12 - ABC Costing

An alternative to absorption costing is activity based costing (ABC).

ABC involves the identification of the factors (cost drivers) which cause the costs of an organisation's major activities. Support overheads are charged to products on the basis of their usage of an activity.

For costs that vary with production level in the short term, the cost driver will be volume related (labour or machine hours).

Overheads that vary with some other activity (and not volume of production) should be traced to products using transaction-based cost drivers such as production runs or number of orders received.

Definition

Activity based costing (ABC) involves the identification of the factors which cause the costs of an organization's major activities. Support overheads are charged to products on the basis of their usage of the factor causing the overheads.

The major ideas behind activity based costing are as follows.

(a) Activities cause costs. Activities include ordering, materials handling, machining, assembly, production scheduling and despatching.

(b) Producing products creates demand for the activities.

(c) Costs are assigned to a product on the basis of the product's consumption of the activities.

Steps for ABC system

An ABC system operates as follows.

Step 1 Identify an organisation's major activities.

Step 2 Identify the factors which determine the size of the costs of an activity/cause the costs of an activity. These are known as cost drivers.

A **cost driver** is a factor which causes a change in the cost of an activity.

Examples of Cost Drivers

Costs	Possible cost driver
Ordering costs	Number of orders
Materials handling costs	Number of production runs
Production scheduling costs	Number of production runs
Despatching costs	Number of despatches

Step 3 Collect the costs associated with each cost driver into what are known as cost pools.

Step 4 Charge costs to products on the basis of their usage of the activity. A product's usage of an activity is measured by the number of the activity's cost driver it generates.

ABC versus traditional costing methods

Both traditional absorption costing and ABC systems adopt the two stage allocation process.

Allocation of overheads
ABC establishes separate cost pools for support activities such as despatching. As the costs of these activities are assigned directly to products through cost driver rates, reapportionment of service department costs is avoided.

Absorption of overheads
The principal difference between the two systems is the way in which overheads are absorbed into products.

(a) Absorption costing most commonly uses two **absorption bases** (labour hours and/or machine hours) to charge overheads to products.

(b) ABC uses many **cost drivers** as absorption bases (eg number of orders or despatches). Absorption rates under ABC should therefore be more closely linked to the causes of overhead costs.

Cost drivers

The principal idea of ABC is to focus attention on **what causes costs to increase,** ie the cost drivers.

(a) The **costs that vary with production volume**, such as power costs, should be traced to products using production **volume-related cost drivers**, such as direct labour hours or direct machine hours.

Overheads which do not vary with output but **with some other activity** should be traced to products using **transaction-based cost drivers**, such as number of production runs and number of orders received.

(b) Traditional costing systems allow overheads to be related to products in rather more arbitrary ways producing, it is claimed, less accurate product costs.

Merits of ABC Costing

(a) The **complexity of manufacturing has increased**, with wider product ranges, shorter product life cycles and more complex production processes. **ABC recognises this complexity with its multiple cost drivers.**

(b) In a more competitive environment, companies must be able to assess product profitability realistically. **ABC facilitates a good understanding of what drives overhead costs**.

(c) In modern manufacturing systems, overhead functions include a lot of non-factory-floor activities such as product design, quality control, production planning and customer services. **ABC is concerned with all overhead costs** and so it takes management accounting beyond its 'traditional' factory floor boundaries.

Criticisms of ABC

It has been suggested by critics that **activity based costing has some serious flaws**.

(a) Some measure of (arbitrary) cost apportionment may still be required at the cost pooling stage for items like rent, rates and building depreciation.

(b) Can a single cost driver explain the cost behaviour of all items in its associated pool?

(c) Unless costs are caused by an activity that is measurable in quantitative terms and which can be related to production output, cost drivers will not be usable. What drives the cost of the annual external audit, for example?

(d) ABC is sometimes introduced because it is fashionable, not because it will be used by management to provide meaningful product costs or extra information. If management is not going to use ABC information, an absorption costing system may be simpler to operate.

(e) The cost of implementing and maintaining an ABC system can exceed the benefits of improved accuracy.

(f) Implementing ABC is often problematic.

The implications of using ABC

Pricing – pricing decisions will be improved because the price will be based on more accurate cost data.

Decision making – this should also be improved. For example, research, production and sales effort can be directed towards the most profitable products.

Performance management – should be improved. ABC can be used as the basis of budgeting and forward planning. The more realistic overhead should result in more accurate budgets and should improve the process of performance management. In addition, an improved understanding of what drives the overhead costs should result in steps being taken to reduce the overhead costs and hence an improvement in performance.

Sales strategy – this should be more soundly based. For example, target customers with products that appeared unprofitable under absorption costing but are actually profitable, and vice versa.

12 - ABC Costing

Q1. Suppose that Cooplan manufactures four products, W, X, Y and Z. Output and cost data for the period just ended are as follows.

	Output units	*Number of production runs in the period*	*Material cost per unit*	*Direct labour hours per unit*	*Machine hours per unit*
			$		
W	10	2	20	1	1
X	10	2	80	3	3
Y	100	5	20	1	1
Z	100	5	80	3	3
		14			

Direct labour cost per hour	$5
Overhead costs	$
Short run variable costs	3,080
Set-up costs	10,920
Expediting and scheduling costs	9,100
Materials handling costs	7,700
	30,800

Required

Prepare unit costs for each product using conventional costing and ABC.

Q2. A company manufactures two products, L and M, using the same equipment and similar processes. An extract of the production data for these products in one period is shown below.

	L	*M*
Quantity produced (units)	5,000	7,000
Direct labour hours per unit	1	2
Machine hours per unit	3	1
Set-ups in the period	10	40
Orders handled in the period	15	60

Overhead costs	$
Relating to machine activity	220,000
Relating to production run set-ups	20,000
Relating to handling of orders	45,000
	285,000

Required

Calculate the production overheads to be absorbed by one unit of each of the products using the following costing methods.

(a) A traditional costing approach using a direct labour hour rate to absorb overheads
(b) An activity based costing approach, using suitable cost drivers to trace overheads to products

Q3. Saturn, a chocolate manufacturer, produces three products:

- The Sky Bar, a bar of solid milk chocolate.
- The Moon Egg, a fondant filled milk chocolate egg.
- The Sun Bar, a biscuit and nougat based chocolate bar.

Information relating to each of the products is as follows:

	Sky Bar	Moon Egg	Sun Bar
Direct labour cost per unit ($)	0.07	0.14	0.12
Direct material cost per unit ($)	0.17	0.19	0.16
Actual production/sales (units)	500,000	150,000	250,000
Direct labour hours per unit	0.001	0.01	0.005
Direct machine hours per unit	0.01	0.04	0.02
Selling price per unit ($)	0.50	0.45	0.43

Annual production overhead = $80,000

Required:

Using traditional absorption costing, calculate the full production cost per unit and the profit per unit for each product. Comment on the implications of the figures calculated.

	$
Machining costs	5,000
Component costs	15,000
Set-up costs	30,000
Packing costs	30,000
Production overhead (as per illustration 1)	80,000

Cost driver data:

	Sky Bar	Moon Egg	Sun Bar
Labour hours per unit	0.001	0.01	0.005
Machine hours per unit	0.01	0.04	0.02
Number of production set-ups	3	1	26
Number of components	4	6	20
Number of customer orders	21	4	25

Required:

Using ABC, calculate the full production cost per unit and the profit per unit for each product. Comment on the implications of the figures calculated.

Q4. Cabal makes and sells two products, Plus and Doubleplus. The direct costs of production are $12 for one unit of Plus and $24 per unit of Doubleplus.

Information relating to annual production and sales is as follows:

	Plus	Doubleplus
Annual production and sales	24,000 units	24,000 units
Direct labour hours per unit	1.0	1.5
Number of orders	10	140
Number of batches	12	240
Number of setups per batch	1	3
Special parts per unit	1	4

Information relating to production overhead costs is as follows:

	Cost driver	Annual cost
		$
Setup costs	Number of setups	73,200
Special parts handling	Number of special parts	60,000
Other materials handling	Number of batches	63,000
Order handling	Number of orders	19,800
Other overheads	–	216,000
		432,000

Other overhead costs do not have an identifiable cost driver, and in an ABC system, these overheads would be recovered on a direct labour hours basis.

(a) Calculate the production cost per unit of Plus and of Doubleplus if the company uses traditional absorption costing and the overheads are recovered on a direct labour hours basis.

(b) Calculate the production cost per unit of Plus and of Doubleplus if the company uses ABC.

(c) Comment on the reasons for the differences in the production cost per unit between the two methods.

(d) What are the implications for management of using an ABC system instead of an absorption costing system?

Q5. Explorer Limited produces two products, Y and Z, and has always used absorption costing to allocate overheads to each product. The directors are now considering adopting activity based costing (ABC).

REQUIRED

(a) Compare how overheads are apportioned using absorption costing and ABC. [4]

Additional information

The budgeted data for the two products for the year ending 31 December 2017 is as follows:

	Y	Z
Raw materials used (kilo)	2	3
Direct labour hours	0.75	1
Unit selling price	$19	$25
Annual production and sale	2500	4000

The cost of raw materials is $2.50 per kilo and the labour force are paid $8 per hour.

Annual overheads are as follows:

	$
Machine maintenance overheads	8 500
Purchasing overheads	17 000
Selling and distribution overheads	18 750

REQUIRED

(b) Calculate the cost per unit for **each** product using absorption costing. [7]

Additional information

	Y	Z
Number of production runs	20	16
Number of purchase orders	55	65
Number of sales deliveries	85	160

REQUIRED

(c) Calculate the cost per unit for **each** product using ABC. [7]

(d) (i) Compare the total profit per product using absorption costing and ABC. [4]

(ii) Comment on the results. [1]

(e) Advise the directors whether or not ABC should be adopted. Justify your answer. [2]

[Total: 25]

Q6. Chetna runs a business printing logos on sweatshirts. The sweatshirts come in two types, Standard and Superior. The selling price is set at cost plus 30%.

The following information is available for the year.

	Standard	Superior
Number of sweatshirts sold	22 500	9 000
Purchase cost per sweatshirt	$5	$8
Printing materials per sweatshirt	$0.50	$0.50
Labour time to print each sweatshirt	5 minutes	5 minutes

Overheads were as follows:

	$
Machine set up costs	18 900
Other production overheads	5 850
Selling and administration	17 250
Total	42 000

REQUIRED

(a) Calculate an overhead absorption rate based on labour hours. [2]

Additional information

Staff printing the logos are paid $10 an hour.

REQUIRED

(b) (i) Calculate the total cost allocated to each type of sweatshirt. [4]

(ii) Calculate the selling price for **each** sweatshirt. [2]

Additional information
Chetna has suggested that it would be better to allocate the machine set up cost to each product based on the number of times the machine is set up. The machine has to be set up each time there is a different logo.

During the year the machine was set up 600 times for Standard sweatshirts and 975 times for Superior sweatshirts. Other overheads are still allocated on the basis of labour hours.

REQUIRED

(c) (i) Calculate the total costs allocated to **each** type of sweatshirt when machine set up costs are allocated using the number of set up times.

[4]

(ii) Calculate the revised selling price for **each** type of sweatshirt. [2]

(iii) Calculate the change in selling price for **each** type of sweatshirt. [2]

(d) Explain **three** differences between activity based costing and absorption costing. [6]

(e) Advise Chetna which method she should use. Justify your answer. [3]

[Total: 25