81% of total)	5,67,350 (39.72% of total)	5,44,175 (38.10% of total)	1,48,040 (10.37% of total)
Profit *per customer per case*	**22.25**	14.79	6.93	9.51

(ii) Going by volume of cases sold, customer C is the biggest customer accounting for 56% of total sales volume, followed by customer B (27%), customer D (11%) and customer A (6%). However, in terms of profit per customer, Customer B is the most profitable accounting for 39.72% of the cumulative customer profits of ₹14,28,235. Customer C contributes to 38.10% of the same. Comparing customers B and C, customer B is more profitable despite accounting for sales volume that is less than half of customer C (customer C's 56% of sale volume versus customer B's 27%). The primary reason for this is because the discount given to customer C (8.8%) is higher than that given to customer B (5.6%). The difference is terms of sale could be due to the fact that customer C is the biggest customer and hence is able to negotiate for a higher discount. Consequently, for each case sold, customer C gets an additional discount of ₹8 as compared to customer B. This is reflected in the contribution generated per case. Sale of one case to customer C generates ₹10 contribution versus sale of one case to customer B generates ₹18 contribution. This has a huge impact on profitability. In terms of profit generated per case sold, customer C has the lowest contribution at ₹6.93 per case. The company may review whether this difference in terms of sale to each of its customers is justified. If the discount to customer C at 8.8% was initially extended to promote sales, negotiations can be made to reduce this to mutually acceptable rates. However, care must be taken not to lose customer C to competitors.

Customer D is the least profitable accounting for just 10.37% of the total customer profits. In terms of sale volume, the customer ranks third providing 11% volume. However, the customer is not profitable because of the following reasons:

(a) A *discount rate* of 7.2% is provided to the customer. Each case sold after a discount of ₹18 per case, generates a contribution per case of only ₹14 per case. This is much lower compared to the contribution per case of customer A (₹27 per case) and customer B (₹18 per case). This discount policy may need to be reviewed. One scenario where such a high discount may be justified would be where customer D supplies the products that it manufactures at a discounted rate to a sister concern of the company. Therefore, at a parent company / overall level, the higher discount rate for a low volume customer D may be justified.

(b) For a customer that provides 11% of volume, the *number of site visits* during the year were 10. Customer C giving 56% of volume had only 16 visits and customer B giving 27% of volume had only 12 visits. This indicates that customer D, although a smaller customer, requires more visits than regular customers. Therefore, site visit costs are higher for this customer. The reason for a higher handholding by the company for this customer has to be analyzed. For example, one possible reason could be that customer D requires the cases customized to its production requirement. This may require more site visits by the company's personnel. To resolve this, due to the extra work involved, the company may wish to charge a higher sale price for the cases customized for customer D. In another other scenario, it may choose to charge the customer a fixed rate for each site visit.

(c) For a customer that provides 11% of volume, the *number of orders* placed in a year are 24. Customer C giving 56% of volume placed 35 orders in a year and customer B giving 27% of volume placed 18 orders in a year. This indicates that customer D, although a small customer, places orders more frequently than other larger customers. Therefore, order processing costs are higher for customer D. The company may revise *ordering schedule* for this customer or find out the reason for higher proportion of purchase orders, in order to pass on some of the cost to the customer. For example, let us say, customer D has an agreement with the company to provide cases "just in time" resulting in more frequent orders as compared to other customers. Therefore, the company is providing flexibility in procurement to customer D. For this convenience, it may pass on some of the ordering cost to customer D by way of a higher selling price or a lower discount.

(d) Again, given the volume, the *number of deliveries* to customer D (400) is at a higher proportion compared to the larger customers C (450) and B (350). The company may revise *delivery schedule* for this customer or find out the reason for higher proportion of deliveries, in order to pass on some of the cost to the customer. For example, let us say, customer D has an agreement with the company to provide cases "just in time" resulting in more frequent deliveries as compared to other customers. Therefore, the company is providing flexibility in procurement to customer D. For this convenience, it may pass on some of the delivery cost to customer D by way of a higher selling price or a lower discount.

Customer A is the smallest customer providing only 6% of total sale volume. However, with a contribution per case at ₹27 per case and a profit per case at ₹22.25 per case, it is the most profitable of all customers. The primary reason for this is the discount of 2% offered is much lower than other customers. Each case sold to customer A yields a contribution of ₹27 as compared to a contribution of ₹10 from customer C, the biggest customer. Possible reason for a lower discount maybe customer A, being a smaller player, may have lesser bargaining power compared to other customers. If the company wishes to have a longer business relationship with customer A, it may wish to provide more favorable discount terms to this party. However, since customers B and C are much larger customers, any benefit passed onto customer A should not impact the company adversely in the long run. For example, to get more orders from customer A, the company gives a 10% discount to the party. Consequently, the profitability of customer A will decrease. Let us say customer A places huge orders due to which there are capacity constraints within the company. Sales to customers B and C, the current larger customers, may be impacted. This could affect the company adversely in terms of lost sales to customers B and C and loss of business relationships with these parties. Therefore, careful consideration should be given before extending discounts to improve sales from customer A.

As regards *product handling cost*, each customer is currently charged ₹2.5 per case sold. The company, if feasible, apply Activity Based Costing technique to find out if this can be allocated based on the cost driver for each customer. Let us say, packing cost before shipment is part of product handling cost. If customer B requires special packing to ship the goods, then customer B needs to be allocated a higher packaging cost as compared to the others. This cost can be recouped from customer B through a higher selling price.

6. (i) Customer Wise Profitability Statement and Overall Profitability Statement

SN.	Particulars	PER	MGH	WLY	Total ₹
A	Sales (net proceeds) –Table 1	2,41,288	2,37,500	2,72,812	7,51,600
B	Variable Cost of Goods Sold	1,50,000	1,42,500	1,87,500	4,80,000
C	*Assignable- Marketing and Administration Cost* - Table 2				
	• Order Taking and Processing	1,200	600	4,500	6,300
	• Sale Return Processing	150	-	1,200	1,350
	• Billing Cost	200	100	750	1,050
	• Customer Visit	800	-	4,000	4,800
	Total Assignable Marketing and Administration Cost	2,350	700	10,450	13,500

D	*Assignable- Distribution Cost* - Table 2				
	• Expedited / Rush Orders	250	-	1,250	1,500
	• Delivery Costs	8,000	4,000	-	12,000
	• Inventory Carrying Cost	10,000	9,500	12,500	32,000
	Total Assignable Distribution Cost	18,250	13,500	13,750	45,500
E	*Non- Assignable Fixed Cost*	-	-	-	1,00,000
F	Total Costs (B+C+D+E)	1,70,600	1,56,700	2,11,700	6,39,000
G	Net Profit (Step A - F)	70,688	80,800	61,112	1,12,600
H	Profit % of Sales (G / A)	29%	34%	22%	15%

Workings

Table 1: Customer Sales Analysis - Revenue Analysis

All figures in ₹

Particulars	PER	MGH	WLY	Total ₹
Sales {Sale Units × Sale Price (gross)}	2,50,000	2,37,500	3,12,500	8,00,000
Less: Sale Return (Step 1 × Return%)	1,250	-	31,250	32,500
Net Sales	2,48,750	2,37,500	2,81,250	7,67,500
Less: Cash Discount	7,462	-	8,438	15,900
Net Proceeds	2,41,288	2,37,500	2,72,812	7,51,600
Final Collections vs Original Sale	97%	100%	87%	94%

Table 2: Assignable Marketing, Administrative and Distribution Costs

All figures in ₹

Particulars	PER	MGH	WLY	Total
Order Taking and Processing (# of orders × cost per order)	1,200	600	4,500	6,300
Expedited / Rush Orders (# of orders × cost per order)	250	-	1,250	1,500
Delivery Costs (Distance in km. × cost per km)	8,000	4,000	-	12,000
Sale Return Processing (# of returns × cost per return)	150	-	1,200	1,350
Billing Cost (# of invoices × cost per invoice)	200	100	750	1,050
Customer Visit (#of customer visits × cost per visit)	800	-	4,000	4,800
Inventory Carrying Cost (# of units × inventory carrying cost p.u.)	10,000	9,500	12,500	32,000

(ii) Customer strategy: It can be seen that Bookmark LLP has an overall profit of ₹1,12,600 or 15% of sales. While the performance is good, the firm's management has to analyze customer wise profitability.

(a) WLY is the largest customer in terms of units sold. However, Table 1 above shows that sale returns at 10%, which is unusually large compared to other customers. Bookmark LLP has to investigate why the returns are of such large quantity. Possibly, there could be communication gap between the firm and WLY. Possible non-conformity in goods delivered has resulted in returns. Only 87% of the original sale value is being collected. The root cause of the problem has to be identified and rectified. This will also reduce the sale return processing costs.

(b) WLY has placed many rush orders, which requires Bookmark LLP to ship these orders immediately, using costlier means of transportation. Currently, there is no charge for shipping rush orders. In order to deter WLY from repeatedly placing rush orders, Bookmark LLP can charge the customer for shipping such orders beyond a threshold number of orders. Say rush orders beyond 2 orders will be charged to the customer.

(c) WLY has placed 15 orders for 1,250 units. Comparatively, PER and MGH placed 4 and 2 orders for approximately 1,000 units each. WLY can be requested to place fewer orders with larger quantity per order, in order to optimize ordering cost.

(d) Being the largest customer, WLY has 5 sale visits from Bookmark LLP, which is more than the other 2 customers. Priced at ₹800 per visit, this very costly. At the same time, WLY is yielding the least profit. Therefore, Bookmark LLP should reassess if resources can be reallocated to the other two more profitable customers. That may encourage more sales from higher yielding customers.

(e) Since WLY seems to need more hand-holding in terms of more sales visits as well as higher rush orders, Bookmark LLP may assess if it wants to discontinue or reduce business. Alternatively, it may reassign these resources towards existing or newer customers to get better profitability. However, if WLY can be migrated to a higher profitability, Bookmark LLP need not lose out its market share.

(f) Customer MGH is the most profitable yielding 34% return over sales, although in terms of 'Advanced Learner's Dictionary' ordered, it is the smallest of the three. Bookmark LLP can assess if it can extend some discount, in order to encourage more sales. Currently, Customer MGH does not get any discount.

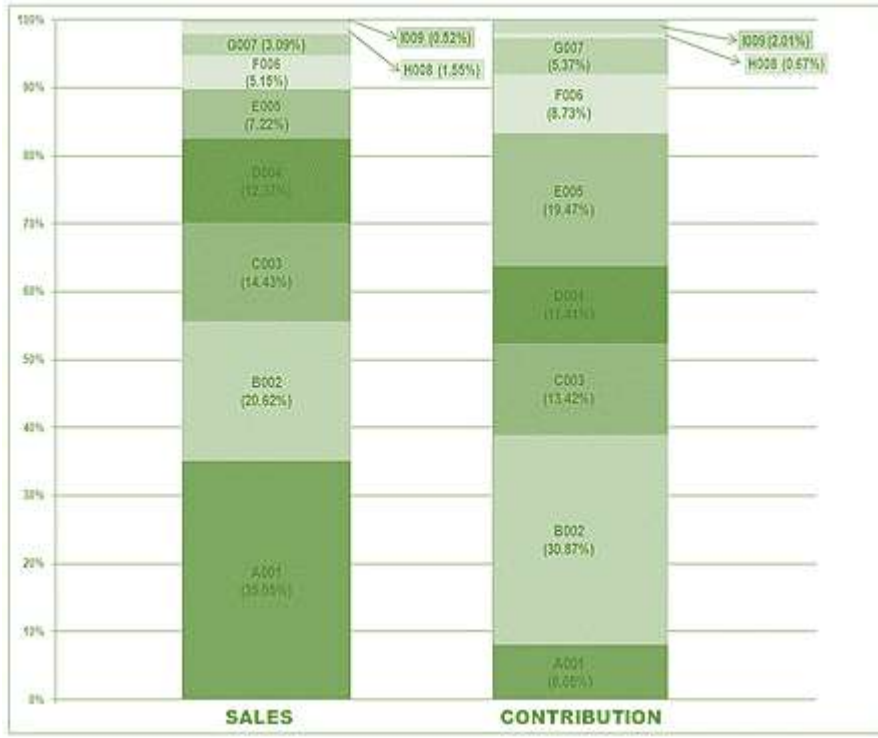
(g) Bookmark LLP can assign more sales visits to Customer PER and MGH to encourage them purchase more as well as provide high quality customer service.

7. "Pareto Analysis"

Model	Sales (₹'000)	% of Total Sales	Cumulative Total	Model	Cont. (₹'000)	% of Total Cont.	Cumulative Total %
Pareto Analysis Sales				**Pareto Analysis Contribution**			
A001	5,100	35.05%	35.05%	B002	690	30.87%	30.87%
B002	3,000	20.62%	55.67%	E005	435	19.47%*	50.34%
C003	2,100	14.43%	70.10%	C003	300	13.42%	63.76%
D004	1,800	12.37%	82.47%	D004	255	11.41%	75.17%
E005	1,050	7.22%	89.69%	F006	195	8.73%*	83.90%
F006	750	5.15%	94.84%	A001	180	8.05%	91.95%
G007	450	3.09%	97.93%	G007	120	5.37%	97.32%
H008	225	1.55%	99.48%	I009	45	2.01%	99.33%
I009	75	0.52%	100.00%	H008	15	0.67%	100.00%
	14,550	100.00%			2,235	100.00%	

(*) *Rounding - off difference adjusted.*

Diagram Showing "Sales and Contribution"



Recommendations

Pareto Analysis is a rule that recommends focus on the most important aspects of the decision making in order to simplify the process of decision making. The very purpose of this analysis is to direct attention and efforts of management to the product or area where best returns can be achieved by taking appropriate actions.

Pareto Analysis is based on the 80/20 rule which implies that 20% of the products account for 80% of the revenue. But this is not the fixed percentage rule; in general business sense, it means that a few of the products, goods or customers may make up most of the value for the firm.

In present case, four models namely A001, B002, C003, D004 account for around 80% (82.47%) of total sales whereas around 80% (83.90%) of the company's contribution is derived from five models namely B002, E005, C003, D004 and F006.

Models B002 and E005 together account for 50.34% of total contribution but having only 27.84% share in total sales. So, these two models are the key models and should be the top priority of management. Both C003 and D004 are among the models giving 80% of total contribution as well as 80% of total sales so; they can also be clubbed with B002 and E005 as key models. The management of the company should allocate maximum resources to these four models.

Model F006 features among the models giving 80%of total contribution with a relatively lower share in total sales. Management should focus on its promotional activities.

Model A001 accounts for 35.05% of total sales with only 8.05% share in total contribution. Company should review its pricing structure to enhance its contribution.

Models G007, H008 and I009 have a lower share in both total sales as well as contribution. Company can delegate the pricing decision of these models to the lower levels of management, thus freeing themselves to focus on the pricing decisions for key models.

8. (i) Statement Showing "Pareto Analysis of Total Parts"

Parts	No. of Items	% of Total Items	Cumulative Total
Motor	30	35.29	35.29%
Trimmer	20	23.53	58.82%
Track	17	20.00	78.82%
Door	8	9.41	88.23%
T-Lock	6	7.06	95.29%
Miscellaneous	4	4.71	100.00%

(ii) Statement Showing "Pareto Analysis of Type of Services (Motor)"

Type of Services	No. of Items	% of Total Items	Cumulative Total
Adjust	16	53.33	53.33%
Lubricate	9	30.00	83.33%
Install	3	10.00	93.33%
Replace	2	6.67	100.00%
	30		

(iii) Pareto Analysis is a rule that recommends focus on most important aspects of the decision making in order to simplify the process of decision making. The very purpose of this analysis is to direct attention and efforts of management to the area where best pay-off can be achieved by taking appropriate actions.

Pareto Analysis is based on the 80/20 rule which implies that 20% of the products account for 80% of the revenue. But this is not the fixed percentage rule. In a general business sense, it means that a few of the products, goods or customers may make up most of the value for the firm.

The present case stands in a difference to 80/20 rule. Because the company installs doors, they sometimes have multiple service calls to install each door piece by piece. They may have to install, replace, adjust, or lubricate some part to get the door working properly. They work with five main parts: door, motor, track, trimmer and t-lock. The service calls with reference to motors are heavy and accounted for as much as 35.29% of the number of calls attended. Motor together with trimmer accounted for 58.82%. So, these two parts are to be considered as key parts and ABC enterprises must be ever ready to cater to all provisional requirements for attending these classes without any inordinate delay. Any delay in service these calls is likely to damage its service rendering reputation within a very short span of time. Further, the second level Pareto Analysis on motors has revealed a particular reference to the service problems related to motors. Adjustments and Lubrication issues cover up 83.33% of the total service problems exclusively connected to Motors. So, ABC Enterprise must direct its best efforts and develop specific expertise to solve these problems in the best interest of the customer.

NOTES