

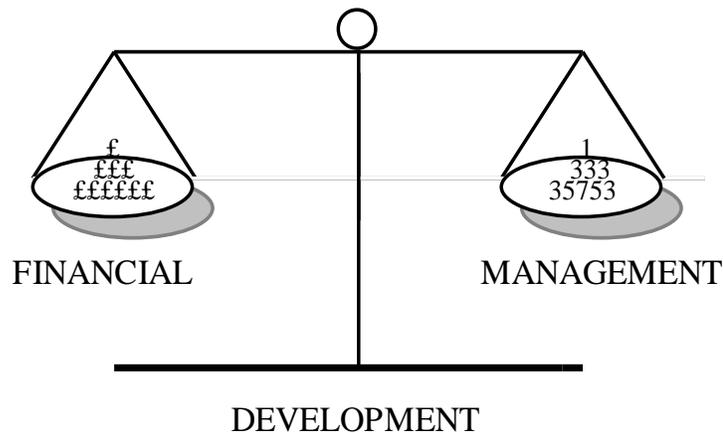
FINANCIAL MANAGEMENT DEVELOPMENT

Financial Accounting

University Accounting

NO 163

COSTING



ONE OF A SERIES OF GUIDES FOR
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This is one of a series of documents produced by David A Palmer as a guide for managers on specific financial topics to assist informed discussion. Readers should take appropriate advice before acting upon any of the issues raised.

COSTING IN UNIVERSITIES

THE NATURE OF COSTS

There are many different types of cost. However it is vital to realise that no one cost is appropriate for all decisions. True cost analysis and its use in decision making involves considering the future not just relying on the past. The most commonly used cost is the amount spent on an item to get it to its current state or the amount of an expense. This is the Historic Cost. It is the keystone of Financial accounting and is used to calculate profit by deducting it from sales value. Other categories of cost are:

Variable costs	Costs which directly vary with the volume sold or produced. Examples include materials or overtime.
Fixed costs	Costs which are not related to volume. Examples include rent or heating costs.
Direct Costs	Costs which can be identified with particular courses, processes or parts of an organisation. Examples include the materials on a technology course or the depreciation cost of machinery used for a particular course.
Indirect Costs	Costs which are not directly connected with that particular course, process or part of the organisation and which therefore may have to be allocated or apportioned on some arbitrary basis. An example is the rent of a campus which is apportioned to the various faculties on the basis of floorspace occupied.
Marginal Cost	The cost of one more unit. This may be a little or a lot depending on the state of capacity. It will change with circumstances. If a campus is working at half capacity then there may be no marginal cost of performing an extra task. If it is already at full capacity then the cost of accepting one more unit might be the cost of setting up a new campus.
Sunk Cost	A past cost irrelevant for future decisions. An example is the cost of a machine which is obsolete, the original cost is of no assistance in any management decision for the future. A current example is original cost of the Channel Tunnel.
Opportunity cost	The cost of the next best alternative which would be foregone if a particular course of action were taken. The cost of your time on a training course is not your salary but the loss of the value you would have added to your organisation if you had done something else.

FIXED AND VARIABLE COSTS FOR RISK ASSESSMENT

In the short term all costs are fixed, in the long term all costs are variable. It depends on timescale and the level of the review. However the split between fixed and variable costs is vital to assess the impact of changes in the level of demand. Consider two companies.

TWO COMPANIES - SAME SALES, SAME COSTS DIFFERENT STRUCTURESCOMPANY A

	£
SALES	10,000
VARIABLE COSTS	8,000
CONTRIBUTION	<u>2,000</u>
FIXED COSTS	1,000
PROFIT	<u>1,000</u> =====

COMPANY B

	£
SALES	10,000
VARIABLE COSTS	1,000
CONTRIBUTION	<u>9,000</u>
FIXED COSTS	8,000
PROFIT	<u>1,000</u> =====

Both companies have the same profit but which company would you rather work for?

Hopefully those who are sales orientated would opt for company B, while those who are risk averse would opt for company A. The answer depends upon your view of the future.

Recalculate profits under two different scenarios. In the first, sales are expected to rise by 20%. In the second, sales are expected to fall by 20%. Notice that contribution is defined as sales less variable costs, and that variable costs vary directly with sales whereas fixed costs do not.

		SALES UP 20%	SALES DOWN 20%
<u>COMPANY A</u>	£	£	£
SALES	10,000	12,000	8,000
VARIABLE COSTS	8,000	9,600	6,400
CONTRIBUTION	<u>2,000</u>	<u>2,400</u>	<u>1,600</u>
FIXED COSTS	1,000	1,000	1,000
PROFIT	<u>1,000</u> =====	<u>1,400</u> =====	<u>600</u> =====

When Sales are good the contribution rises and since fixed costs do not change the profit is automatically improved. When sales fall by 20% profits are reduced. However, because the majority of costs are variable the company is protected when times are hard. The price it pays for the low risk is the lower reward when sales are good. Examples of such companies are supermarkets, staff agencies and training companies.

	£	£	£
<u>COMPANY B</u>			
SALES	10,000	12,000	8,000
VARIABLE COSTS	1,000	1,200	800
CONTRIBUTION	<u>9,000</u>	<u>10,800</u>	<u>7,200</u>
FIXED COSTS	8,000	8,000	8,000
PROFIT	<u>1,000</u> =====	<u>2,800</u> =====	<u>(800)</u> =====

Because company B has low variable costs it does well when times are good and badly when sales fall. Such companies have cyclical profits and tend to hit the headlines in both good and bad times. Examples are the car industry, merchant banks, estate agents etc. Such companies need to concentrate all their efforts on making sales and because of their cost structure are frequently found to be dumping surplus capacity at marginal cost.

It is commonplace to try to alter the cost structure, by making fixed costs variable to reduce the risk of a down turn in demand. Outsourcing and subcontracting are one approach. More common is redundancy for some, with those retained being asked to work overtime. Employees are a variable cost for companies but a fixed cost for the nation!

FIXED AND VARIABLE COSTS FOR PRODUCT RISK APPRAISAL

The split between fixed and variable costs is vital to assess the break-even point for sales when evaluating a new product or when considering delisting an existing product. For a University this could be a new Course or a new Campus.

The break-even point is defined as being the level of sales when profit is zero. At this point sales less variable costs less fixed costs equals zero.

IF $\text{SALES} - \text{VARIABLE COSTS} - \text{FIXED COSTS} = 0$

THEN $\text{SALES} - \text{VARIABLE COSTS} = \text{FIXED COSTS}$

OR $\text{CONTRIBUTION} = \text{FIXED COSTS}$

Consider the data above as being for two new potential products:

Product A has a contribution ratio of 20%. That is the ratio of contribution to sales value is 20% (2,000/10,000). Thus for every £1 of sales the contribution and therefore the profit for product A increases by 20p.

How many sales of 20p contribution are needed to cover the fixed costs of £1,000?

5,000 or £5,000 worth because $20p \times 5,000 = 1,000$

The same calculation can be carried out for product B

Product B has a contribution ratio of 90% (9,000/10,000). Thus each unit of product B sold will add 90p contribution and therefore 90p profit.

For product B, fixed costs are £8,000. How many 90p's are required to cover £8,000?

8,889 or £8,889 worth because $90p \times 8,889 = 8,000$

Thus if the sales forecast for each product is 10,000, the manager of product A can afford a shortfall of 50% before he makes a loss, while the manager of product B can only afford a shortfall of 11%. If these were two competing new products then the prudent accountant would accept product A before product B.

Break-even analysis can be a useful mechanism for quantifying risk and identifying the action to take to mitigate it. For example if firm orders of 9,000 can be proved for B then there is no risk of it making a loss. Using spreadsheets different levels of demand, prices and costs can be used to establish the best course of action if a reasonable estimate is made of the fixed and variable costs. Estimates are fine in management accounts. It is better to be approximately right than precisely wrong.

FIXED AND VARIABLE COSTS FOR RESOURCE ALLOCATION

When considering whether to take a particular course of action it is vital to consider only those costs which will vary and ignore those which are fixed. Assume a new salesperson is to be recruited and they can sell £10,000 worth of either product A or product B. Which product should they be asked to sell?

If they sell £10,000 of product A the extra profit generated will be £2,000, because each extra unit brings in an extra 20p. If they sell £10,000 of product B the extra profit generated will be £9,000, because each extra unit brings in an extra 90p.

It does not take a degree in finance to appreciate that the sales person should sell product B, the product with the higher contribution ratio. However it is an unfortunate fact that many organisations have no clear picture of the contribution ratios of the various products in their portfolio and thus do not know which products to promote. In Universities are those involved in promoting courses aware which are high contributors and which are not?

DIRECT AND INDIRECT COSTS - THE DANGERS OF COST ALLOCATION

The direct and indirect definition varies with level. All a University's costs are direct for the University as a unit but some will be indirect for the departments within it. It is right to use costs to guide to decisions on pricing, but external pricing needs consideration of direct costs and not corrupted by allocations of total costs which can lead to misleading conclusions.

Assume a campus costs £100,000 per month to run. It expects to teach 1,000 students per month and therefore when budgeting, each student is costed at £100. During the year demand is poor and volume falls to 500 students. There are too many examples of costing systems which would suggest to management that the cost of each student is now £200 and that therefore the price charged should be doubled! This is not the best way of improving income.

In cost conscious organisations "Cost per unit" is often a key measure of efficiency. Beware improvements in cost per unit that result from purchasing more than is required for current needs. Since the units will stay in stock, profit looks fine. Management frequently only discover the problem when they run out of storage space, or worse, cash.

Direct costing is a vital approach when considering new activities. In particular true cost increases should be identified or estimated, rather than arbitrary allocations of overheads based on existing ratios. It is true that all costs have to be covered, but that does not mean that lower priced business should be turned away it merely means that due consideration needs to be given to the cost structure and the market place in both the short and long term.

MARGINAL COSTS

Marginal cost is the cost of the next unit. It embodies the consideration of both the Fixed/Variable analysis and the Direct/Indirect analysis. As a concept it can be very valuable in assisting pricing decisions but it can be very dangerous unless used carefully. Marginal costing of activities is fine, marginal pricing can be disastrous.

1. Costing and Pricing (Standard)

You have established the following data for a three day course:

Tutor £500 per day

Room £300 per day

Materials £30 per delegate

Admin Support £50 per delegate

Overhead and IT costs £400 per course

How many students are required to break even at a price of £375 per student?

Fixed Costs:		£
	Tutor 3 x 500	1,500
	Room 3 x 300	900
	Overheads	<u>400</u>
		2,800

Income per Student	375	or	400
Variable Cost Materials	(30)		(30)
Variable Cost Admin Support	<u>(50)</u>		<u>(50)</u>
Contribution per Student	295		320

- (a) At £375 10 students covers the fixed costs and yields a surplus of £150.
At £400 9 students covers the fixed costs and yields a surplus of £80.

- (b) What is the "profit" if:
- | | |
|-----------------------------------|--------|
| There are 12 students paying £375 | |
| (12 x 295) - 2,800 | = £740 |
| There are 10 students paying £400 | |
| (10 x 320) - 2,800 | = £400 |

2. Costing and Pricing (Marginal)

Assume you have 10 students booked at £375 and another student rings up and asks to join the course; what is the minimum price you should charge?

The variable costs are £80 so the minimum charge is £80. BUT The assumptions include:

The other students will not want a similar deal.

The room can take another person.

The materials are available.

The materials are extra (if there is a spare set then there is no extra cost).

The Admin Support is truly variable.

You are certain that the late booking will not mean that they will not book a future course at £375.

3. Costing and Pricing (Sunk)

- (a) You discover that the course had a development cost last year of £2,000.
Does this change your earlier answers?

No. What has been spent is spent; it cannot affect your commercial decisions for the future.

- (b) You calculate that updating the course material will cost £150.
Does this change your earlier answers?

The breakeven remains at 10 students, profits will fall by £150. The answer to 2. is unaffected.

- (c) You have four training rooms empty. Heating etc. costs are trivial -
What is the minimum you should charge for their use; what is the maximum?

Zero is the minimum. The maximum is much as you can without losing the business but bear in mind the alternative uses.

- (d) You have four tutors with no courses to run. Why is the answer to (c) less applicable to people.

Tutors not running courses can be usefully employed:

Developing material

Generating new business - advertising the University name

Doing Research for which grants or funding may be available

Pastoral care of Students (to reduce likelihood of leaving)

Chasing payments etc.

In fact anything to increase income or reduce costs!!!! (if you ask nicely)

Starting new courses, ceasing to run old courses, scheduling, decisions on short term hire or purchase, overtime or recruitment should all be driven by consideration of marginal and average cost and demand forecasts. Because demand is difficult to forecast, it may be better to accept fixed contracts at below normal price in order to avoid or reduce risk.

OPPORTUNITY COSTS

Opportunity costs are often dangerous but it can be just as dangerous to ignore them. The opportunity cost is the lost profit or benefit from using a scarce resource in one activity in preference to the next best alternative. The "cost" is the benefit foregone from that alternative.

An employee could walk home or drive home each day. To walk home takes one hour more than driving home. If he stayed at work he could earn an extra £10 in overtime. The opportunity cost of walking is the loss of £10 earnings. (If he would merely go to the pub instead and spend £5 before driving home then the opportunity gain from walking is £5 which is cash saved). Some individuals would say that quality of life is relevant - Accountants would agree and then try to put a value on it by asking how much you would require to compensate for a lower quality of life.

Beware of fictitious opportunities "I could hire a Rolls Royce to go home in for £1,000" so look how much I have saved! However, the concept is an extremely valuable approach in business.

The earlier example on fixed and variable costs can be used to illustrate the concept of opportunity cost. The benefit from the new sales person will be £9,000, if they sell product B. The opportunity cost to the company of using them to sell product B is the contribution from the sales of A which will now not be made i.e. the £2,000.

COST ALLOCATIONS

In most large organisations costs are allocated to products because Direct Costs are only part of the total cost. In order to arrive at full cost various methods of cost absorption/allocation have been used to simulate the fact that costs have been incurred over the product range. Activity Based Costing is merely an application basis which is a more refined approach than floorspace, headcount etc. The important factor is that whatever allocation is used it should be relevant. The most common bases are:

<u>Basis</u>	<u>Used For (for example)</u>
Employee Headcount	Personnel Dept. Non-productive space costs.
Floorspace Occupied Students	Heat/Light/Insurance/Rent Administration Costs Finance Costs
Hours Worked/Taught	Purchasing Department Costs Management Costs

By definition the results will be approximate. The objective is to ensure all costs are included when considering strategic decisions. The allocation methods may be misleading if used for tactical decisions or performance measurement. In particular, managers who have cost targets which include allocated costs may seek to play games to reduce the costs e.g. if allocated on employee headcount - take on expensive agency staff rather than employees; if allocated on floorspace - rope off areas as "not being mine so you can't charge me". These must be avoided.

SUMMARY

Cost Estimation is an art not a science. It involves consideration of the future, the opportunities and the past. It involves consideration of risk and common sense.

If costing is an Art, Pricing is even more so!

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David is an experienced financial professional who has devoted his skills to management training in practical understanding and utilisation of financial information. A Graduate, Chartered Accountant, and Associate of the Institute of Taxation, he is also a Member of the Chartered Institute of Personnel and Development and has been an Ordained as a Deacon in the Catholic Church.

He has worked as a Financial Controller and Company Secretary in the Finance industry and as a Director of Finance and Administration in the Computer Services industry. Since 1990 he has conducted management development programmes for over forty major organisations including Arla Foods, Blue Circle, BP, CSC Computer Sciences, Conoco, Ernst & Young, Lloyds Bowmaker, Royal Mail, Unilever and Zeneca. He also runs programmes for the Leadership Foundation and the management teams at a number of Universities. International training experience includes work in Belgium and Holland for CSC, in Denmark, Kenya and the Czech Republic for Unilever, in Holland and the US for Zeneca, in Dubai for Al Atheer, in Bahrain and Saudi Arabia for Cable & Wireless.

He specialises in programmes in financial management for both tactical and strategic decision making. In addition he has run courses in acquisition evaluation (The Economist, Eversheds, Blue Circle and Hays Chemicals) and in post-acquisition management (Unilever). All training is specifically tailored to the needs of the organisation with the emphasis on practical applications to enhance profitability and cashflow. He has developed material for delivery by in-house personnel (Royal Mail, Lloyds Bowmaker and Conoco), computer based training packages (The Post Office, Unilever and BP), and post course reinforcement self-study workbooks (CSC and Zeneca). He has also produced a training video on Cashflow Management.

He is a prolific writer of case studies, role plays and course material. He has also published articles on the financial justification of training, financial evaluation of IT investment proposals, the use of Activity Based Costing and Customer Profitability statements, commercial considerations for consultants, the need for taxation awareness training for general managers, evangelisation and Christian business ethics.

Many of his generic documents are freely available on his website:

FinancialManagementDevelopment.com including papers on Charity Management.

In addition to his Diaconal work in the Church, he has held a number of voluntary positions including University, College and School Governor, Hospice Treasurer and Trustee of various charitable institutions. He continues to provide ad hoc commercial advice to several other charitable organisations. He has been married for over 35 years and has one daughter and three granddaughters.

This series of papers is designed to help managers by providing a basic understanding of key financial concepts to assist them in their work. It is provided at no cost since this knowledge is a Gift from God and thus to be shared (Matthew 10:8).