

CHAPTER 2

ACTIVITY BASED COSTING

Illustration 1

ABC Ltd. is a multiproduct company, manufacturing three products A, B and C. The budgeted costs and production for the year ending 31st March, 20X8 are as follows:

Particulars	A	B	C
Production quantity (Units)	4,000	3,000	1,600
Resources per Unit:			
- Direct Materials (Kg.)	4	6	3
- Direct Labour (Minutes)	30	45	60

The budgeted direct labour rate was ₹10 per hour, and the budgeted material cost was ₹ 2 per kg. Production overheads were budgeted at ₹ 99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed an Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

1. Budgeted overheads were analysed into the following:

	(₹)
Material handling	29,100
Storage costs	31,200
Electricity	39,150

2. The cost drivers identified were as follows:

Material handling	Weight of material handled
Storage costs	Number of batches of material
Electricity	Number of Machine operations

3. Data on Cost Drivers was as follows:

	A	B	C
For complete production: Batches of material	10	5	15
Per unit of production: Number of Machine operators	6	3	2

You are requested to:

1. PREPARE a statement for management showing the unit costs and total cost of each product using the absorption costing method.
2. PREPARE a statement for management showing the product costs of each product using the ABC approach.
3. STATE what are the reasons for the different product costs under the two approaches?

[Answer: ₹ 21.50; ₹ 32.25; ₹ 33; ₹ 86,000; ₹ 96,750; ₹ 52,800]

[Answer: ₹ 1,00,360; ₹ 86,940; ₹ 48,256]

Illustration 2

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost
Power	Kilowatt hours	50,000 kilowatt hours	₹ 2,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	₹ 3,00,000

The company makes three products M, S and T. For the year ended March 31, 20X9, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

- (i) COMPUTE the costs allocated to each product from each activity.
- (ii) CALCULATE the cost of unused capacity for each activity.
- (iii) DISCUSS the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

[Answer: M= ₹ 40,000; ₹ 1,05,000; S= ₹ 80,000; ₹ 75,000; T= ₹ 60,000; ₹ 90,000]

[Answer: ₹ 20,000; ₹ 30,000]

Illustration 3

ABC Ltd. Manufactures two types of machinery equipment Y and Z and applies/absorbs overheads on the basis of direct-labour hours. The budgeted overheads and direct-labour hours for the month of December, 20X8 are ₹ 12,42,500 and 20,000 hours respectively. The information about Company's products is as follows:

	Equipment	Equipment
	Y	Z
Budgeted Production volume	2,500 units	3,125 units
Direct material cost	₹ 300 per unit	₹ 450 per unit
Direct labour cost		
Y : 3 hours @ ₹ 150 per hour	₹ 450	
X : 4 hours @ ₹ 150 per hour		₹ 600

ABC Ltd.'s overheads of ₹ 12,42,500 can be identified with three major activities:

Order Processing (₹ 2,10,000), machine processing (₹ 8,75,000), and product inspection (₹ 1,57,500). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection hours
Y	350	23,000	4,000
Z	250	27,000	11,000
Total	600	50,000	15,000

Required:

- (i) Assuming use of direct-labour hours to absorb/apply overheads to production, COMPUTE the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.
- (ii) Assuming use of activity-based costing, COMPUTE the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.
- (iii) ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, CALCULATE the amount of cost distortion (under-costed or over-costed) for each equipment.

[Answer to (i): ₹ 936.38; ₹ 1,298.50]

[Answer to (ii): ₹ 976.80; ₹ 1,266.16]

[Answer to (iii): (₹ 40.42); ₹ 32.34]

Illustration 4

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

- (i) General Supermarket Chains
- (ii) Drugstore Chains
- (iii) Chemist Shops

The following data for the month of April, 20X9 in respect of RST Limited has been reported:

	General Supermarket Chains (₹)	Drugstore Chains (₹)	Chemist Shops (₹)
Average revenue per delivery	84,975	28,875	5,445
Average cost of goods sold per delivery	82,500	27,500	4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity –based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

Activity Area	Cost Driver
Customer purchase order processing	Purchase orders by customers
Line-item ordering	Line-items per purchase order
Store delivery	Store deliveries
Cartons dispatched to stores	Cartons dispatched to a store per delivery
Shelf-stocking at customer store	Hours of shelf-stocking

The April, 20X9 operating costs (other than cost of goods sold) of RST Limited are ₹ 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 20X9 are as follows:

Activity Area	Total costs in April, 20X9 (₹)	Total Units of Cost Allocation Base used in April, 20X9
Customer purchase order processing	2,20,000	5,500 orders
Line-item ordering	1,75,560	58,520 line items
Store delivery	1,95,250	3,905 store deliveries
Cartons dispatched to store	2,09,000	2,09,000 cartons
Shelf-stocking at customer store	28,160	1,760 hours

Other data for April, 20X9 include the following:

	General Supermarket Chains	Drugstore Chains	Chemist Shops
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons shipped per store delivery	300	80	16
Average number of hours of shelf-stocking per store delivery	3	0.6	0.1

Required:

- COMPUTE for April, 20X9 gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.
- COMPUTE the April, 20X9 rate per unit of the cost-allocation base for each of the five activity areas.
- COMPUTE the operating income of each distribution channel in April, 20X9 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?
- DESCRIBE four challenges one would face in assigning the total April, 20X9 operating costs of ₹ 8,27,970 to five activity areas.

[Answer to (i): 2.91%; 4.76%; 9.09%; 3.72%]

[Answer to (ii): 40 order; 3 line item order; 50 delivery; 1 dispatch; 16 hour]

[Answer to (iii): 2.33%; 3.96%; 5.96%]

Illustration 5

Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at ₹ 90 per case and sells to retail customers at a list price of ₹ 108 per case. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Cases sold	4,680	19,688	1,36,800	71,550	8,775
List Selling Price	₹ 108	₹ 108	₹ 108	₹ 108	₹ 108
Actual Selling Price	₹ 108	₹ 106.20	₹ 99	₹ 104.40	₹ 97.20
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	₹ 750 per purchase order
Customer visits	₹ 600 per customer visit
Deliveries	₹ 5.75 per delivery Km travelled
Product handling	₹ 3.75 per case sold
Expedited deliveries	₹ 2,250 per expedited delivery

Required:

- COMPUTE the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.
- STATE what insights are gained by reporting both the list selling price and the actual selling price for each customer?

[Answer to (i): ₹ 53,090; ₹ 2,23,531; ₹ 6,90,375; ₹ 7,39,757; ₹ 274]

Illustration 6

MNP suits is a ready-to-wear suit manufacturer. It has four customers: two wholesale channel customers and two retail-channel customers.

MNP suits has developed the following activity-based costing system:

Activity	Cost driver	Rate in 2004
Order processing	Number of purchase orders	₹ 1,225 per order
Sales visits	Number of customer visits	₹ 7,150 per visit
Delivery-regular	Number of regular deliveries	₹ 1,500 per delivery
Delivery-rushed	Number of rushed deliveries	₹ 4,250 per delivery

List selling price per suit is ₹ 1,000 and average cost per suit is ₹ 550. The CEO of MNP suits wants to evaluate the profitability of each of the four customers in 2003 to explore opportunities for increasing profitability of his company in 2004. The following data are available for 2003:

Item	Wholesale customers		Retail customers	
	W	H	R	T
Total number of orders	44	62	212	250
Total number of sales visits	8	12	22	20
Regular deliveries	41	48	166	190
Rush deliveries	3	14	46	60
Average number of suits per order	400	200	30	25
Average selling price per suit	₹ 700	₹ 800	₹ 850	₹ 900

Required:

- (i) Calculate the customer-level operating income in 2003
- (ii) What do you recommend to CEO of MNP suits to do to increase the company's operating income in 2004?
- (iii) Assume MNP suits' distribution channel costs are ₹ 17,50,000 for its wholesale customers and ₹ 10,50,000 for the retail customers. Also, assume that its corporate sustaining costs are ₹ 12,50,000. Prepare Income statement of MNP suits for 2003.

[Answer to (i): ₹ 24,54,650; ₹ 28,06,750; ₹ 10,46,500; ₹ 11,98,250]

[Answer to (iii): ₹ 34,56,150]

Illustration 7

A B C D Co. Ltd. produces and sells four products A, B, C and D. These products are similar and usually produced in production runs of 10 units and sold in a batch of 5 units. The production details of these products are as follows:

Product	A	B	C	D
Production (Units)	100	110	120	150
Cost per unit:				
Direct material (₹)	30	40	35	45
Direct labour (₹)	25	30	30	40
Machine hour (per unit)	5	4	3	4

The production overheads during the period are as follows:

Particulars	₹	₹
Factory works expenses	22,500	
Stores receiving costs	8,100	
Machine set up costs	12,200	
Cost relating to quality control	4,600	
Material handling and dispatch	9,600	57,000

The cost drivers for these overheads are detailed below:

Cost	Cost drivers
Factory works expenses	Machine hours
Stores receiving costs	Requisitions raised
Machine set up costs	No. of production runs
Cost relating to quality control	No. of production runs
Material handling and dispatch	No. of orders executed

The number of requisitions raised on the stores was 25 for each product and number of orders executed was 96, each order was in a batch of 05 units.

Required:

- (i) Total cost of each product assuming the absorption of overhead on machine hour basis;
- (ii) Total cost of each product assuming the absorption of overhead by using activity base costing; and
- (iii) Show the differences between (i) and (ii) and comment.

[Answer to (i): ₹ 20,500; ₹ 20,900; ₹ 18,600; ₹ 30,750]

[Answer to (ii): ₹ 18,945; ₹ 20,984.7; ₹ 20,688; ₹ 30,129]

[Answer to (iii): Unit cost diff= ₹ 15.55; -₹ 0.77; -₹ 17.40; ₹ 4.14]

Illustration 8

ABC Limited manufactures two radio models, the Nova which has been produced for five years and sells for ₹ 900, and the Royal, a new model introduced in early 2004, which sells for ₹ 1,140. Based on the following Income statement for the year 2004-05, a decision has been made to concentrate ABC Limited's marketing resources on the Royal model and to begin to phase out the Nova model.

ABC Limited Income Statement for the year ending March 31, 2005

Particulars	Royal Model ₹	Nova Model ₹	Total ₹
Sales	45,60,000	1,98,00,000	2,43,60,000
Cost of Goods sold	31,92,000	1,25,40,000	1,57,32,000
Gross margin	13,68,000	72,60,000	86,28,000
Selling & Administrative Expenses	9,78,000	58,30,000	68,08,000
Net Income	3,90,000	14,30,000	18,20,000
Unit Produced and sold	4,000	22,000	
Net Income per unit sold	97.50	65	

The standard unit costs for the Royal and Nova models are as follows:

Particulars	Royal Model ₹	Nova Model ₹
Direct materials	584	208
Direct Labour		
Royal (3.5 hrs x ₹ 12)	42	
Nova (1.5 hrs x ₹ 12)		18
Machine usage		
Royal (4 hrs x ₹ 18)	72	
Nova (8 hrs x ₹ 18)		144
Manufacturing overheads (applied on the basis of machine hours at a pre-determined rate of ₹ 25 per hour)	100	200
Standard Cost	798	570

ABC Ltd.'s Controller is advocating the use of activity-based costing and activity-based cost management and has gathered the following information about the company's manufacturing overheads cost for the year ending March 31, 2005.

Activity centre (Cost driver)	Traceable Costs ₹	Number of Events		
		Royal	Nova	Total
Soldering (Number of solder joints)	9,42,000	3,85,000	11,85,000	15,70,000
Shipments (Number of shipments)	8,60,000	3,800	16,200	20,000
Quality control (Number of Shipments)	12,40,000	21,300	56,200	77,500
Purchase orders (Number of orders)	9,50,400	1,09,980	80,100	1,90,080
Machine Power (Machine hours)	57,600	16,000	1,76,000	1,92,000
Machine setups (Number of setups)	7,50,000	14,000	16,000	30,000
Total Traceable costs	48,00,000			

Required:

- (i) Prepare a Statement showing allocation of manufacturing overheads using the principles of activity-based costing.
- (ii) Prepare a Statement showing product cost profitability using activity-based costing.
- (iii) Should ABC Ltd. continue to emphasize the Royal model and phase out the Nova model? Discuss.

[Answer to (i): ₹ 409.98; ₹ 143.64]

[Answer to (ii): (₹ 8,49,920); ₹ 26,69,920]

Illustration 9

ABC Bank is examining the profitability of its Premier Account, a combined Savings and Cheque account. Depositors receive a 7% annual interest on their average deposit. ABC Bank earns an interest rate spread of 3% (the difference between the rate at which it lends money and rate it pays to depositors) by lending money for home loan purpose at 10%.

The Premier Account allows depositors unlimited use of services such as deposits, withdrawals, cheque facility, and foreign currency drafts. Depositors with Premier Account balances of ₹ 50,000 or more receive unlimited free use of services. Depositors with minimum balance of less than ₹ 50,000 pay ₹ 1,000-a-month service fee for their Premier Account.

ABC Bank recently conducted an activity-based costing study of its services. The use of these services in 2005-06 by three customers is as follows:

	Activity- Based Cost Per Transaction	Account Usage		
		Customer X	Customer Y	Customer Z
Deposits/withdrawal with teller	₹ 125	40	50	5
Deposits/withdrawal with automatic teller machine (ATM)	₹ 40	10	20	16
Deposits/withdrawal on pre- arranged monthly basis	₹ 25	0	12	60
Bank Cheques written	₹ 400	9	3	2
Foreign Currency drafts	₹ 600	4	1	6
Inquiries about Account balance	₹ 75	10	18	9
Average Premier Account balance for 2005-06		₹ 55,000	₹ 40,000	₹ 12,50,000

Assume Customer X and Z always maintains a balance above ₹ 50,000, whereas Customer Y always has a balance below ₹ 50,000.

Required:

- (i) Compute the 2005-06 profitability of the customers X, Y and Z Premier Account at ABC Bank.
- (ii) What evidence is there of cross-subsidisation among the three Premier Accounts? Why might ABC Bank worry about this Cross-subsidisation, if the Premier Account product offering is Profitable as a whole?
- (iii) What changes would you recommend for ABC Bank's Premier Account?

[Answer to (i): (₹ 10,500); ₹ 2,700; ₹ 29,660]

