

ACCA

Paper PM

Performance Management

FOR EXAM UNTIL JUNE 2024

## Introduction of PM

### 1.AIM FO PAPER 课程目标

The aim of the syllabus is to develop knowledge and skills in the application of management accounting techniques to quantitative and qualitative information for planning, decision-making, performance evaluation and control.

### 2.RELATIONSHIP 课程关联

**SBL 战略商业领袖**

**Strategic business leader**

**SBR 战略商业报告**

**Strategic business reporting**

**APM 高级业绩管理**

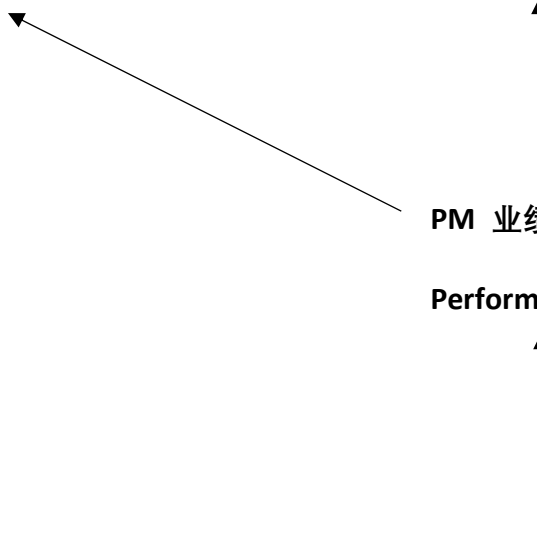
**Advanced performance management**

**PM 业绩管理**

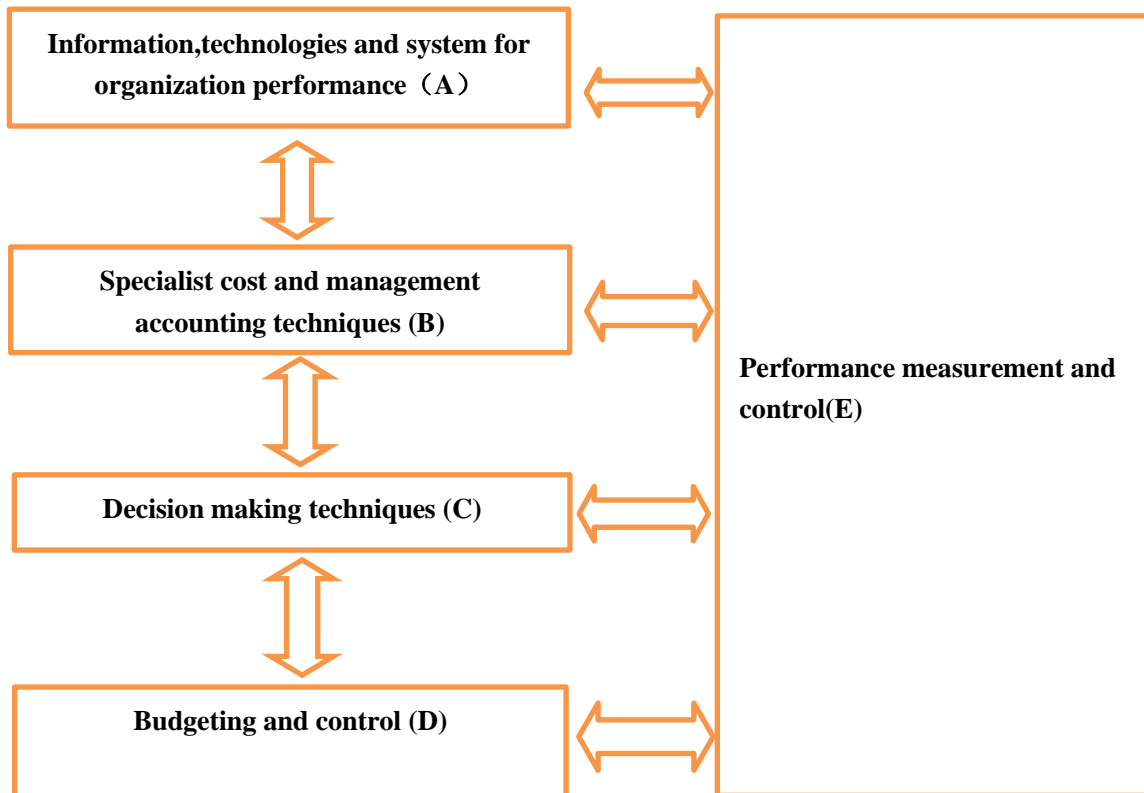
**Performance management**

**MA 管理会计**

**Management accounting**



### 3. MAIN CAPABILITIES



### 4. EXAM FORMAT

- Time allowed: 3 hours (plus 10 minutes to read the pre-exam instructions)
- Predominantly computational
- All questions are compulsory

Section	Style of question type	Description	Proportion of exam, %
A	Objective test	15*2	30
B	Objective test case	3*10	30
C	Long question	2*20	40
Total			100

Section A and B questions will be selected from the entire syllabus. These questions are marked automatically

Question C will mainly focus on the following syllabus areas :

Syllabus area A

Syllabus area C

Syllabus area D

Syllabus area E

The response to these questions are human marked.

Full specimen exam:

<https://www.accaglobal.com/wales/en/student/exam-support-resources/fundamentals-exams-study-resources/f5/specimen-exams.html>

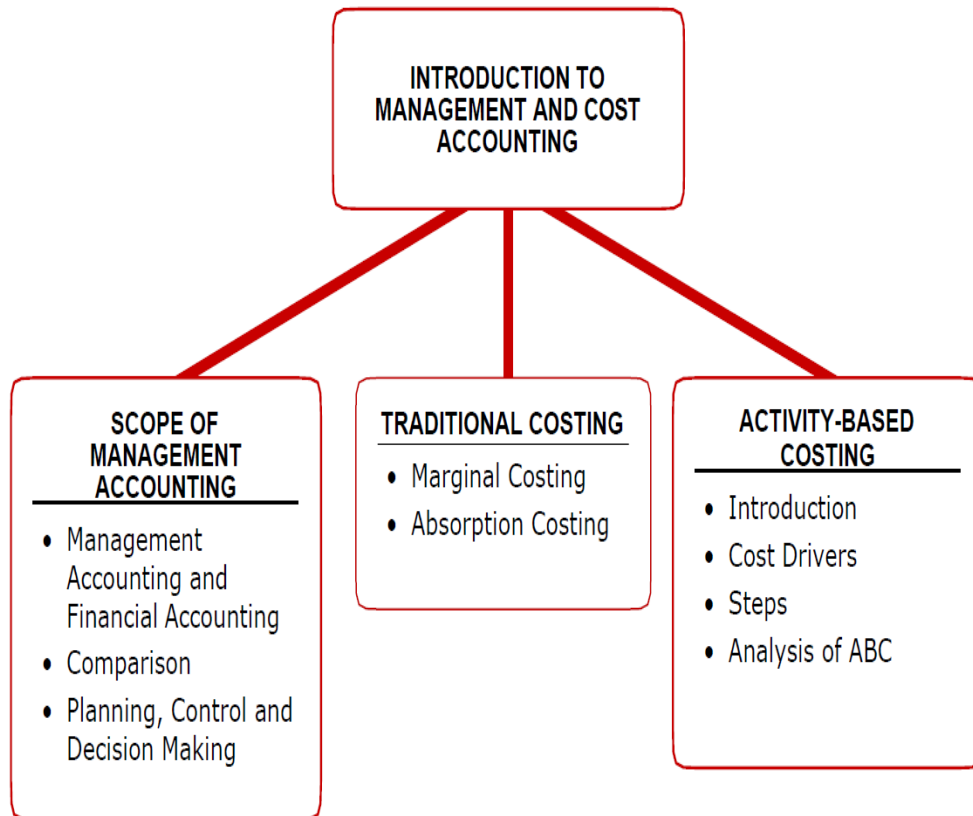
**5.Pass rate 历年考试通过率**

Jun 2022	Sep 2022	Dec 2022	Mar 2023	Jun 2023
41	40	43	44	40

*With wisdom and knowledge you have gained today, and with wisdom and determination you will understand tomorrow's challenges. May you never lose your indomitable spirit.*

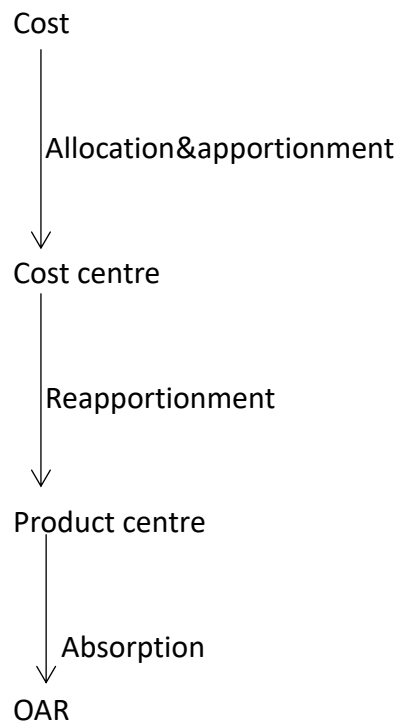
# Chapter 3 Activity Based Costing

## Visual Overview

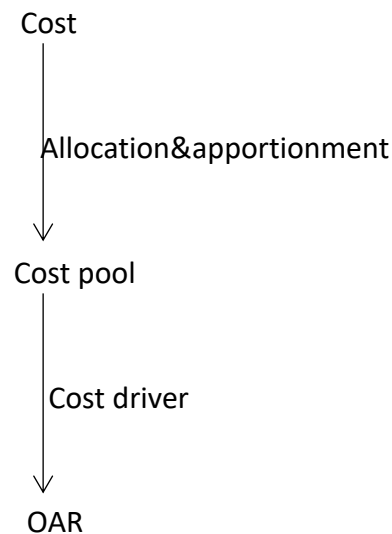


## 1. Activity based costing verses absorption costing

### Traditional absorption costing



### Activity based costing



Traditional absorption costing suitable for

- One for a few simple and similar products.
- Production overheads were only a very small proportion.

However, modern manufacturing environment is:

- Production overheads become a larger proportion of total costs
- The production has become more complex and more supporting activities are involved
- Companies must be able to assess product profitability realistically in order to gain competitive advantages.

## 2. Activity based costing

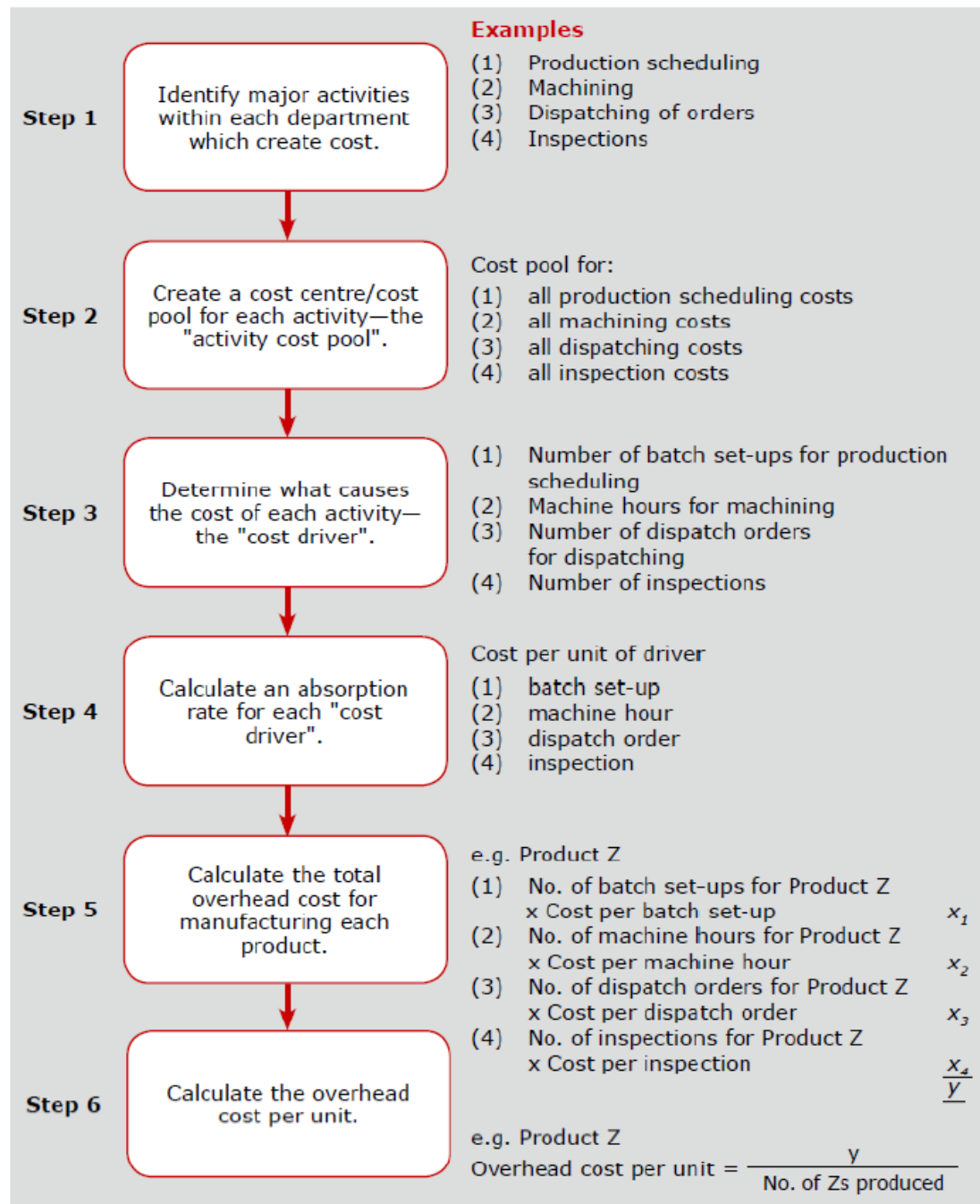
### 2.1 Definition

**Activity based costing (ABC)** is a method of costing which involves identifying the costs of the main support **activities** and the **factors that 'drive' the costs** of each activity.

Support overheads are charged to products by absorbing cost on the basis of the product's usage of the factor driving the overheads.

## 2.2 Outline of an ABC system

An ABC system operates as follows.



Example 1:

Suppose that Cooplan manufactures four products, W, X, Y and Z. Output and cost data

for the period just ended are as follows.

		Number of			
	Output	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	<u>5</u>	80	3	3
		<u>14</u>			

Direct labour cost per hour: \$5

Overheads	\$
Machine operating cost	3,080
Set-up costs	10,920
Expediting and scheduling costs	9,100
Material handling costs	<u>7,700</u>
Total overheads	<u>30,800</u>

**Required:**

Prepare unit costs for each product using:

- (1) Conventional absorption costing
- (2) ABC

**Solution:**

**(1) AC**

Using a conventional absorption costing approach, the absorption rate for overheads based on direct labour hours or machine hours is:



$\$30,800 \div 440 \text{ hours} = \$70 \text{ per direct labour hour}$

The product costs would be as follows:

	W	X	Y	Z
	\$	\$	\$	\$
Direct material (no change)	20	80	20	80
Direct labour (no change)	5	15	5	15
Production overheads	<u>70</u>	<u>210</u>	<u>70</u>	<u>210</u>
Cost per unit	<u>\$95</u>	<u>\$305</u>	<u>\$95</u>	<u>\$305</u>

## (2) ABC

STEP 1 Group overheads into activities, according to how they are driven. These are called **cost pools**.

	\$
Machine operating costs	3,080
Set-up costs	10,920
Expediting and scheduling costs	9,100
Material handling costs	<u>7,700</u>
Total overheads	<u>30,800</u>

STEP 2 Identify **cost drivers** for each activity. ie, what causes these activity costs to be incurred.

Machine operating costs	—————>	No. of machine hour
Set-up costs	—————>	No. of production run
Expediting and scheduling costs	—————>	No. of production run
Material handling costs	—————>	No. of production run

STEP 3 Calculate an OAR for each activity

machine hours =  $10 \times 1 + 10 \times 3 + 100 \times 1 + 100 \times 3 = 440 \text{ hrs}$

$$\begin{aligned}\text{The OAR of machine operating costs} &= \frac{\text{Machine operating costs}}{\text{Machine hours}} \\ &= \$3,080 \div 440 \text{ machine hours} \\ &= \$7 \text{ per machine hour}\end{aligned}$$

$$\begin{aligned}\text{The OAR of set-up costs} &= \frac{\text{Set-up costs}}{\text{number of production runs}} \\ &= \$10,920 \div 14 \text{ production runs} \\ &= \$780 \text{ per production run}\end{aligned}$$

$$\begin{aligned}\text{The OAR of expediting and scheduling costs} &= \frac{\text{Expediting and scheduling costs}}{\text{number of production runs}} \\ &= \$9,100 \div 14 \text{ production runs} \\ &= \$650 \text{ per production run}\end{aligned}$$

$$\begin{aligned}\text{The OAR of material handling costs} &= \frac{\text{Material handling costs}}{\text{number of production runs}} \\ &= \$7,700 \div 14 \text{ production runs} \\ &= \$550 \text{ per production run}\end{aligned}$$

STEP 4. **Absorb** the activity costs into the product.

	W	X	Y	Z
Machine operating costs				
= \$7 per machine hour	70	210	700	2,100
Machine set-up costs				
= \$780 per production run	1,560	1,560	3,900	3,900
Expediting and scheduling costs				
= \$650 per production run	1,300	1,300	3,250	3,250
Material handling costs				
= \$550 per production run	<u>1,100</u>	<u>1,100</u>	<u>2,750</u>	<u>2,750</u>
Total overheads	4,030	4,170	10,600	12,000
No. of products produced	<u>10</u>	<u>10</u>	<u>100</u>	<u>100</u>

Production cost per unit	<u>403</u>	<u>417</u>	<u>106</u>	<u>120</u>
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STEP 5: Calculate the full product cost per unit

	W	X	Y	Z
	\$	\$	\$	\$
Direct material (no change)	20	80	20	80
Direct labour (no change)	5	15	5	15
Production overheads	403	417	106	120
Cost per unit	<u>\$428</u>	<u>\$512</u>	<u>\$131</u>	<u>\$215</u>

### 3. Merits and Criticisms of Activity Based Costing

ABC has both advantages and disadvantages, and tends to be more widely used by larger organizations and the service sector.

#### Advantages of ABC:

- ✓ Better decision making. Companies will have a more accurate knowledge of cost per unit, and therefore profit per unit. They can evaluate whether to stop producing loss-making products.
- ✓ Where cost plus pricing is used, the use of ABC means that the price will be more likely to achieve the desired margins.
- ✓ There is a better understanding of what causes costs because of the identification of the cost driver. This enables managers to make more informed decisions on actions to reduce cost.
- ✓ Control of overheads is easier, as responsibility for incoming costs must be established before ABC can be implemented.
- ✓ More accurate performance measurement leads to better performance management.

#### Disadvantages of ABC:

- ✓ ABC is still based on budgeted overheads on the current period, which may be unsuitable for future strategic decisions.
- ✓ It is more complex and the selection of cost drivers may not be straightforward.
- ✓ Additional time and cost will be incurred in setting up and administering the system.

### Exercise

1. Brick by Brick is a building business that provides a range of building services to the public. Recently it has been asked to quote for garage conversion (GC) and extensions to properties (EX) and has found that it is winning fewer GC contracts than expected. In addition, BBB also produces and sells different types of brick to the construction industry. The three types of brick produced are clay, concrete and reclaimed bricks. BBB has a policy to price all jobs at budgeted total cost plus 50% overheads. Overheads are currently absorbed on a labour hour basis. BBB thinks that a switch to activity based costing (ABC) to absorb overheads would reduce the costs associated with GC and hence make them more competitive.

You are provided with the following data:

Overhead category	Annual overhead	Activity driver	per year
Supervisors	90,000	Site visits	500
Planners	70,000	Planning documents	250
Property related	<u>240,000</u>	Labour hours	40,000
Total	400,000		

A typical GC takes 300 labour hours to complete. A GC requires only one site visit, a supervisor and needs only one planning document to be raised. An EX requires six site visits and five planning documents.

(1). What are the total overheads assigned to a GC using labour hours to absorb the overheads?

GC \$( )

(2). What are the total overheads assigned to a GC using ABC principles in respect of supervisor costs?

GC \$( )

(3). What are the total overheads assigned to an EX using ABC principles in respect of planning costs?

EX \$( )

(4) The absorption cost and ABC cost per service have now been correctly calculated as follows:

	GC	EX
Absorption cost	\$11,000	\$20,500

ABC cost	\$10,260	\$20,980
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Are the following statements true or false?

1. Changing to a system of ABC costing should lead to a more competitive price being charged for the GC.
2. Using ABC would cause total overhead costs to increase.

A 1 only

B 2 only

C Neither 1 nor 2

D Both 1 and 2

(5).Which of the following statements about Brick by Brick and the use of ABC is true?

A.The traditional absorption approach gives a better indication of where cost savings can be made.

B.ABC is a cheaper system for BBB than absorption costing

C.ABC eliminates the need for cost apportionment

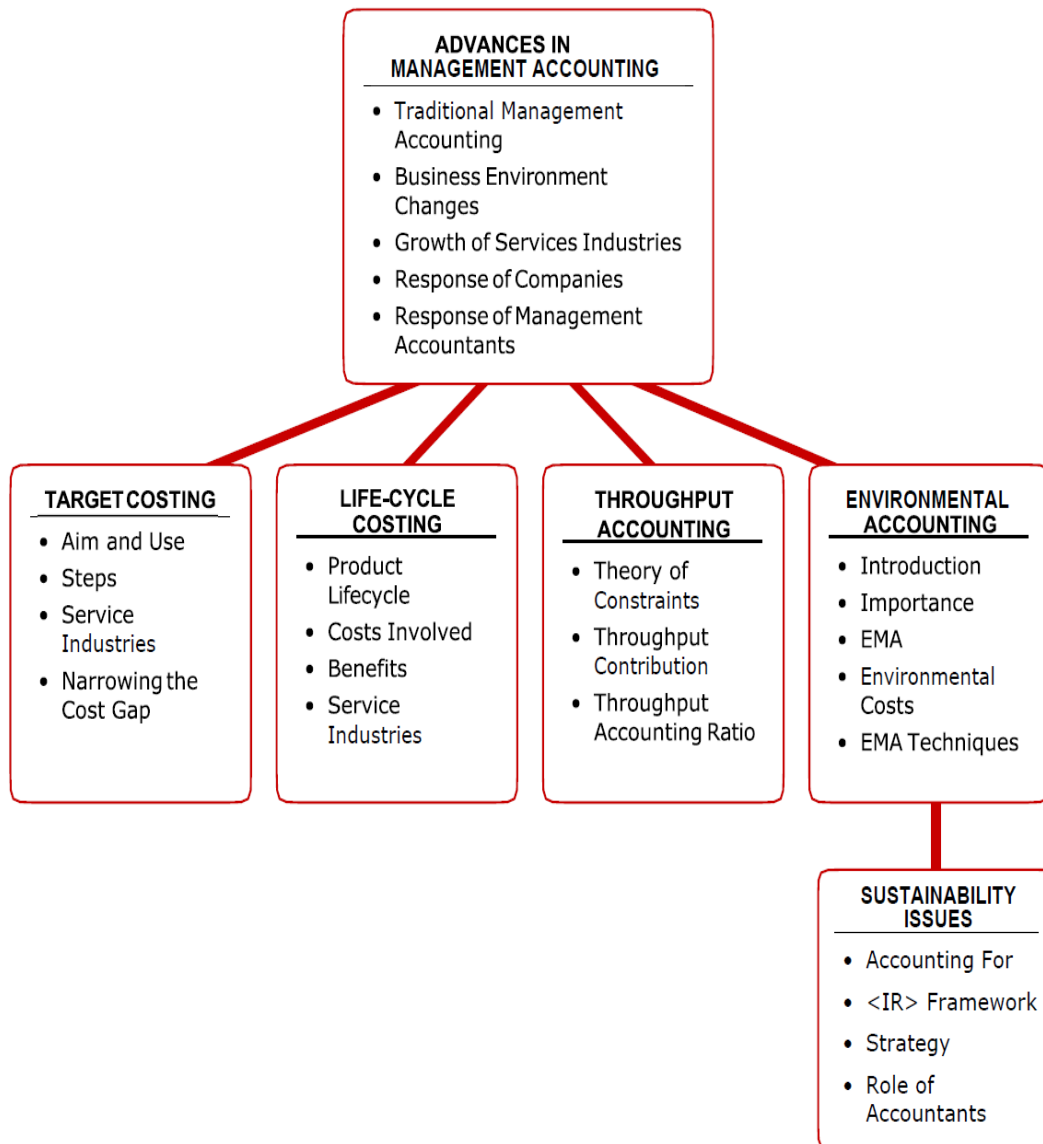
D.ABC improves pricing decisions.

## Summary and Quiz

- Activity-based costing (ABC) aims to provide a more meaningful cost of a product, by linking costs to the activities that drive them.
- Steps in ABC:
  - Identify the activities that cause costs to be incurred.
  - Allocate and apportion costs between "activity cost pools".
  - Identify the cost drivers for each activity.
  - Calculate the absorption rate per unit of driver (divide costs in (2) by quantities in (3)).
  - Calculate the total overhead for product (multiply (4) by the number of activities for each product).
  - Calculate the overhead cost per unit of product (divide (5) by the number of units for each product).
- The main advantage of ABC is that it focuses on the activities which cause costs rather than products.
- The main disadvantage is its complexity (and expense of implementing), which makes it inappropriate for many organisations.

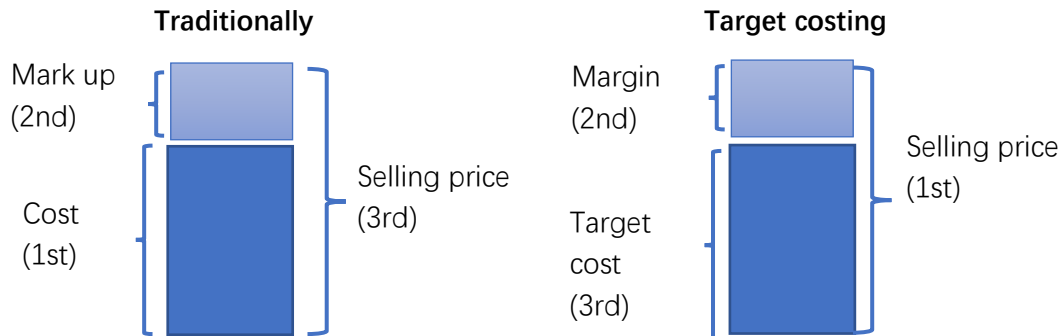
# Chapter 4 Advanced in Management Accounting

## Visual Overview



## 1. Target Costing

### 1.1 Traditional Cost Plus Pricing versus Target Costing:

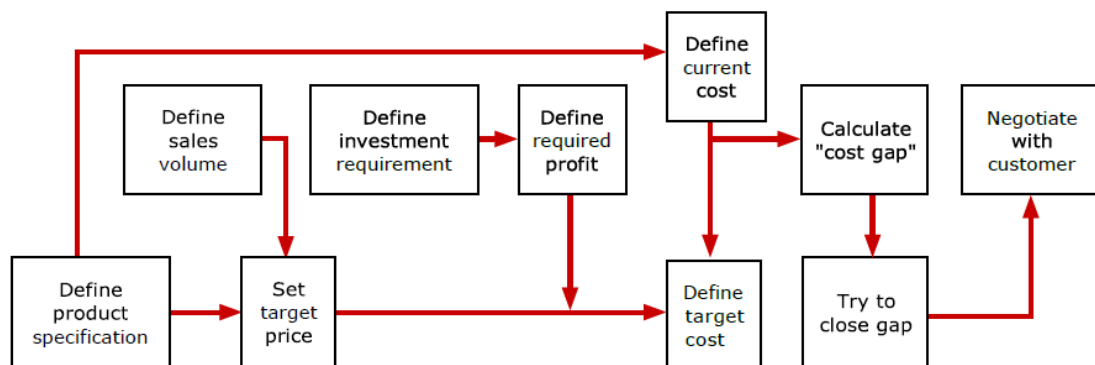


**Target costing** involves setting a target cost by subtracting a desired profit margin from a target selling price.

### 1.2 Implementing Target Costing

1. Determine the price the market will accept for the product based on market research. This may take into account the market share required.
2. Deduct a required profit margin from this price – this gives the target cost.
3. Estimate the actual cost of the product. If it is a new product, this will be an estimate.
4. Identify ways to narrow the gap between the actual cost of the product and the target cost.

Target costing can be illustrated by the following flow diagram:



### Activity 1 Target Costing

Exclusive Motors is designing a new version of its luxury car, the Z123 series. The vehicle will be launched next year. It is expected to have a lifecycle of 10 years.

The production of the car will require an investment of \$3 billion. The company needs a profit of 20% a year on this investment.



The marketing department believes that the car could be sold for a price of \$40,000 each. 100,000 cars would be manufactured and sold each year.

**Required:**

**Calculate the target cost of one Z123.**

### **1.3 Narrowing the Target Cost Gap**

There are various methods to reduce product cost; an important consideration when using these techniques is to ensure that the perceived value of the final product/service is not reduced.

- (a) Reconsider the design to eliminate non-value-added elements.
- (b) Reduce the number of components or standardise components.
- (c) Use less expensive materials.
- (d) Employ a lower grade of staff on production.
- (e) Invest in new technology.
- (f) Outsource elements of the production or support activities.
- (g) Reduce manning levels or redesign the workflow.

Note\*:

- (i) Increase the selling price will not close the cost gap, because increasing the selling price will negatively affect the sales volume.
- (ii) cost reduction may affect the value of the product.

However, as stated earlier, the most effective time to eliminate unnecessary cost and reduce the expected cost to the target cost level is during the product design and development phase, not after 'live' production has begun.

### **1.4 Target Costing in Service Industries**

Target costing is likely most appropriate in manufacturing industries, where a volume of standard products is to be made. Although it can also be used in service industries, there may be additional challenges:

- In many service industries, the "products" are non-standard and customised. It is difficult to define a target cost when there is no standard product.
- A higher portion of costs in service industries are indirect (overheads). It is harder to reduce these on a product-by-product basis.
- Reducing costs in a service industry may be at the expense of customer service or quality. In manufacturing industries, it may be possible to identify cost savings that remove parts of a product that customers do not value.

There are **five major characteristics** of services.

- (a) **Intangibility**. This refers to the **lack of substance** which is involved with service delivery.
- (b) **Inseparability/ simultaneity**. Many services are created at the **same time** as they are consumed.
- (c) **Variability/ heterogeneity**. Many services face the **problem of maintaining** consistency in the **standard of output**.
- (d) **Perishability**. Services are innately **perishable**.
- (e) **No transfer of ownership**. Services do not result in the transfer of property.

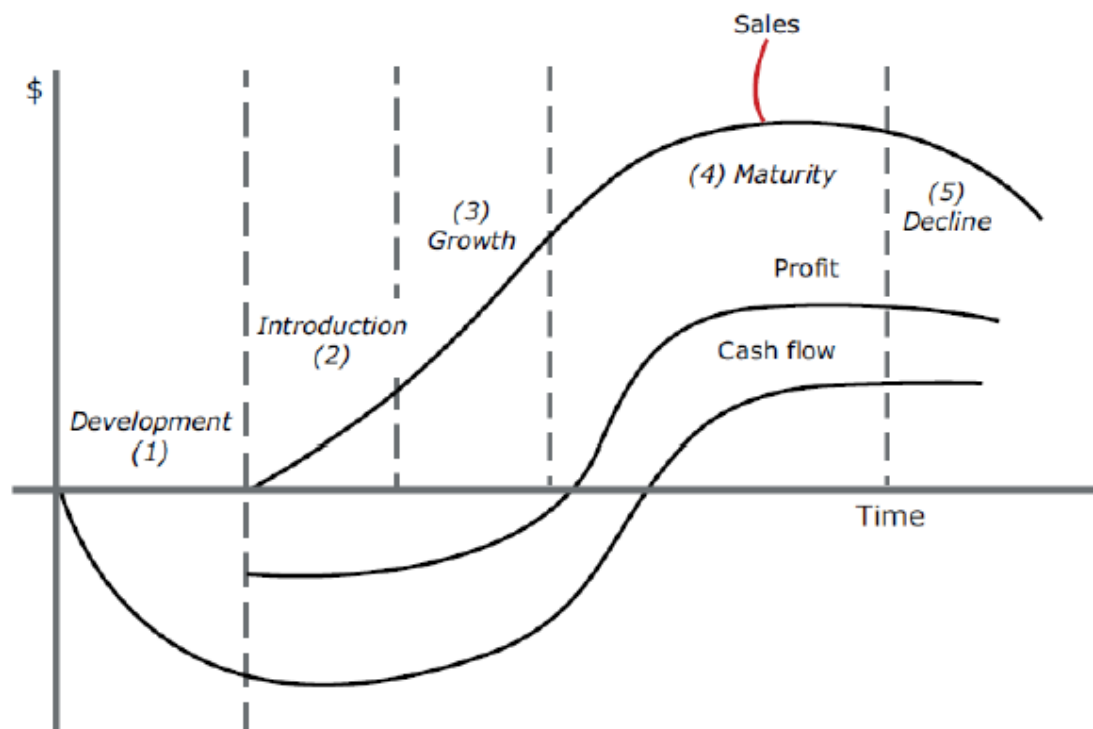
## 2. Life Cycle Costing

### Definition

**Life-cycle costing** – a system which tracks and accumulates the actual costs and revenues attributable to each product from development through to abandonment.

### 2.1 Characteristics of The Product Life Cycle

The production life cycle can be divided into five stages.



Stage	Sales volume	Costs
<b>Development</b>	None	Research and development
<b>Introduction</b>	Very low levels	Very high fixed costs
<b>Growth</b>	Rapid increase	✓ Increase in variable costs ✓ Some fixed costs increase
<b>Maturity</b>	Stable High volume	Primarily variable costs
<b>Decline</b>	Falling demand	✓ Primarily variable costs (now decreasing) ✓ Some fixed costs (eg. Decommissioning costs)

## 2.2 Traditional Costing vs Life Cycle Costing

### 2.2.1 Traditional costing

1. Mostly for accounting period (1 year), not over a product life cycle (several years)
2. Only Charge production cost to product

### 2.2.2 Life cycle costing

1. Estimate the costs and revenue attributable to a product over its entire expected life cycle.
2. Tracks and accumulates the actual costs and revenues attributable to each product from development through to abandonment.

### Example 3 Life-Cycle Costing

Zany developed a new computer game during the year 20X2 for \$200,000. The game will be launched in the year 20X3. Budgeted revenues and costs of the game over its lifecycle (life-cycle costing) are presented below:

	20X2	20X3	20X4	20X5
Sales (units)	0	16,000	34,000	12,000
	\$000	\$000	\$000	\$000

	20X2	20X3	20X4	20X5
Revenue	0	160	340	120
Variable costs	0	30	65	20
Contribution	0	130	275	100
Marketing costs	40	30	0	0
Development costs	200	0	0	0
Annual profit	(240)	100	275	100
Cumulative profit	(240)	(140)	135	235
Life-cycle cost per unit:	\$000			
Total variable costs	115 (30 + 65 + 20)			
Marketing costs	70 (40 + 30)			
Development costs	200			
Total life-cycle costs	385			
Total output (000 units)	62			
Life-cycle cost per unit	\$6.21			

Since the selling price is \$10 per unit, life-cycle profit per unit = \$3.79 (\$10 – \$6.21).

### 2.3 Benefits of Life Cycle Costing

- Life-cycle costing encourages management to plan the pricing strategy for the whole product life, rather than on a short-term basis.
- Identifying the costs incurred throughout the product's life means that management understands the costs better, enabling management to control them better.
- It is much easier to "design out costs" during the design phase of a product than to "control out costs" later in a product's lifecycle.
- Decisions about whether to continue to develop and manufacture products will be based on complete information when the product lifecycle is considered.

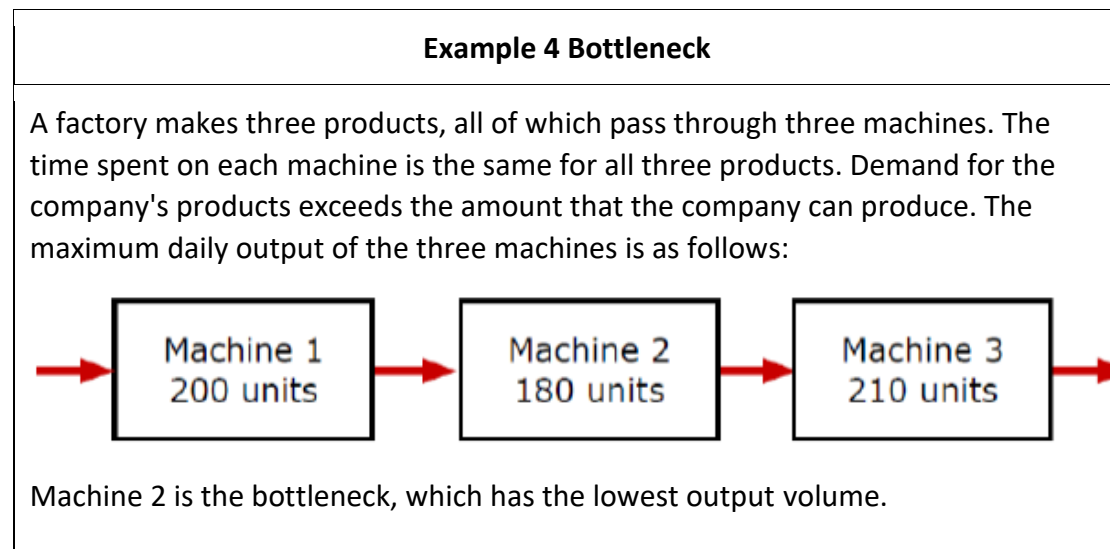
## 3. Throughput Accounting

### 3.1 Theory of Constraints

The theory of constraints (TOC) is an approach to production management and optimizing production performance.

Its key financial concept is to **turn materials into sales as quickly as possible**, thereby maximizing the net cash generated from sales.

Bottleneck resource or binding constraints is a process which has a lower capacity than preceding or subsequent activities, thereby limiting throughput.



Goldratt and Cox devised a **five-step approach** to summarize the key stages of **TOC**.

The steps to follow are:

Step 1 – **Identify** the binding constraint / bottleneck

Step 2 – **Exploit the bottlenecks**. The highest possible output must be achieved from the binding constraint. This output must never be delayed and as such a buffer inventory should be held immediately before the constraint.

Step 3 – **Subordinate everything else**. Operations prior to the binding constraint should operate at the same speed as it so that work in progress (WIP) does not build up.

Step 4 – **Elevate** the system's bottleneck. Steps should be taken to increase resources or improve its efficiency.

Step 5 – **Return** to Step 1. The removal of one bottleneck will create another elsewhere in the system.)

### 3.2 Throughput Accounting

**Throughput accounting (TA)** is an approach to production management which aims to maximize sales revenue less materials cost, while also reducing inventory and operational expenses.

Sales revenue

-Material cost

Throughput contribution

-Factory cost

Profit

Throughput accounting is based on the following concepts, all derived from the TOC.

(a) **Concept 1**

In the short run, all costs in the factory (with the exception of materials costs) are **fixed costs**.

These fixed costs include direct labour costs. It is useful to group all these costs and call them **Total Factory Costs (TFC)**.

(b) **Concept 2**

Throughput accounting is most appropriate to use in a just-in-time(JIT) environment because of the emphasis on throughput and inventory minimization. In a JIT environment, all inventory is a 'bad thing', inventory has no value and the **ideal inventory level should be zero**.

Inventory should be **valued at material cost only**

**3.3 Performance Measures in Throughput Accounting**

Throughput is maximized by ranking products in order for production and sales according to the **throughput per bottleneck resource**.

$$\text{Throughput per bottleneck resource} = \frac{\text{throughput per unit}}{\text{bottleneck resource per unit}}$$

Throughput per unit = sales price - material cost per unit

**Example 1: Maximizing throughput and multiple products**

WR Co manufactures three products, A, B and C. Product details are as follows.

	<i>Product A</i>	<i>Product B</i>	<i>Product C</i>
	\$	\$	\$
Sales price	2.80	1.60	2.40
Materials cost	1.20	0.60	1.20
Direct labour cost	1.00	0.80	0.80
Weekly sales demand	4,000 units	4,000 units	5,000 units
Machine hours per unit	0.5 hours	0.2 hours	0.3 hours

Machine time is a bottleneck resource and maximum capacity is 4,000 machine hours per week. Operating costs including direct labour costs are \$10,880 per week. Direct labour workers are not paid overtime and work a standard 38-hour week.

**Required:**

Determine the optimum production plan for WR Co and calculate the weekly profit that would arise from the plan.

**Solution**

**STEP 1 Determine the bottleneck resources**

The bottleneck resource is machine time (4,000 machine hours available each week).

**STEP 2 Calculate the throughput per unit for each product**

	<i>Product A</i>	<i>Product B</i>	<i>Product C</i>
	\$	\$	\$
Sales price	2.80	1.60	2.40
Materials cost	<u>1.20</u>	<u>0.60</u>	<u>1.20</u>
Throughput/unit	<u>1.60</u>	<u>1.00</u>	<u>1.20</u>

**STEP 3 Calculate throughput per bottleneck resource (Machine hour)**

	<i>Product A</i>	<i>Product B</i>	<i>Product C</i>
<i>Throughput per unit</i>	<i>1.6</i>	<i>1.0</i>	<i>1.2</i>
Machine hours per unit	0.5 hours	0.2 hours	0.3 hours
Throughput per machine hour	\$3.20*	\$5.00	\$4.00

\* \$1.60 / 0.5 hours = \$3.20

**STEP 4 Rank products**

<i>Product A</i>	<i>Product B</i>	<i>Product C</i>
3rd	1st	2nd

**STEP 5 Allocate resources to arrive at optimum production plan**

The profit-maximizing weekly output and sales volumes are as follows.

Product	Units	Bottleneck resource hours/unit	Total hours	Throughput per unit \$	Total throughput \$
B	4,000	0.2 hours	800	1.00	4,000
C	5,000	0.3 hours	<u>1,500</u>	1.20	6,000
			2,300		
A (bal. fig.)	3,400	0.5 hours (bal fig)	<u>1,700</u>	1.60	<u>5,440</u>
			4,000		<u>15,440</u>
Less operating					

expenses      (10,880)  
Profit per week      4,560

**Exercise 1**

A factory produces two products, A and B. Both products pass through three processes; Process 1, Process 2 and Process 3. Process 2 has been identified as the bottleneck. There are 10 hours of Process 2 time available per day. Information relating to the two products is as follows:

	<b>A</b>	<b>B</b>
	<b>\$</b>	<b>\$</b>
Selling price per unit	100	80
Direct materials per unit	70	60
Direct labour per unit	5	10
Traditional contribution per unit	25	10
Maximum demand per day	8	14
Time on Process 2 per unit (hours)	1	0.5

**Required:**

**Determine the daily production plan that would maximise throughput contribution.**



### 3.4 Throughput Accounting Ratio

The **throughput accounting ratio** (TA ratio) is the ratio of the throughput per unit of bottleneck resource to the factory cost per unit of bottleneck resource. This ratio should be as high as possible, and certainly more than 1.0.

$$\text{Throughput accounting ratio} = \frac{\text{throughput per bottleneck resource}}{\text{factory cost per bottleneck resource}}$$

$$\text{Factory cost per unit of bottleneck resource} = \frac{\text{total factory cost}}{\text{total bottleneck resource}}$$

A TA ratio that is not much **higher than 1.0** is barely profitable. The aim should be to achieve as high a TA ratio as possible.

Products can be ranked in order of priority for manufacture and sale in order of their TA ratios. (**Higher TA ratios should be given priority over lower TA ratios**).

However, ranking products in order of priority according to their TA ratio will always give the same ranking as putting them in order of throughput per unit of bottleneck resource.

### Exercise 2

Continuing on from *Exercise 1*. The factory costs per day are as follows:

	\$
Labour costs	120
Variable overheads	180
Fixed overheads	50
Total costs per day	350

**Required:**

**Calculate the TPAR for products A and B.**

### 3.5 How Can A Business Improve The Throughput Accounting Ratio?

In an exam question on throughput accounting, you may be asked about ways in which the TA ratio for a product might be increased. The ratio is increased by either:

- (a) Increasing the throughput per bottleneck hour, or
- (b) Reducing the operating cost per bottleneck hour.

The TA ratio could be increased in any of the following ways.

**Increase the selling price for the product.** This will increase the throughput per unit, and so will increase the throughput per unit of bottleneck resource.

**Reducing the material cost per unit.** This will increase the throughput per unit, and so will increase the throughput per unit of bottleneck resource.

**Improve efficiency, and increase the number of units or product that are made in each bottleneck hour.** This would increase total throughput per hour. The operating costs per hour would be unaffected, therefore the TA ratio would increase.

**Reduce expenditure on operating costs/factory costs.** This will reduce the operating cost per unit of bottleneck resource.

**Elevate the bottleneck,** so that there are more hours available of the bottleneck resource. Throughput per unit of bottleneck resource would be unaffected but, since operating costs are all fixed costs and there are more bottleneck hours available, the operating cost per bottleneck hour would fall, and the TA ratio would increase. However, there may be adverse consequences from some of these measures.

## 4. Environmental Management Accounting

### 4.1 Introduction

Management accountants need to be aware of the environmental costs associated with business activities. The general public are becoming more conscious about environment and therefore customer habits and choices are being influenced by environmental factors and whether businesses are perceived as being 'green'.

Businesses, however, often face difficulties with **defining, identifying** and **controlling** environmental costs.

### 4.2 Achieving Business and Environmental Benefits

**Bennett and James** suggested six ways in which business and environmental benefits could be obtained through environmental management accounting:

1. Taking account of environmental effects in making capital expenditure decisions.
2. Better understanding of environmental costs that are otherwise hidden in other overheads that management is unaware of.
3. Reducing waste and saving energy.
4. Understanding environmental effects on life-cycle costs, many of which are incurred at the end of a product's life (e.g. to dispose of electronic goods in accordance with local laws on recycling).
5. Measuring environmental performance as stakeholders are becoming more interested in the impact that organisations have on the environment.
6. Involving management accountants in longer-term strategic planning for environmental-related issues.

### 4.3 Defining Environmental Costs

Hansen and Mendoza (1999) suggested that environmental costs could be classified as:

Classification	Definition	Examples
Environmental prevention costs	The costs of activities undertaken to prevent the production of waste	Redesigning processes to reduce the amount of pollution released into the atmosphere
Environmental detection costs	Costs are those incurred to ensure that the organisation complies with regulations and voluntary standards	Auditing the organisation's environmental activities
Environmental internal failure costs	Costs are costs incurred to clean up environmental waste and pollution before it has been released into the environment	Disposing of toxic waste
Environmental external failure cost	Costs incurred on activities performed after discharging waste into the environment	Cleaning up an ocean after spilling oil

The US Environmental Protection Agency (1998) as cited by ACCA (2016) defined the following costs:

Classification	Definition	Examples
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Conventional costs	Ordinary use of equipment, material and overhead costs where the environment would benefit from decreased use	Buying energy and other scarce resources
Potentially hidden costs	Costs hidden in overheads	Design cost of more environmentally friendly processes
Contingent costs	potential future costs	Cleaning up damage caused by pollution
Image and relationship costs	Costs incurred to manage perception/image	Tree planting

Much business activity takes place at the cost of the environment.

**Externalized costs** are those for which wider society has to 'pay' at least an element - eg global warming.

**Internalized costs** are those impacts are contained within the organization.

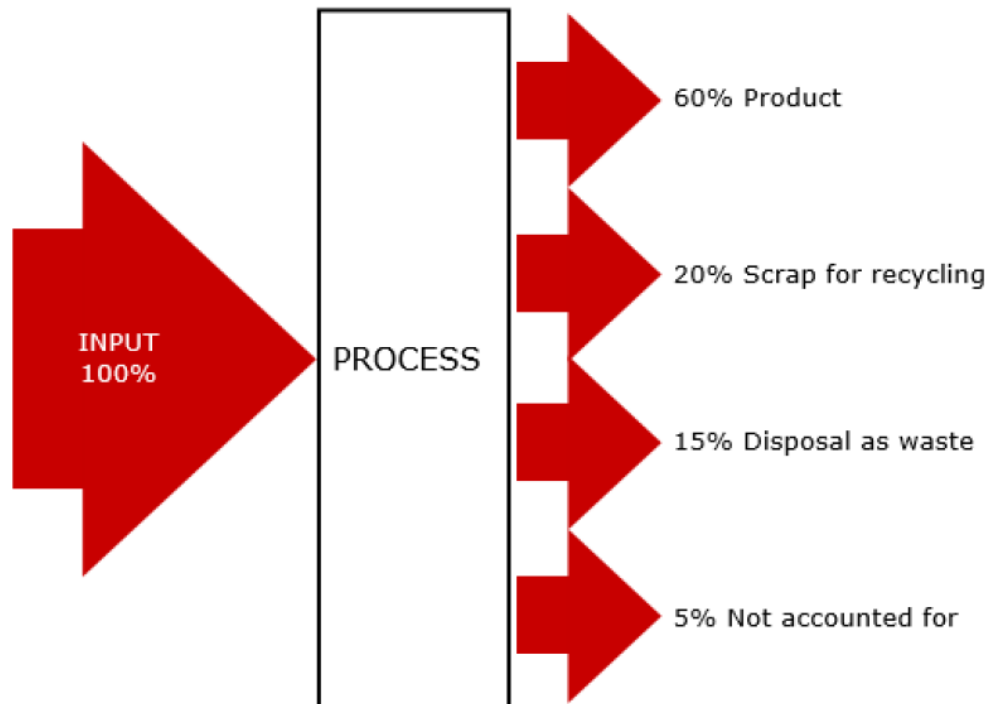
#### 4.4 Environmental management accounting

**EMA – the identification, collection, analysis and use of** two types of information for internal decision-making: **physical information** on the use, flows and rates of energy, water and materials (including wastes); and **monetary information** on environment-related costs, earnings and savings.

#### 4.5 Four Management Accounting Techniques for Identify and Allocate Environmental Costs

##### 4.5.1 Input/output flow analysis

Input output analysis of "mass balance" aims to make it clear to management how much waste is being generated by their activities. The aim is simply to compare the output of a production process (in physical units) with the input on the basis that "what comes in must go out". What is not included in the output must therefore be waste. Process flows are often used to show these more specifically. For example:



#### 4.5.2 Flow cost accounting

Flow cost accounting is a more detailed version of input-output analysis. Flow cost accounting examines not only the physical quantities of material, but also the costs and values of output and waste for each process. So the costs of input into each process are calculated and apportioned between the output of the process and waste using process costing principles.

The costs used in flow cost accounting are sometimes categorised as follows:

- Material costs;
- System costs, which are the costs incurred within the various processes which add value to the product (e.g. wages and overheads);
- Delivery and disposal costs, which are incurred in delivering goods to customers or disposing of waste.

#### 4.5.3 Activity-based costing

Environmental activity-based costing combined elements of environmental costing with an activity-based costing system. Environment costs can be divided into two categories.

- (a) **Environment related costs**, such as an incinerator or a sewage treatment plant, for which costs can be directly traced
- (b) **Environment driven costs**, which are normally hidden within total overheads in a conventional costing system

#### 4.5.4 Life cycle costing

Under this method of environmental cost accounting, environmental costs for a product are considered from the **design stage** of the product right up to the **end of life costs**, such as decommissioning and removal.

By identifying the environmental costs of a product over its entire expected life, including the costs of clean-up and disposal at the end of the product's life, management can make a decision about whether the environmental costs are acceptable, or they can consider ways of reducing the costs to a more acceptable level.

These decisions can be made before the product is actually brought into production.

### 4.6 Accounting for Environmental and Sustainability Factors

There is increasing demand from society that organisations be held responsible for a range of sustainability issues, which will ultimately affect their financial performance and ability to generate value over time. Accountants play a central role in helping organisations navigate these opportunities and risks.

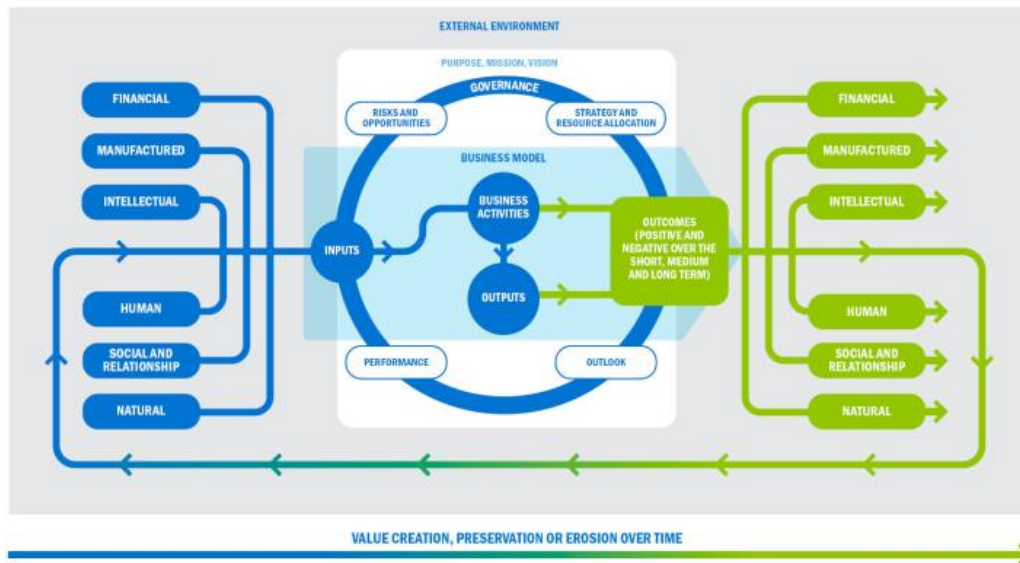
#### Definition

**Sustainability** – meeting the needs of the present without compromising the ability of future generations to meet their own needs.

– *United Nations Bruntland Commission (1987)*

#### 4.6.1 <IR> Framework

Sustainable value creation by organisations relies on a broad set of inputs (capitals), which are increased, decreased, or transformed by the organisation's activities. The principle is that organisations are part of an interconnected system, and understanding how this integration applies to sustainability helps build more resilient businesses that generate value over time.



#### 4.6.2 Sustainability Strategy Perspectives

A sustainability strategy means building value for shareholders while contributing to the needs of a sustainable society. Therefore, the accounting process supporting this mandate must account for the multiple perspectives required to inform the necessary decisions.

This requires an integrated and externally-oriented focus on what truly drives sustainability within the organisation, with a focus on four perspectives:

- Value creation from capitals
- Stakeholder perspectives
- Megatrends affecting opportunities and threats
- Customer preferences

These perspectives are summarised in the diagram below.



#### 4.6.3 Role of Accountants in Developing Sustainable Practices

A report by the International Federation of Accountants (IFAC) *Accounting for Sustainability* lists actions that professional accountants can focus on to drive sustainability in their organisation:

These actions are centred on three main areas:





Area	Aspects
<b>Leadership and Business Strategy</b>	<p><b>Make sustainability strategic, not just tactical</b> Finance has the skills and ability to support the business to ensure sustainability initiatives are strategic rather than tactical in nature:</p> <ul style="list-style-type: none"> <li>• Identifying the business case at an organisational, project or issue level;</li> <li>• Facilitate leadership and commitment;</li> <li>• Engage the finance and accounting function;</li> <li>• Connecting sustainability to strategy, risk and performance, and identifying how decisions can be enhanced by integrating sustainability-related information into areas such as business planning, risk and performance management and investment appraisal.</li> </ul>
<b>Management, Operations and Accounting</b>	<p><b>Improve the process of information and data collection, analysis and reporting</b> Finance professionals bring the rigour and discipline used in accounting to collect, analyse and report sustainability data. They need to work closely with sustainability professionals and others to understand what information needs to be captured and how it will be used:</p> <ul style="list-style-type: none"> <li>• Generating information and analysis to support decisions;</li> <li>• Reducing the sustainability impact of products, services and operations.</li> </ul>
<b>Communications, Reporting and Disclosure</b>	<p><b>Integrate with reporting</b> Finance professionals are best placed to incorporate meaningful sustainability performance information into business reporting processes and disclosures and to inform stakeholders of an organisation's ability to create value over time:</p> <ul style="list-style-type: none"> <li>• Developing a business reporting strategy and approach;</li> <li>• Integrating sustainability impacts into financial reporting;</li> <li>• Assuring Sustainability Disclosures and Reports.</li> </ul>

## Summary

### Summary and Quiz

- Target costing attempts to achieve an acceptable margin in a situation where the price of a product or service is determined externally by the market. It can be used during the design phase of a new product (to "design out" costs) for existing products.
- Techniques that may be used in closing a target gap include:
  - Tear down analysis ("reverse engineering");
  - Value engineering; and
- Life-cycle costing involves tracking the cumulative costs and revenues through the states of a product from development to abandonment. It encourages management to plan the pricing strategy for a product over its life rather than the short term.
- According to the theory of constraints there is always at least one constraint (a bottleneck) that limits the achievement of a goal.
- Throughput accounting draws management's attention to bottleneck processes.
  - Throughput contribution means sales revenue less material cost.
  - Throughput accounting aims to maximise the throughput generated per hour by eliminating bottlenecks.
  - A product breaks even if its throughput accounting ratio (TPAR) is 1.
- Environmental management accounting (EMA) aims to provide management with monetary and non-monetary (physical) information to enable them to understand and manage the environmental impact of the organisation's activities.
- Environmental costs include:
  - Conventional costs;
  - Potentially hidden costs;
  - Contingent costs; and
  - Image and relationship costs.
- Techniques used in EMA include input/output analysis as well as ABC and life-cycle costing.
- Accountants must be able to link sustainability to the broader business agenda by highlighting elements that build resilience and develop a sustainable strategy.