CHAPTER 2

An introduction to cost terms and purposes

Teaching tips and points to stress

Costs in general

Cost assignment is a general term for attaching either direct or indirect costs to cost objects. The distinction between direct and indirect costs is important because direct costs are directly traced to the cost object, while indirect costs are often pooled and then allocated to the cost object with less precision. Management therefore has more confidence in the accuracy of direct costs. The text uses the term cost tracing to refer specifically to assigning direct costs to cost objects. Cost allocation is reserved for assigning indirect costs to cost objects.

Cost objects include (1) activities or processes, (2) outputs of processes, such as products, services and projects; (3) parts of the organisation (e.g. departments or programmes); and (4) customers. Information on costs associated with these cost objects facilitates decisions such as (1) which manufacturing process is most economical, (2) what price should be charged for the service, (3) which department uses its resources most efficiently and (4) which customers contribute most to the company's profits. There is more to cost accounting than product costing.

Direct costs and indirect costs

Students have trouble with the distinctions between direct/indirect costs and cost tracing/cost allocation. Familiar examples can help. Public accounting firms directly trace direct professional labour costs to each audit engagement (through time sheets). In contrast, rent on the firm's office and depreciation on its computers cannot be traced to individual engagements. These are indirect costs that must be allocated to the different engagements. Allocation of indirect costs is a difficult but important topic that is covered in more detail in later chapters.

Example: Is photocopying a direct or an indirect cost with respect to department cost objects? In the past, it was difficult to keep track of the amount of copying done by different departments. Moreover, there was generally less copying. Photocopying was typically considered an indirect cost because it was often an immaterial amount and hard to trace. Today, businesses are making more photocopies than ever before. Counters inserted into copiers (copy keys) easily keep track of the number of copies made by each user. Because copying costs are now higher and easier to trace, they are more often directly traced. (An additional benefit of the counters is that they may induce employees to make fewer copies because the number of copies is now more observable.)

Cost drivers and cost management

Cost management occurs when managers actively strive to reduce costs. Two major avenues for cost management are focusing on value-added activities (and eliminating non-value-added activities such as stock handling) and reducing consumption of cost drivers in value-added activities. Reduced consumption of cost drivers reduces costs only if managers actively squeeze costs down. As more managers do their own word processing, typing by secretaries declines.

But unless management reduces the number of secretaries in response to the reduced workload, secretarial costs will not reduce.

Two types of cost behaviour pattern: variable costs and fixed costs

The distinction between variable costs (VCs) and fixed costs (FCs) is necessary to address basic questions such as how much manufacturing costs change if the level of output increases by 5%. For example, many fast-food restaurants guarantee workers only an hour or two of work per shift. If sales are less than expected, workers can be dismissed for the shift after their guaranteed hour (or two). In this case, direct-labour cost varies directly with output (sales). In contrast, many government workers are salaried and cannot be dismissed except under extreme circumstances. Here, direct-labour costs for a government department are relatively fixed.

Students are often confused about when VCs are variable, and when FCs are fixed. Variable costs vary in total and FCs are fixed in total. However, VCs per unit are consistent, and FCs per unit decline as more units are produced.

Total costs and unit costs

Students often treat 'unitised' fixed costs as if they were variable costs, forgetting that fixed costs are fixed in total. They attempt to calculate total costs by multiplying the cost per unit by the number of units. Because of this misleading nature of unitised fixed costs, it is better to base projections and comparisons on total costs. When estimating total costs, students should consider variable costs as an amount per unit and fixed costs as a lump sum total amount.

Financial statements and cost terminology

The basic concepts of assigning costs to cost objects (and using this information for planning and control) apply to service, merchandising and manufacturing companies. Students find it easier to grasp the basic concepts by starting with service companies, which are the simplest as they have no stocks. Merchandisers add the complications of purchases and stocks. The final step is manufacturers, which is more difficult due to the complexities of cost of good manufactured (CGM) and the three types of stock.

Solutions to review questions

2.1 A cost object is anything for which a separate measurement of costs is desired. Examples include a product, a service, a project, a customer, a brand category, an activity, a department and a programme.

2.2 Costs are not direct or indirect in isolation. A cost object (such as a product, service or project) must be specified.

- Direct costs of a cost object are those costs that are related to the particular cost object and that can be traced to it in an economically feasible (cost effective) way.
- Indirect costs of a cost object are those costs that are related to the particular cost object but cannot be traced to it in an economically feasible (cost effective) way.

Assume that the cost object is a Macintosh computer product. Apple assembles multiple products in each of its plants. The computer screen is a direct cost of the Macintosh. In contrast, the salary of the security guard at the plant where the Macintosh is assembled would be an indirect cost of the Macintosh.

2.3 Consider a supervisor's salary in a maintenance department of a telephone company. If the cost object is the department, the salary is a direct cost. If the cost object is a telephone call by a customer, the salary is an indirect cost.

2.4 Factors affecting the classification of a cost as direct or indirect include:

1 the materiality of the cost in question

2 available information-gathering technology

3 design of operations

4 contractual arrangements.

2.5 A cost driver is any factor that affects total costs. Examples include:

Business function	Example of cost driver
Research and Development	Number of research projects
Design	Number of products in design
Production	Number of units produced
Marketing	Number of advertisements run
Distribution	Number of items distributed
Customer service	Number of service calls

2.6 The relevant range is the range of the cost driver in which a specific relationship between cost and driver is valid. This concept enables the use of linear cost functions when examining cost-volume-profit (CVP) relationships as long as the volume levels are within that relevant range.

2.7 A unit cost is calculated by dividing some total cost (the numerator) by some number of units (the denominator). In many cases the numerator will include a fixed cost that will not change despite changes in the number of units to be assembled. It is erroneous in those cases to multiply the unit cost by volume changes to predict changes in total costs at different volume levels.

2.8 Descriptions of the three sectors are:

- Service-sector companies provide services or intangible products to their customers - for example, legal advice or an audit. These companies do not have any stock of intangible products at the end of an accounting period.
- Merchandising-sector companies provide tangible products they have previously purchased in the same basic form from suppliers. Merchandise purchased from suppliers but not sold at the end of an accounting period is held as stock.

- Manufacturing-sector companies provide tangible products that have been converted to a different form from the products purchased from suppliers. At the end of an accounting period, stock of a manufacturer can include direct materials, work in progress and finished goods.

Thus, manufacturing and merchandising companies have stock while service companies do not. Manufacturing companies have direct materials, work in progress and finished goods stock whereas merchandising companies have only goods purchased for resale stock (merchandise stock).

2.9 The three major categories of the stockable costs of a manufactured product are:

1 direct materials costs

2 direct manufacturing labour costs

3 indirect manufacturing costs.

2.10 *Direct materials costs*: The acquisition costs of all materials that eventually become part of the cost object (say, units finished or in progress) and that can be traced to that cost object in an economically feasible way. Acquisition costs of direct materials include freight-in (inward delivery) charges, sales taxes and customs duties. *Direct manufacturing labour costs*: The compensation of all manufacturing labour that is specifically identified with the cost object (say, units finished or in progress) and that can be traced to the cost object in an economically feasible way. Examples include wages and fringe benefits paid to machine operators and assembly-line workers.

Indirect manufacturing costs: All manufacturing costs considered to be part of the cost object (say, units finished or in progress) but that cannot be individually traced to that cost object in an economically feasible way. Examples include power supplies, indirect materials, indirect manufacturing labour, plant rent, plant insurance, property taxes on plants, plant depreciation and the compensation of plant managers.

Prime costs: All direct manufacturing costs. In the two-part classification of manufacturing costs, prime costs would comprise direct materials costs. In the threepart classification, prime costs would comprise direct materials costs and direct manufacturing labour costs.

Conversion costs: All manufacturing costs other than direct materials costs.

Solutions to exercises

2.11 **Total costs and unit costs.** (10 min)

1 Total cost, €40,000. Unit cost per person, €40,000 ÷ 500 = €80.00

2 Total cost, €40,000. Unit cost per person, €40,000 ÷ 2,000 = €20.00

3 The main lesson of this problem is to alert the student early in the course to the desirability of thinking in terms of total costs rather than unit costs wherever feasible. Changes in the number of cost driver units will affect total variable costs but not total fixed costs. In our example, it would be perilous to use either the €80.00 or the €20.00 unit cost to predict the total cost because the total costs are not

affected by the attendance. Instead, the student association should use the €40,000 total cost. Obviously, if the musical group agreed to work for, say €40.00 per person, such a unit variable cost could be used to predict the total cost.

2.13 Total costs and unit costs. (10 min)

1 Unit cost = Total costs ÷ Number of units

	Total costs	Number of units	Unit cost
a	€60,000	200	€300
b	€60,000	250	€240
c	€60,000	300	€200

2 The unit-cost figures per passenger calculated in requirement 1 should play no role in predicting the total air-flight costs to be paid next month. Weltferien pays Saxon-Air on a per round-trip flight basis, not on a per passenger basis. Hence, the cost driver for next month is the number of round-trip flights, not the number of passengers.

2.14 Classification of costs, service sector. (15-20 min)

Cost object: Each individual focus group

Cost variability: With respect to changes in the number of focus groups

There may be some debate over classifications of individual items. Debate is more likely as regards cost variability.

Cost item	D or I	V or F
A	D	V
B	I	F
C	I	V[a]
D	I	F
E	D	V
F	I	F
G	D	V
H	I	V[b]

[a] Some students will note that phone call costs are variable when each call has a separate charge. It may be a fixed cost if Presta-Serviços has a flat monthly charge for a line, irrespective of the amount of usage.

[b] Petrol costs are likely to vary with the number of focus groups. However, vehicles likely serve multiple purposes and detailed records may be required to examine how costs vary with changes in one of the many purposes served.

2.15 Classification of costs, merchandising sector. (15-20 min)

Cost object: Film section of store

Cost variability: With respect to changes in the number of films sold Assumptions may be made over classifications of individual items. This is mainly in relation to cost variability. Whether DVDs and videos cost the same is another matter.

Cost item	D or I	V or F
A	I	F
B	I	V
C	D	V
D	D	F
E	I	F
F	I	V
G	I	F
H	D	V

2.16 Cost drivers and the value chain. (15 min)

1

	Business function area	Representative cost driver
A	Research and development	Number of patents filed with government agency
B	Design of products/processes	Hours spent designing cars
C	Production	Hours assembly line in operation
D	Marketing	Minutes of television advertising time
E	Distribution	Number of cars shipped
F	Customer service	Number of calls to free customer services

2

	Business function area	Representative cost driver
A	Research and development	• Hours of design and testing work
		• Number of new models in development
B	Design of products/processes	• Number of focus groups on alternative models and designs
		• Hours of engineering and retooling
C	Production	• Number of units coming off assembly line
		• Number of models manufactured
D	Marketing	• Number of promotion packages mailed
		• Number of sales
E	Distribution	• Number of cars shipped overseas
		• Number of cars delivered to showrooms
F	Customer service	• Number of cars recalled
		• Number of personnel on free customer phone lines

2.17 Calculating cost of goods manufactured and cost of goods sold. (20-25 min)

Schedule of cost of goods manufactured for the year ended 31 December 2005 (in €million)

	€m	€m
Direct materials used		13.05
Direct manufacturing labour costs		15.10
Indirect manufacturing costs:		
Property tax on plant building	0.45	
Plant utilities	2.56	
Depreciation of plant building	1.35	
Depreciation of plant equipment	1.65	
Plant repairs and maintenance	2.40	
Indirect manufacturing labour costs	3.45	
Indirect materials used	1.65	
Miscellaneous plant overhead	0.60	14.10
Manufacturing costs incurred during 2005		32.25
Add opening work in progress stock, 1 Jan. 2005		3.00
Total manufacturing costs to account for		35.25
Deduct closing work in progress stock, 31 Dec. 2005		3.90
Cost of goods manufactured		31.35

Schedule of cost of goods sold for the year ended 31 December 2005 (in €million)

	€m
Opening finished goods, 1 Jan. 2005	4.05
Cost of goods manufactured (above)	31.35
Cost of goods available for sale	35.40
Closing finished goods, 31 Dec. 2005	5.10
Cost of goods sold	30.30

2.18 Income statement and schedule of cost of goods manufactured. (25-30 min)

Howell Ltd
Income Statement for the Year Ended 31 December 2005
(in £millions)

	£m	£m
Revenues		950
Cost of goods sold:		
Opening finished goods, 1 Jan. 2005	70	
Cost of goods manufactured (below)	645	
Cost of goods available for sale	715	
Closing finished goods, 31 Dec. 2005	55	660
Gross margin		290
Marketing, distribution, and customer-service costs		240
Operating income		50

Howell Ltd

Schedule of cost of goods manufactured for the year ended 31 December 2005

(in £millions)

	£	£
Direct materials costs:		
Opening stock, 1 Jan. 2005	15	
Purchases of direct materials	325	
Cost of direct materials available for use	340	
Closing stock, 31 Dec. 2005	20	
Direct materials used		320
Direct manufacturing labour costs		100
Indirect manufacturing costs:		
Indirect manufacturing labour	60	
Plant supplies used	10	
Plant utilities	30	
Depreciation - plant, building and equipment	80	
Plant supervisory salaries	5	
Miscellaneous plant overhead	35	220
Manufacturing costs incurred during 2005		640
Add opening work in progress stock, 1 Jan. 2005		10
Total manufacturing costs to account for		650
Deduct closing work in progress, 31 Dec. 2005		5
Cost of goods manufactured		£645

2.19 Interpretation of statements. (20-25 min)

1 The schedule in 2.18 can become a Schedule of cost of goods manufactured and sold simply by including the opening and closing finished goods stock figures in the supporting schedule, rather than directly in the body of the income statement. Note that the term cost of goods manufactured refers to the cost of goods brought to completion (finished) during the accounting period, whether they were started before or during the current accounting period. Some of the manufacturing costs incurred are held back as costs of the closing work in progress; similarly, the costs of the opening work in progress stock become a part of the cost of goods manufactured for 2005.

2 The sales manager's salary would be charged as a marketing cost as incurred by both manufacturing and merchandising companies. It is basically an operating cost that appears below the gross margin line on an income statement. In contrast, an assembler's wages would be assigned to the products worked on. Thus, the wages cost would be charged to work in progress and would not be expensed until the product is transferred from finished goods stock to cost of goods sold as the product is sold.

3 The direct-indirect distinction can be resolved only with respect to a particular cost object. For example, in defence contracting, the cost object may be defined as a contract. Then, a plant supervisor's salary may be charged directly and wholly to that single contract.

4 Direct materials used = £320,000,000 ÷ 1,000,000 units = £320 per unit

Depreciation = £80,000,000 ÷ 1,000,000 units = £80 per unit

5 Direct materials unit cost would be unchanged at £320. Depreciation unit cost would be £80,000,000 ÷ 1,200,000 = £66.67 per unit. Total direct materials costs would rise by 20% to £384,000,000, whereas total depreciation would be unaffected at £80,000,000.

6 Unit costs are averages and they must be interpreted with caution. The £320 direct materials unit cost is valid for predicting total costs because direct materials is a variable cost; total direct materials costs indeed change as output levels change. However, fixed costs like depreciation must be interpreted quite differently from variable costs. A common error in cost analysis is to regard all unit costs as one - as if all the total costs to which they are related are variable costs. Changes in output levels (the denominator) will affect total variable costs, but not total fixed costs. Graphs of the two costs may clarify this point; it is safer to think in terms of total costs than in terms of unit costs.

2.20 Finding unknown balances. (20-25 min)

Let G = given, I = inferred.

Step 1:	**Use gross margin formula**	**Case 1**	**Case 2**
	Revenues	£32,000G	£31,800G
	Cost of goods sold	**A** 20,700I	20,000G
	Gross margin	11,300G	**C** 11,800I

Step 2:	**Use schedule of cost of goods manufactured formula**	**Case 1**	**Case 2**
	Direct materials used	£8,000G	£2,000G
	Direct manufacturing labour costs	3,000G	5,000G
	Indirect manufacturing costs	7,000G	**D** 6,500I
	Manufacturing costs incurred	18,000I	23,500I
	Add opening work in progress, 1/1	0G	800G
	Total manufacturing costs to account for	18,000I	24,300I
	Deduct closing work in progress, 31/12	0G	3,000G
	Cost of goods manufactured	18,000I	21,300I

Step 3:	**Use cost of goods sold formula**	**Case 1**	**Case 2**
	Opening finished goods stock, 1/1	£4,000G	£4,000G
	Cost of goods manufactured	18,000I	21,300I
	Cost of goods available for sale	22,000I	25,300I
	Closing finished goods stock, 31/12	**B** 1,300I	5,300G
	Cost of goods sold	20,700I	20,000G

For case 1, do steps 1, 2 and 3 in order.

For case 2, do steps 1, 3 and then 2.

2.21 Fire loss, calculating stock costs. (30-40 min)

1 €50,000 **2** €28,000 **3** €62,000

This problem is not as easy as it first appears. These answers are obtained by working from the known figures to the unknowns in the schedule below. The basic relationships between categories of costs are:

Prime costs (given) = €294,000

Direct materials used = €294,000

Direct manufacturing labour costs = €294,000 - €180,000 = €114,000

Conversion costs = Direct manufacturing labour costs ÷ 0.6
€180,000 ÷ 0.6 = €300,000

Indirect manufacturing costs = €300,000 - €180,000 = €120,000
(or 0.40 = €300,000)

Schedule of Calculations

			€
Direct materials, 1/1/2005			16,000
Direct materials purchased			160,000
Direct materials available for use			176,000
Direct materials, 26/2/2005	**3**	=	62,000
Direct materials used (€294,000 - €180,000)			114,000
Direct manufacturing labour costs			180,000
Prime costs			294,000
Indirect manufacturing costs			120,000
Manufacturing costs incurred during the current period			414,000
Add work in progress, 1/1/2005			34,000
Manufacturing costs to account for			448,000
Deduct work in progress, 26/2/2005	**2**	=	28,000
Cost of goods manufactured			420,000
Add finished goods, 1/1/2005			30,000
Cost of goods available for sale (given)			450,000
Deduct finished goods, 26/2/2005	**1**	=	50,000
Cost of goods sold (80% of €500,000)			€400,000

2.22 Comprehensive problem on unit costs, product costs. (30 min)

1 If 2 kg of direct materials are used to make each unit of finished product, 100,000 units × 2 kg, or 200,000 kg were used at €l0.70 per kg of direct materials (€140,000 ÷ 200,000 kg). Therefore, the closing stock of direct materials is 2,000 kg × €0.70 = €1,400.

2

	Manufacturing costs for 100,000 units		
	Variable	**Fixed**	**Total**
Direct materials costs	€140,000	€	€140,000
Direct manufacturing labour costs	30,000	-	30,000
Plant energy costs	5,000	-	5,000
Indirect manufacturing labour costs	10,000	16,000	26,000
Other indirect manufacturing costs	8,000	24,000	32,000
Cost of goods manufactured	€193,000	€40,000	€233,000

Average unit manufacturing cost: €233,000 ÷ 100,000 units

= €2.33 per unit

Finished goods stock in units: €20,970 (given)

= €2.33 per unit

= 9,000 units

3 Units sold in 2005 = Opening stock + Production - Closing stock

= 0 + 100,000 - 9,000 = 91,000 units

Selling price per unit in 2005 = €436,800 ÷ 91,000

= €4.80 per unit

4

Revenues (91,000 units sold × €4.80)		€436,800
Cost of units sold:		
Opening finished goods, 1 Jan. 2005	€ 0	
Cost of goods manufactured	233,000	
Cost of goods available for sale	233,000	
Closing finished goods, 31 Dec. 2005	20,970	212,030
Gross margin		224,770
Operating costs:		
Marketing, distribution and customer-service costs	162,850	
Administrative costs	50,000	212,850
Operating income		€ 11,920

Note: Although not required, the full set of unit variable costs are:

Direct materials costs	€1.40	
Direct manufacturing labour costs	0.30	
Plant energy costs	0.05	per unit manufactured
Indirect manufacturing labour costs	0.10	
Other direct manufacturing costs	0.08	
Marketing, distribution, and customer-service costs	1.35	per unit sold

2.25 Revenue and cost recording and classifications, ethics. (25-30 min)

1 Concerns include:

a Total payments made by Aran Sweaters do not 'appear' to be adequately described. Elements of 'total compensation' appear to be:

- €12 million payment to O'Neil in Achill Island
- €4.8 million payment to O'Neil subsidiary in Switzerland
- Assistance with life insurance plans for 'O'Neil executives at rates much more favourable than those available in Achill Island'

One possible motivation for restricting the payment in Achill Island to €12 million is to avoid showing higher profits in Achill Island. A second motivation could be that the Swiss subsidiary is siphoning off revenues to O'Neil senior executives, which should be paid to O'Neil. This could arise if the O'Neil Swiss subsidiary is 'owned' by the senior executives of O'Neil rather than being a 100% subsidiary of O'Neil.

The assistance with the insurance plans is in the grey area. If O'Neil is willing to accept a lower price in return for Aran Sweaters assisting with the insurance plans, it may be a judicious economic decision by Aran Sweaters. Aran Sweaters is not hurt economically in this scenario. The concern is whether Aran Sweaters is assisting the senior executives to divert 'de facto' payments to themselves.

b Product design costs of Aran Sweaters include €4.8 million for 'own product design'. It is stated that the director of product design views it 'as an "off-statement" item that historically he has neither responsibility for nor any say about' and that 'to his knowledge, O'Neil uses only Aran Sweaters designs with either zero or minimal changes'. It may be that the €4.8 million payment is a hidden payment made to avoid Achill Island taxation. However, the result is incorrect classification of product design costs at Aran Sweaters.

c O'Neil receives from Aran Sweaters the margin between €16.8 million (€12 million + €4.8 million) and the €3 million payment for wool,i.e. €13.8 million. Note that Aran Sweaters can assist O'Neil to meet the 25% ratio of 'domestic labour costs to total costs'. Charging €6.00 million for wool and receiving €19.8 million for sweaters will result in the same €13.8 million margin, but will mean O'Neil will not meet the 25% test as total costs will now be €13 million instead of €10 million. Aran Sweaters has to ensure it takes an arm's-length in its approach to supply contracts and purchase contracts or else it may be accused by the Achill Island government of assisting O'Neil to avoid local taxes.

Note: Some students will ask whether O'Neil should be able to classify labour fringe benefits as a domestic labour cost. This is not Sheridan's domain given that she is controller of Aran Sweaters. Her concern with the Achill Island tax rebate is whether Aran Sweaters is being 'pressured' to adjust its billing amounts to facilitate O'Neil to have a ratio of 'domestic labour costs to total costs' exceeding 25%. If you want to discuss this issue, point out that labour fringe benefits are typically an integral part of

labour costs. Hence, if they can be traced, O'Neil is justified in including them in domestic labour costs.

2 There are a variety of ethical issues relating primarily to competence and integrity that Sheridan faces:

a Is Aran Sweaters assisting O'Neil to avoid income taxes in Achill Island either:

- by funnelling €4.8 million to a Swiss company rather than to O'Neil in Achill Island, or
- by understating both the €3 million wool supply cost and the €16.8 total revenue amount?

b Is Aran Sweaters assisting senior executives of O'Neil to enrich themselves at the expense of the shareholders of O'Neil?

c Are the accounting records of Aran Sweaters properly reflecting the underlying activities?

3 Steps Sheridan could take include:

a Seeking further information on why the €4.8 million payment is being made to the Swiss subsidiary. This should be done first internally and then by speaking to O'Neil executives.

b Ensure product design costs at Aran Sweaters reflect actual product design work. So-called 'off-statement' items should be eliminated if no adequate explanation can be given for them.

c Ensure Aran Sweaters personnel follow any company guidelines about supply relations or customer relations. There is nothing inherently wrong with assisting O'Neil negotiate a better insurance package for its executives. The concern is whether developing a 'too cosy' relationship will lead to more questionable practices being overlooked.