

## Traditional Costing vs. Activity-based Costing

(Relevant to Paper II – PBE Management Accounting and Finance)

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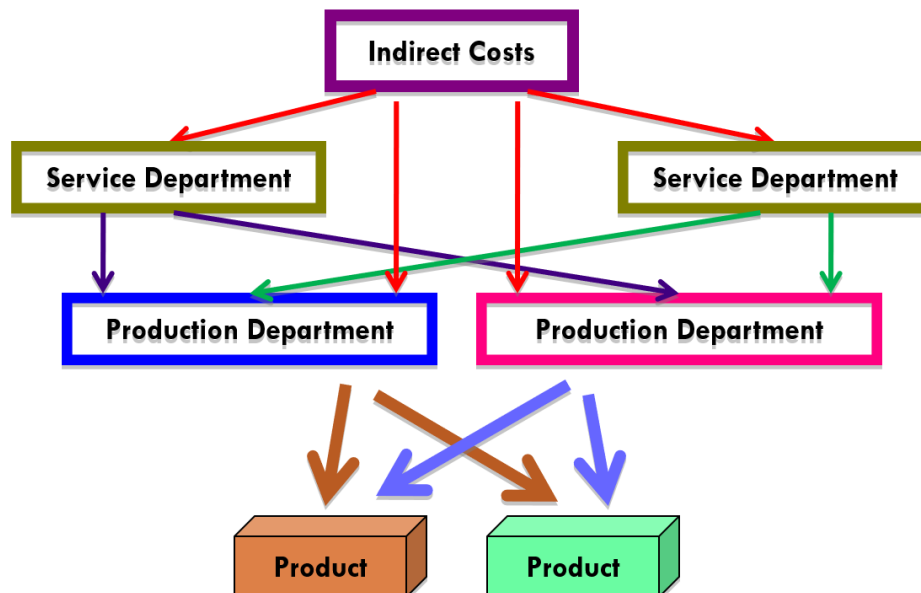
A costing system determines the cost of a cost object through completing two basic steps: cost accumulation and cost assignment. Cost accumulation means collecting cost data in an organized way through an accounting system. The accumulated costs are then assigned to the cost object through tracing (for direct costs) and allocation (for indirect costs, which are also called overheads). Traditional costing and Activity-based Costing (ABC) are identical in the way that they trace direct costs to a cost object, but differ in the way that they allocate indirect costs to a cost object.

There are two significant differences between traditional costing and ABC:

### Cost Pools

Traditional costing uses cost centres as cost pools and allocates indirect costs to a cost object through those cost centres. Figure 1 shows the process of cost allocation under traditional costing, using the product as the cost object.

Figure 1: Traditional Costing

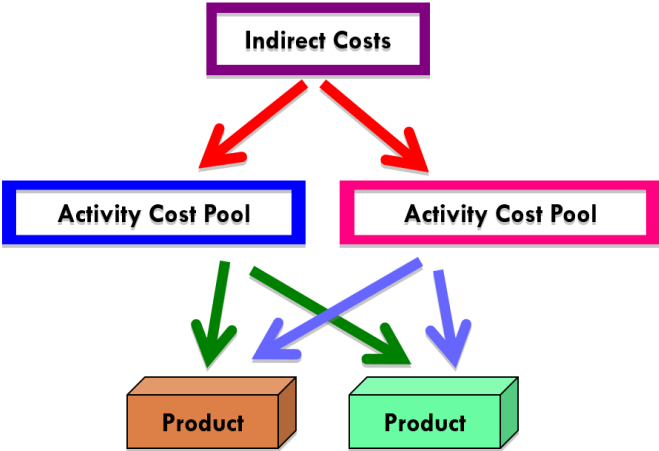


In the above figure, indirect costs are first assigned (both traced and allocated, depending on whether a specific indirect cost item can be directly traced to a cost centre or not) to cost centres. Here cost centres include service departments, which provide internal services to other

departments, and production departments, which directly participate in the production process. The costs accumulated in service departments are then reallocated to production departments using the direct method, step-down method or reciprocal method. By this time, the indirect costs accumulated in production departments include the departments' own indirect costs and any indirect costs received from service departments. These indirect costs are then allocated to products by using the allocation rate (also called the absorption rate). Since assigning costs to cost centres and reallocating service departments' costs to production departments are both complicated topics and this article is about the difference between traditional costing and ABC, the remaining part of the article will focus solely on cost allocation from production departments to products.

Under ABC, cost centres are not used as cost pools to allocate indirect costs. Instead, activities are used as cost pools. Indirect costs are first accumulated in activity cost pools and then allocated to products using activity cost driver rates according to the products' requirements for different activities. Figure 2 shows the process.

**Figure 2: Activity-based Costing**



The choice of cost pools under ABC is more reasonable because companies consume resources as a result of conducting activities instead of having cost centres. For example, consider a company that claims to have a production department but does not conduct any production activities. Under traditional costing, it does not actually incur costs. However, the company will incur costs when the production department conducts production activities, such as handling materials, setting up machines, running those machines and doing quality control.

**Allocation Bases**

Under traditional costing, the allocation bases used to allocate indirect costs are volume-based allocation bases. Examples include direct materials costs, direct manufacturing labour hours, machine hours, output volume, and so on. These allocation bases have a positive correlation

with output volume. Therefore, they are called volume-based allocation bases. By using volume-based allocation bases, traditional costing simply assumes that all indirect costs are driven by output volume. However, this assumption is not realistic because many indirect costs are not actually affected by output volume. For example, the design cost of a product is affected by the complexity of the product. Once the product design is finished, the design cost is fixed no matter how many units of the product are finally produced. To recognize the diversity of operating activities, the ABC method classifies operating activities into four hierarchies and applies relevant allocation bases to allocate activity costs. The allocation bases chosen usually have a causal relationship with activities in different hierarchies, and thus they are also called activity cost drivers.

Table 1 provides a summary of cost hierarchy.

**Table 1: Activity Cost Hierarchy**

Activities	Examples of Cost Pools	Examples of Cost Drivers
<b>Unit-level activity</b> Activities that are performed on each unit of a product or service	(a) Electricity costs (b) Product handling costs	(a) Machine hours (b) Output unit
<b>Batch-level activity</b> Activities that are performed for each batch of products, regardless of batch size	(a) Machine setup costs (b) Inspection costs	(a) Number of setups (b) Number of production runs
<b>Product-sustaining activity</b> Activities that are performed to support each type of product, regardless of the number of batches or number of units produced	(a) Product design	(a) Number of components, which reflects product complexity
<b>Facility-sustaining activity</b> Activities that are performed to maintain business operations but not directly linked to a specific product	(a) Factory supervision costs (b) Plant insurance	(a) Direct labour hours, assuming most of the factory manager's work is related to managing workers (b) Square footage of plant space

By recognizing the diversity in activities and using relevant cost drivers, ABC releases the assumption that all indirect costs are driven by output volume. Thus it can provide more accurate cost information for decision-making purposes.

## Example

PBE Co. is an ice cream producer. Currently it produces at capacity and sells ice cream in two flavours: vanilla and mocha-almond. The company is using traditional costing, under which indirect costs are allocated based on direct labour hours. The operating data for PBE Co. in March 2017 is as follows.

	Vanilla	Mocha-almond
Units produced and sold	50,000	1,000
Price	HK\$30	HK\$50
Direct labour hours per unit	0.02	0.02
Direct labour cost per hour	HK\$50	HK\$50
Machine hours per unit	0.01	0.01
Machine setup hours per production run	4	6
Number of production runs	50	10
Direct materials used	HK\$300,000	HK\$10,000

The company incurs manufacturing overheads totalling HK\$1,275,000 in March 2017. An interview with the production manager shows that the following activities are required in the production process during the month.

Activity	Hierarchy	Cost Driver	Costs
Run machine	Unit-level activity	Machine hours	HK\$510,000
Handle production run	Batch-level activity	Production runs	HK\$144,000
Set up machine	Batch-level activity	Machine setup hours	HK\$520,000
Support products	Product-sustaining activity	Number of product	<u>HK\$101,000</u>
			HK\$1,275,000

### Required:

1. Calculate the profit for each product using traditional costing.
2. Calculate the profit for each product using ABC.
3. Comment on the results calculated above

### Solutions:

Requirement 1:

#### Profitability of Two Products under Traditional Costing

	Vanilla (HK\$)	Mocha-almond (HK\$)	Total (HK\$)
Sales revenue	1,500,000	50,000	1,550,000
Direct materials	300,000	10,000	310,000
Direct labour	50,000	1,000	51,000
Manufacturing overhead	<u>1,250,000</u>	<u>25,000</u>	<u>1,275,000</u>
Gross margin	(100,000)	14,000	(86,000)

Requirement 2:

Activity Cost Driver Rate

Activity	Cost Driver	Vanilla	Mocha-almond	Total Activity	Activity Cost (HK\$)	Activity Cost Driver Rate (HK\$)
Run machine	Machine hours	500	10	510	510,000	1,000
Handle production run	Production runs	50	10	60	144,000	2,400
Set up machines	Machine setup hours	200	60	260	520,000	2,000
Support products	Number of products	1	1	2	101,000	50,500

Profitability of Two Products under ABC

	Vanilla (HK\$)	Mocha-almond (HK\$)	Total (HK\$)
Sales revenue	1,500,000	50,000	1,550,000
Direct materials	300,000	10,000	310,000
Direct labour	50,000	1,000	51,000
Manufacturing overheads			
Run machine (HK\$1,000 × 500; HK\$1,000 × 10)	500,000	10,000	510,000
Handle production run (HK\$2,400 × 50; HK\$2,400 × 10)	120,000	24,000	144,000
Setup machine (HK\$2,000 × 200; HK\$2,000 × 60)	400,000	120,000	520,000
Support product (HK\$50,500 × 1)	<u>50,500</u>	<u>50,500</u>	<u>101,000</u>
Gross margin	79,500	(165,500)	(86,000)

Requirement 3:

The result shows that traditional costing overcosted 'Vanilla' and undercosted 'Mocha-almond'. Although 'Mocha-almond' is a small-volume product, it consumes a lot of batch-related resources, as well as having the same product-sustaining cost as 'Vanilla'. Allocating overheads based on product volume using traditional costing results in product-cost cross-subsidization, which means that the high-volume product 'Vanilla' subsidizes the low-volume product 'Mocha-almond'. In other words, 'Vanilla' bears some of the costs that are actually consumed by 'Mocha-almond'.

According to the ABC result, 'Vanilla' is profitable product. However, due to the loss caused by 'Mocha-almond', the company suffers a loss as a whole. The company may improve its profits by:

1. Increasing the production batch size for 'Mocha-almond' by encouraging customers to place large-size orders. Given the same production volume, batch-related costs can be reduced by increasing the batch size.
2. Increasing sales of 'Mocha-almond' by offering a discount. The product-sustaining cost will remain the same even though sales increase. Therefore, profits will increase faster than costs will increase.
3. Improving production efficiency to reduce activity cost driver rate. For example, the company can better train its setup workers to reduce the cost for each machine setup hour.

## References

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