

# 12 Costing and pricing

## INTRODUCTION

Organizations need to know the total cost of each product or service they provide to their customers for the following reasons:

- to value work-in-progress and completed work as current assets in the balance sheet;
- to determine the cost of sales to enter in the profit and loss account;
- to control product costs by comparing them with a predetermined target or standard cost;
- to know what profit is made at any particular selling price;
- to fix selling prices based on total cost, although it should always be borne in mind that there are other non-cost influences on prices.

When prices are cost based, this calculation usually takes place before the order is received from the customer. This is the case when an estimate or quotation is requested for one-off or purpose-built items. Where standardized products are concerned, the normal selling price is usually based on the total cost incurred on producing the product or providing the service. An element of profit is added in both cases for profit-seeking enterprises.

Sometimes work may be undertaken on a *cost plus* basis, meaning that the supplier will be reimbursed for all legitimate direct costs plus an

agreed percentage for overheads plus a further agreed profit percentage. Some government contracts are let out on this basis. The selling price in these cases can only be worked out after the event. The costing procedure for working out the production cost of any product or service is the same, irrespective of whether it takes place before or after the work is completed. This procedure is called *absorption costing* by accountants and is a key step towards *full cost* or *total cost* pricing.

## ABSORPTION COSTING

This term was chosen to describe the approach whereby products are charged with all the direct costs associated with each product and also absorb a share of the total production overheads. We can therefore say:

$$\boxed{\text{Total production cost}} = \boxed{\text{Direct costs}} + \boxed{\text{Share of production overheads}}$$

### Example

A jobbing printer receives an enquiry for 100,000 leaflets of A5 size printed in black ink. The cost estimator has prepared the following estimate of resources required to do the job:

#### Direct costs:

- Paper – 204 reams of A4 at £3 per ream
- Ink – 2 litres at £9 per litre
- Labour time – 2 hours at £15 per hour

#### Indirect costs:

- Production overheads and machine utilization – 2 hours at £55 per hour.

The total production cost is as follows:

	£
<i>Direct costs:</i>	
Paper	612
Ink	18
Labour	30
<i>Indirect costs:</i>	
Production overheads	<u>110</u>
<b>Total production cost</b>	<b><u>£770</u></b>

The precise methods used, and overhead recovery rates charged, vary from one organization to another and depend on whether one global rate, multiple departmental rates or cost driver activity rates are employed.

## FULL COST PRICING

The above example of a product absorbing production overheads is an important stage on the way to finding the total cost and then adding a profit margin to arrive at a selling price. Full cost pricing can be described as:

<b>Direct costs</b>	+	<b>Share of overheads</b>	+	<b>Profit margin</b>	=	<b>Selling price</b>
Direct materials		Production overheads				
Direct labour		Administrative overheads				
Direct expenses		Selling + distribution overheads				

### Example

Returning to our earlier example, let us now assume that selling, distribution and administration overheads are recovered by charging £20 per hour and an extra 10 per cent of total costs is added for profit.

The quoted selling price can now be completed as follows:

<b>Direct costs:</b>	£
Paper	612
Ink	18
Labour	30
<b>Indirect costs:</b>	
Production overheads	<u>110</u>
Total production cost	770
Other overheads	<u>40</u>
Total cost	810
Profit	<u>81</u>
Selling price to quote	<u>£891</u>

In larger firms, a number of departmental overhead recovery rates may be needed to determine total costs. This approach is used to channel overheads only to those products benefiting from the services provided by a particular department.

### Example

The following details have been assembled to work out the price for a job in response to a customer's request:

*Direct materials:* 7.5 kilos at £10.50 per kilo

<i>Direct labour:</i>	Department	Hours	Rate per hour
	Machine shop	2.0	£8
	Assembly dept	1.0	£6
	Packing shop	0.2	£5

*Production overheads:* These are recovered by means of separate hourly recovery rates for each of the above departments.

*Other overheads and profit:* An oncost of 25 per cent to the total production cost to cover selling and administration costs, plus an element of profit.

The annual budgets for overheads for the above three departments are:

<i>Department</i>	<i>Hours</i>	<i>Overheads</i>	<i>Hourly rate</i>
Machine shop	1,000	£50,000	£50.00
Assembly dept	1,500	£22,500	£15.00
Packing shop	800	£26,000	£32.50

The price quotation can now be prepared as follows:

		£	£
Direct materials:	7.5 kilos at £10.50		78.75
Direct labour:	2 hours at £8	16.00	
	1 hour at £6	6.00	
	0.2 hours at £5	<u>1.00</u>	23.00
Overheads:	2 hours at £50	100.00	
	1 hour at £15	15.00	
	0.2 hours at £32.50	<u>6.50</u>	<u>121.50</u>
Total works cost			223.25
Oncost of 25% for selling and administration overheads plus profit			<u>55.81</u>
Selling price to quote to customer			<u><u>£279.06</u></u>

## PROFIT MARGINS

Profit margins can vary very much between firms in the same industry and also from one industry to another. To understand why they vary we need to look again at the relationship of three key accounting ratios – return on capital, profit margin and turnover of capital, which were first described in Chapter 9.

Most profit-seeking firms set financial objectives in the form of a return on capital. If a firm had £2 million capital invested in business assets then it might regard a pre-tax annual profit of £400,000 as reasonable. This equates to a 20 per cent return on capital.

If this annual profit of £400,000 was earned on sales of £4 million, this gives a profit margin of 10 per cent. These sales of £4 million, when related to the capital employed of £2 million, result in a turnover of capital of two times, ie each £1 of capital generates £2 of sales in the year.

These three ratios are related to each other as follows:

$$\begin{array}{rclcl} \text{Return on capital} & = & \text{Profit margin} & \times & \text{Turnover of capital} \\ 20\% & = & 10\% & \times & 2 \end{array}$$

Not all firms earn a 20 per cent return on capital. Some earn more and some less, depending on the state of the economy and the quality of their management. In the long run, a reasonable return on capital is essential for a firm to remain independent and attract new capital to facilitate growth.

Firms also differ in the size of the other two ratios. Some industries have a high profit margin to compensate for a low rate of turnover of capital, as will be found with capital intensive activities, such as electricity generation and electricity distribution. Other industries have a low profit margin compensated by a high turnover of capital rate, as found in construction, civil engineering and food retailing.

The conclusion we can draw from this is that there is no one profit-margin percentage that applies to all firms. Each firm sets its own target in the light of what is achievable in its own industry and circumstances. The 10 per cent profit margin used in the estimating example may or may not be typical of the printing industry. We would have to look at the results of surveys carried out by their trade associations, or business monitoring organizations, to know what was the norm.

Drury (see Further reading) states that companies are often too simplistic in their approach to pricing models. The most successful, in his view, use cost-plus pricing, but in a flexible manner.

This does not necessarily mean that profit-seeking companies stick rigidly to prices determined by total costs. Companies use absorption costing as a long-term guide to what they need to sell at to earn a reasonable rate of return. In the short term, companies often trim their prices to suit market conditions. This can be disguised by the use of discounts as opposed to an overt price cut. This angle is explored more

in the following chapter on marginal costing where the concept of *contribution* is introduced.

Some industries are dominated by just one or only a few large suppliers. Small firms in these industries may have to be price followers rather than price determiners, unless they can differentiate their products on service or quality grounds.

## COSTING METHODS

Working out the total cost of a product may not be quite as straightforward as it sounds in some industries where different methods of production or operations are used. There are a number of costing methods specifically designed to suit the way a particular product is made or service provided in varying industries and sectors. These costing methods go under various names:

- job costing;
- batch costing;
- contract costing;
- process costing;
- service costing.

Essentially, these five methods derive from only two main forms – *job costing* or *process costing*. We now look at the distinguishing features of each costing method.

### **Job costing**

This applies where an individual job is carried out to a customer's specification, either at the supplier's premises or at the customer's premises. Jobbing printing and repairs to domestic appliances are relevant examples. The earlier examples (building up costs to quote a price) illustrated job costing.

Each job is costed as a separate entity and given its own unique *job number* in the cost coding system. This number is inserted on all prime documents – timesheets, stores issue notes and invoices – so that all direct costs related to each particular job are specifically charged to it. Overheads are added later in line with the recovery methods and recovery rates used by that firm. In this way the total cost of each job is gradually built up until the job is physically completed. This information can all be recorded by

computer, but in some firms a *job card* may accompany the work through its various stages and departments. Resources consumed are logged onto the job card as the work progresses, in the same way as it would be entered on a computer record of the same job number.

## Batch costing

Where a number (batch) of identical products (cost units) are produced at one time they are often treated as one job in total and costed as such. The unit cost is therefore the total cost divided by the number of cost units in the batch.

### Example

A batch of 1,000 washing machines was produced by a factory last week. Direct costs of labour and material parts charged to the job number for this batch amounted to £80,000. Overheads attributable to this production were a further £70,000.

$$\text{Unit cost} = \frac{\text{Total cost}}{\text{Number of units}} = \frac{\text{£80,000} + \text{£70,000}}{1,000} = \text{£150}$$

## Contract costing

This applies to any very large job, usually associated with the construction industry, and often carried out at the client's site or premises. This is another variant of job costing, so that each contract, or part of a contract, will have its own job number. However, there are a number of special features of contract costing that distinguish it from job and batch costing.

Direct costs of labour and materials still apply, but there may be additional direct costs for plant hire or work done by subcontractors. Site overhead charges can be specifically charged to an individual contract so the only overhead apportionments needed are those that relate to head office charges.

### Example

#### Contract No 123

	£	
Site wages	20,400	
Site salaries	18,600	
NI, pensions, etc		6,200

Subcontract work		17,000
Internal plant hire		3,500
External plant hire		7,000
Materials delivered to site	46,000	
Site overheads	5,300	
Head office charges	<u>2,750</u>	
Total contract costs to date		<u>£126,750</u>

Progress payments, assessed on the value of work done, help to offset the amount of working capital needed to finance contract work. This system of payment allows contractors and civil engineering firms to carry out multi-million pound schemes with only a relatively small amount of capital.

## Process costing

This system of costing applies to a continuous and ongoing process that never, or rarely, stops. In such circumstances the unit cost cannot be separately recorded as in job costing. The unit cost in process costing is found by dividing the total costs for a period of time by the output over that period.

### Example

The total of all direct and indirect costs for running a coal mine for a week amounted to £6 million. Output during this time amounted to 200,000 tonnes.

$$\text{Cost per tonne} = \frac{\text{£6m}}{200,000 \text{ tonnes}} = \text{£30 per tonne}$$

In some process industries there may be partially completed products at any moment in time so that at the end of an accounting period these need to be converted into *equivalent whole units* in order to calculate the average unit cost of each complete unit.

### Example

A company started a process on 1 March and incurred total costs of £100,000 during the month. Output for the month was 2,000 complete products plus 200 that were 40 per cent partially completed.

$$\text{Cost per unit} = \frac{\text{£100,000}}{2,000 + (200 \times 40\%)} = \frac{\text{£100,000}}{2,080} = \text{£48.07}$$



Further situations in some process industries, for example oil refining, are when products are produced either *jointly* or as a *by-product* of the main process. The costing treatment of by-products, so called because they do not have significant value relative to the main product, is that their *net realizable value* goes to offset the costs of the main product.

However, when products are produced simultaneously in a process, with each product having a significant value on its own, these are referred to as *joint products*. The costing problem this throws up is how to split the common costs incurred up to the separation point. This can be done in one of two ways:

1. *By volume* – the common costs are apportioned *pro rata* to a physical measure of the quantity of each produced; or
2. *By market value* – the common costs are apportioned on the basis of the market value of each joint product at the time of separation.

## Service costing

This system of costing applies to any service industry where a uniform or standard service is provided to customers. In theory it should be easier to cost services than, say, manufactured products, because there are no stocks and work-in-progress to be valued. In practice it may be hard to define some services and to draw boundaries to separate one service from another. Without such definition it will be impossible to cost separate services.

Service costing is similar to process costing in that the total costs of providing the service over a period of time is divided by the quantity of services provided to get a unit cost. Transport or electricity businesses could divide their total costs for a period of time by the activity taking place during that time to lead to the average *cost per passenger mile* or the *cost per kWh* respectively.

### Example

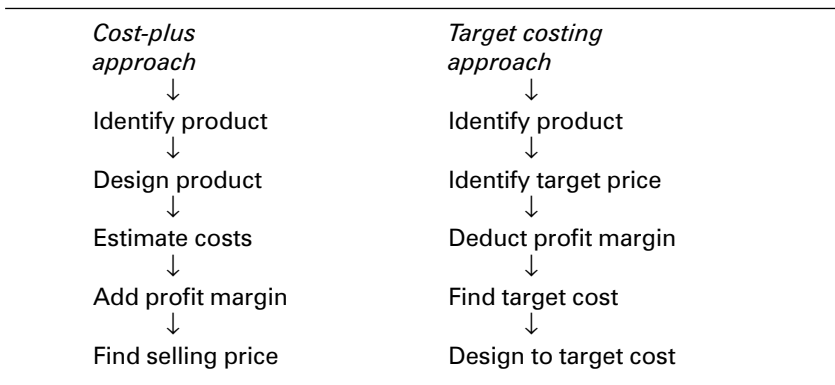
The running costs of a local swimming-pool amount to £16,000 per week. Last week 8,000 people used the pool. The average cost per swim is therefore £2.

Where there is not a single homogeneous service provided, as with a swim, but a mixture of swims, saunas, exercise sessions and the like, then a detailed cost analysis not unlike product costing will be required. Activity-based costing techniques may be employed here to advantage.

The actual unit cost of a service is used to help fix prices or other charges, but can also be used as a basis for cost control. For example, comparisons can be made with past unit costs or with pre-set targets, or by benchmarking with similar organizations.

## TARGET COSTING

This is not so much a costing technique as a management process to drive down costs to a level that will earn a satisfactory margin on the target selling price. This is the very reverse of cost-plus pricing which



**Figure 12.1** Comparison of cost-plus pricing with target costing

builds up direct and indirect costs to a total cost, then adds a profit margin to arrive at the selling price, as shown in Figure 12.1.

Target costing is attributed to the car manufacturer Toyota as far back as the 1960s and was widely copied by other Japanese manufacturers. More recently it has been adopted in other countries, not least those hosting Japanese-owned plants and their satellite suppliers. Whereas cost-plus pricing, if rigidly adhered to, ignores the customer and the state of the market, target costing is market driven and starts at the customer end. It addresses what the customer will be prepared to pay and what competition will allow to be charged.

The main thrust of target costing is in the design stage. Multi-discipline teams are formed to look at all aspects of product design, customer usage, value engineering and production processes. It is said that cost reduction is much more easily achieved at the pre-manufacturing stage than after the product is designed and into regular production.

## INFLATION

When estimating future costs to establish an overhead recovery rate, full allowance for the anticipated rate of inflation should be made for the review period. Similarly, when actually quoting estimates or fixing selling prices, the up-to-date cost of materials and depreciation should be used. To do otherwise will not result in sufficient profit being made to replace the resources consumed at today's prices.

### Further reading

- Bhimani, A and Okano, H (June 1995) Targeting excellence: target cost management at Toyota in the UK, *Management Accounting*, June.
- Drury, C (2004) *Management and Cost Accounting*, Thomson Learning, Stamford, CT.
- Glautier, MWE (2004) *Accounting Theory and Practice*, FT Prentice Hall, Harlow.
- Recording and Evaluating Costs and Revenues* (2007), Kaplan Press, Wokingham.

### Self-check questions

1. Prepare a price quotation for the jobbing printer (mentioned early in the chapter) who has now received an order for 10,000 A5 menu cards. Direct materials are estimated at £180 and machine time will take three hours. All other cost and profit information is as before.
2. What size profit margin is required to give a return on capital of 30 per cent when the turnover of capital is two times?
3. What costing method is most suited to oil refining?
4. How would a local authority know if its unit cost for providing a particular service was high, low, or indifferent?
5. What two bases can be used to split the common costs of joint products up to the separation point?
6. What is the purpose of target costing?

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