



General editor  
**Zahirul Hoque**

**Handbook of  
Cost and  
Management  
Accounting**

Spiramus

# Handbook of Cost & Management Accounting

Edited by

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*To my wife, Shirin*



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## Preface

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Today's businesses operate in a dynamic, complex environment as they are affected by *STEP* (sociological, technological, economic and political) factors, internal and global competition, and increasingly, the bargaining power of suppliers and customers. These forces have radically altered today's business environment. In order to survive organisations should rethink their strategic philosophy and the role of management accounting. Management accounting systems exist to help managers make economic decisions. In preparing and assessing their strategic plans, organisations need information on many areas of their business environment. Management accounting is also in a process of change. While some businesses continue to use conventional methods of costing, performance measurement and cost analysis, increasing numbers are adopting activity-based cost allocation system, strategic-oriented investment decisions models, and multiple performance measures such as the Balanced Scorecard. This handbook addresses both conventional and contemporary issues in cost and management accounting.

It presents an intriguing combination of 24 chapters, separated into nine themes, dealing respectively with: (1) understanding the basics (two chapters); (2) planning and cost control (three chapters); (3) product costing processes (two chapters); (4) cost allocation processes (three chapters); (5) decision making (three chapters); (6) corporate financial management (three chapters); (7) contemporary management accounting (four chapters); (8) performance evaluation (two chapters); and (9) cases in public sector costing and budgeting (two chapters). All the chapters provide both retrospective and modern views and commentaries by knowledgeable scholars in the field, who are able to offer unique insights on the changing role of cost and management accounting in today's businesses. People without a background in cost and management accounting should find all of these chapters easily understandable.

This handbook is written primarily for practitioners such as professional accountants (chartered accountant (CA), chartered management accountant (CMA, UK), certified practicing accountant (CPA) and certified management accountant (CMA, USA)), internal auditors, financial analysts, business managers, and chief executives. It can also be used by students pursuing both undergraduate and postgraduate degrees in accounting. As the principal focus of this book is on conceptual foundations, it would also be ideal for courses in graduate programs such as master's degree, MBA or Executive MBA.

The contributors and I have been equal partners in the compilation of this volume. I am grateful to the contributors whose chapters are presented here. Many thanks to Carl Upsall and his team at Spiramus for their support.

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February 2005



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Professor Hoque earned his PhD in public sector management accounting and control from the University of Manchester in 1993 under the supervision of Professor Trevor Hopper. He is a fellow of the Institute of Cost and Management Accountants of Bangladesh and a member of CPA Australia. He is also associated with the following professional bodies: the Institute of Certified Management Accountants in Australia, Accounting and Finance Association of Australia and New Zealand, American Accounting Association, British Accounting Association, European Accounting Association, and the International Association for Accounting Educators and Research (IAAER).

Professor Hoque is the founding editor of the *Journal of Contemporary Accounting & Organisational Change* and is on the editorial boards of *Accounting, Accountability and Performance* and *Investment Management and Financial Innovations*.

Professor Hoque's research interests include the design and use of performance management systems, particularly balanced scorecard implementations in organisations both in the public and private sector; public sector reforms and accounting change, industrial relations and management controls in mining companies, value for money auditing, and management accounting in emerging economies. He has published widely in these fields in leading journals, including *Journal of Management Accounting Research*, *Accounting and Business Research*, *Accounting, Auditing and Accountability Journal*, *Management Accounting Research*, *Critical Perspectives on Accounting*, *The British Accounting Review*, *Advances in Management Accounting*, *Public Administration and Development*, *The International Journal of Accounting*, *Journal of Accounting Education*, *International Journal of Public Sector Management*, and *The Journal of Cost Management*. Professor Hoque has been awarded (with Professor Carol Adams) the 2004 CPA Australia Public Sector Research Grant for studying performance management practices in government departments in Australia.

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# PART 1

## Understanding the Basics

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- Chapter 1            The role of cost and management accounting  
*Zahirul Hoque*
- Chapter 2            An introduction to cost terminology, cost flows,  
and cost behaviour  
*Zahirul Hoque*



# Chapter 1

## The role of cost and management accounting

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Zahirul Hoque

### LEARNING OBJECTIVES

After completing your study of this chapter, you should have learned:

1. How cost accounting and management accounting relate to each other
2. How management accounting differs from financial accounting
3. The difference between line function and staff function in an organisation
4. The usefulness of the cost and management accounting data in an organisation



## Introduction

---

In this chapter I try to answer some questions which someone embarking on a study of cost and management accounting might naturally ask. Questions such as: What is cost accounting? What is management accounting? What is its role relative to other branches of accounting? What sorts of decisions do managers have to take and how might cost and management accounting information help them? What is financial accounting? How is management accounting different from financial accounting? This chapter is about introducing these basic concepts of cost and management systems.

## Managers' information need and the role of accounting

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Managers in an organisation make decisions to achieve their organisation's objectives. These decisions are about how to make their organisations translate their strategic goals or objectives into action. To do so, they need information, and accounting provides financial and cost information to managers to assist them in making decisions. Should the company outsource their accounting and information technology (IT) functions or should it have its own accounting and IT services? Should the company make its own materials and supplies for its production need or it should buy them from outside suppliers? Should the company introduce a sophisticated computerised accounting system or it should be happy with its current manual accounting processes? Should the university offer a higher settlement to its academic staff to avoid a strike? Should the firm market a new product line? How much should the firm spend on advertising? Research and development? Cost and management accounting systems are expected to meet managers' such information need. In today's competitive operating environment, the organisation also needs non-costing or non-financial information for managerial decisions. This book focuses on the traditions and innovations in cost and management accounting systems.

We see three branches of accounting - financial accounting, cost accounting, and management accounting – to provide the relevant and accurate information to managers. Let me discuss them next.

### **Financial accounting**

Financial accounting measures and records business transactions and provides financial statements that are based on generally accepted accounting principles (GAAP) as well as relevant financial reporting standards (FRS). Financial accounting is concerned with the external reporting through financial statements to investors, government authorities, and other outside parties. Thus, financial accounting produces financial data for preparing 'Statement of Financial Performance' (income statement or profit and loss statement) and 'Statement of Assets and Liabilities' (balance sheet).

### **Cost accounting**

Cost accounting is a sub-field of accounting that records, measures, and reports information about costs for income statements and balance sheets. A cost is a sacrifice of resources. Today's cost accounting is also concerned with collecting

and reporting cost information for managerial decisions. When cost accounting is used for external purposes, it measures the cost of production and sales in accordance with GAAPs. When used for internal purposes, cost accounting information provides the basis for planning, controlling, and decision-making.

### **Management accounting**

Management accounting identifies, collects, measures, and reports information that is useful to managers in planning, controlling, and decision-making. Management accounting is concerned with the provision of information to those responsible for managing businesses and other economic organisations to help them in making better decisions about the future of the organisation and in controlling the implementation of the decisions they make.

Management accounting systems produce information mainly for internal users. Thus, management accounting could be properly called *internal accounting*. A management accountant in a firm is responsible for this. His/her role in an organisation is to support/help those individuals who are responsible for carrying out an organisation's basic objectives.

**How do cost accounting and management accounting relate to each other?** In general, when we talk about cost accounting, we mean accumulating cost data for use in income statement and balance sheet. That is, we need cost data for inventory valuation for financial statements purpose. Management accounting provides data for internal managerial decisions to achieve the organisation's goals and objectives. A cost accounting system provides cost data for both cost accounting and managerial accounting.

### **Staff function vs. line function and the management accountant**

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As you study cost accounting and management accounting you should also understand how these disciplines fit in other managerial positions in the organisation. What is the role of a cost and management accountant in an organisation? To understand this, perhaps you should know the distinction between staff function and line function concepts in an organisation. It is important to know what accountants should do and what information they should accumulate and report for managerial decisions.

Let me make the distinction between staff function and line function in an organisation. When we use the term "line function" we mean positions that have direct responsibility for the basic objectives of an organisation. In contrast, when we use the term "staff function" we mean positions that are supportive in nature and have only indirect responsibility for an organisation's basic objectives.

The **Controller**, or the chief accountant, supervises all accounting departments. As the chief accounting officer, the controller has responsibility for both internal and external accounting requirements. This charge may include direct responsibility for taxes, SEC (Securities and Exchange Commission) reports, maintenance of cost and other accounting records, internal controls, performance reporting, internal auditing, budgeting, financial statements, and systems

accounting. Thus, an accountant’s position within the organisation is advisory – staff function. However, in recent years such kind of services has expanded so that in addition to staff function, accountants also become part of the core management where they take part in decision making processes of the organisation.

**Comparison of management accounting and financial accounting**

Let me make the distinction between management accounting and financial accounting in the following manner:

Management accounting	Financial accounting
Internally focused – accumulates information for internal decisions	Externally focused – accumulates financial information for external reporting such as for taxation purposes
No mandatory rules such as GAAPs are followed when preparing financial plans and costing/management accounting reports	Must follow externally imposed rules such as GAAPs and FRSs when preparing financial statements
Emphasis on the current and the future events	Looks to the past (historical orientation)
Subjective and objective (financial and non-financial) information	Objective information (mainly financial or numbers)
Internal evaluation of divisions, branches or centres	External evaluation of firm as a whole
Broad, multidisciplinary in focus	More financial-oriented – narrow in focus
Both short-term and long-term oriented	Mainly short-term oriented (for example, an accounting period)

Specific uses of cost and management accounting information

A good management accounting system provides managers high quality and relevant information to make effective decisions to achieve their organisation’s goals or objectives.

Management’s task is to make decisions which are likely to ensure the continued viability of the organisation and to control the implementation of those decisions. Where does (management) accounting fit? It is a part (and only a part) of the total information available to management.

The accounting system provides information to managers in the following four broad areas:<sup>1</sup>

- (1) Internal routing reporting for (a) cost planning and cost control of operations and (b) performance evaluation of managers and activities.
- (2) Internal routine reporting on the profitability of products and services and on pricing.
- (3) Internal nonroutine reporting for strategic and tactical decisions such as formulating overall policies and long-range plans, new product development, capital investments, and special orders.
- (4) External reporting through financial statements to investors, government authorities, and other outside parties.

### Summary

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This chapter introduces the basic accounting tools and their uses in business decisions. It has focused on three branches of accounting systems: financial accounting, cost accounting and management accounting. It has been shown that financial accounting is concerned with recording and reporting financial transactions or activities for external reporting through financial statements such as income statement and the balances sheet. Cost accounting focuses on providing cost information to managers for financial statements and product or service costing purposes. Management accounting is concerned with the development and reporting of information for management planning and controls. The information produced by all these branches of accounting play a paramount role in achieving the organisation's goals. A management accountant is usually concerned with both cost and management accounting issues in an organisation. In today's competitive businesses, management accounting provides both financial and non-financial information to managers to assist them in achieving the organisation's long term goals.

### Further reading

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<sup>1</sup> For details, refer to *Cost Accounting: A Managerial Emphasis* by Charles T. Horngren, George Foster and Srikant, M. Datar (Eighth Edition), Prentice Hall, 1994.



## Chapter 2

An introduction to cost terminology, cost flows, and cost behaviour

Zahirul Hoque

### LEARNING OBJECTIVES

After completing your study of this chapter, you should have learned:

1. The concepts of costs, cost objects and cost drivers
2. The various concepts of product costs
3. The cost behaviour patterns
4. The accounting for cost flows (merchandise and manufacturing)

## Introduction

---

An important objective of a firm is to generate from operations the maximum possible amount of cash. This is because the firm's managers need to strive to attain the output level which is expected to maximise cash resources. Therefore, information on how costs behave in relation to changes in output levels is vital for an effective planning and decision making. This chapter looks at cost concepts, cost classifications and flow, with particular reference to the behaviour of costs in response to changes in output levels.

## Cost and cost objects

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The term 'cost' refers to the total resources used or sacrificed to accomplish a specific objective. A specific objective (which is also called 'cost object') may include the production of a product or the acquisition of a service. Thus, if a manager needs to find out the cost of something, then it is called cost object. Cost is computed for a particular cost object in the conventional accounting way as monetary amounts that must be paid to acquire goods and services.

## Cost driver

---

A cost driver is used to refer to any factor that affects costs of an object. A change in the cost driver results in a change in the total cost of a related cost object. Examples of cost drivers in a production department include number of units produced, number of setups, number of engineering change orders, and direct manufacturing labour costs.

## Classification of product costs

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A cost accounting system classifies product or service costs in many ways. Anyone wishing to make a better, cost effective decision needs to know the basic cost classifications. These are introduced in turn.

### *Direct costs and indirect costs*

A direct cost can be physically traced to a product line, a sales territory, a division, or some other sub-part of the company. If the segment under consideration is a product line, then the materials and labour would be direct costs.

An indirect cost cannot be physically traced to a specific product line, so it must be allocated in order to be assigned to the segment under consideration. An example of this is manufacturing overhead. Indirect costs are allocated to the product or service using a cost allocation method.

### *Variable costs and fixed costs*

**Variable costs** are those costs that vary in total, directly, and proportionally with changes in volume, for example, costs of direct materials and direct labour. If the output of shoes in the shoe factory doubles the second month in comparison to the first month, the total amount spent on direct materials or direct labour should also double. Cost of material per unit or pay per hour should remain the same however.

Fixed costs are those costs that remain unchanged in total, regardless of changes in volume (within the relevant range). Monthly rent on the factory, executive salaries, depreciation of assets, and insurance premiums are examples of fixed costs. Although the total fixed cost remains the same, the per unit fixed cost would fluctuate. A relevant range refers to the range of the cost driver in which a specific relationship between cost and the driver is valid.<sup>2</sup> We see two types of fixed costs: capacity costs and discretionary (programmed) costs. Capacity costs are associated with those costs that are incurred to enable the company to meet and respond to current demands for goods and services. Examples include depreciation on office building and wages. Discretionary or programmed costs, in contrast, are associated with those costs that are not always necessary to production, in the short run, such as research and advertising. This is because these costs do not respond to changes in activity. For example, average programmed cost per unit will be low if volume turns out to be high and high if volume is low.

#### *Semi-variable costs*

**Semi-variable costs** (also called **mixed costs**) have some features like variable costs and some like fixed costs. Examples include: electricity customers may have a monthly minimum bill no matter how little electricity they use. This would be the fixed element. The amount used over the fixed minimum would be the variable element.

#### *Manufacturing cost and non-manufacturing cost*

Manufacturing costs can be defined as any costs that are incurred in making a product. Manufacturing involves changing raw materials into finished products. So a manufacturing firm is involved in production as well as in marketing and administration.

**Cost of a manufactured product** is made up of:

**Direct Materials:** Raw materials that actually go into the product

**Direct Labour:** Workers' wages on the production line

**Manufacturing Overhead:** All other factory costs, for example, rent, heat, light, depreciation of factory equipment, factory property, taxes, insurance.

**Non-manufacturing costs**, in contrast, are those costs that are not used in producing a product. Non-manufacturing costs include:

**Marketing (selling) costs:** Order-getting and order-filling costs, for example, salesmen's salaries, salesmen's travel, transportation out, advertising, sales commissions, and depreciation of delivery equipment and finished goods warehouses.

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<sup>2</sup> Charles T. Horngren, George Foster and Srikant, M. Datar (1994), *Cost Accounting: A Managerial Emphasis* (Eighth Edition), Prentice Hall.



**Administrative costs:** Officers' salaries, depreciation of office machines and furniture, taxes on office building, executive compensation, executive travel costs, etc.

The cost accounting system classifies direct materials costs and direct labour costs as *prime costs* and all manufacturing costs other than direct materials costs are classified as *conversion costs*.

*Capitalized costs, product costs and period costs*

**Capitalized costs** are those costs that are first recorded as an asset which subsequently become an expense. Examples include: costs of purchasing plant, equipment, and computers.

**Product costs** (also called **inventoriable costs**) are those costs associated with the cost of purchasing goods for resale in the case of merchandise business inventory or costs associated with the acquisition and conversion of materials and all other manufacturing inputs into goods for sale in the case of manufacturing business.

**Period costs** are those costs that are recorded as expenses of a particular period. Examples of such costs include: selling and administrative costs (e.g. office salaries, sales commissions, office rent, advertising, utilities, supplies and insurance)

A mercantile business, such as a hardware store, and a service-sector company, such as a hotel and restaurant have period costs (selling and administrative costs), but since they do not manufacture any goods, they have no inventoriable costs or product costs. A Shoe Factory, since it manufactures and sells shoes, has both product costs and period costs.

*Differential or incremental Costs*

In making management decisions (like "make-or-buy" decisions) managers compare alternatives. Any cost that is present under one alternative is known as a differential cost (incremental cost). (An economist calls this "marginal cost.")

Differential costs can be either fixed or variable.

**Example:**

Let us assume that the Habib Garments Company is thinking about changing its marketing method from direct door-to-door sales to distribution through retailers. Present costs and revenues are compared to projected costs and revenues as follows:

*V = Variable; F = Fixed*

Revenues (V) .....	<u>\$700,000</u>	<u>\$800,000</u>	<u>\$100,000</u>
Cost of Goods Sold (V) .....	\$200,000	\$250,000	\$50,000
Advertising (F) .....	\$20,000	\$40,000	\$20,000
Commissions (V) .....	\$40,000	0	(\$40,000)
Warehouse Depreciation (F) .....	\$30,000	\$20,000	(\$10,000)

Other Expenses (F) .....	\$50,000	\$50,000	0
Total Expenses	\$340,000	\$360,000	\$20,000
Net Income .....	\$360,000	\$440,000	\$80,000

Looking at the extreme right-hand column of the table, the differential revenue of \$100,000 less the differential expenses of \$20,000 leaves a differential net income of \$80,000, so it would be valuable, in this case, for Habib Garments Company to switch to the proposed Retailer Distribution Method.

*Opportunity costs*

Opportunity costs - potential benefits that are lost when the choice of one course of action makes it necessary to **give up** a competing course of action. That is, potential benefit given up when one alternative is chosen over another. All decisions have opportunity costs associated with them.

Opportunity costs are not entered in the accounting records but are considered either explicitly or implicitly when making decisions.

*Example*

ABC firm is considering investing \$20,000 in land to be held for building a warehouse in the future. At present this \$20,000 is invested in a governmental bond at 8% earning \$1,600 per year interest. If ABC cashes in the bond and buys the land, the \$1,600 per year interest income would be given up, so this is an Opportunity Cost. They lose \$1,600 now, but have the opportunity to build on their own property at a later date.

*Sunk cost*

Sunk costs are those costs that are not affected in total by management's choice between the alternatives it is considering. These costs have already been incurred, which cannot be changed by any decision made now or in the future. Sunk costs are not differential costs, this is because present decisions cannot help with sunk costs. Sunk costs are never relevant in decision making.

*Example*

On 1 January 2004 Moon Skylights bought a factory machine for \$50,000. On 15 January 2004 it realised that this decision was not a good buy and the machine does not fit in with their current production needs. The expenditure has already been incurred even though it has been unwise. No future decision can cause the cost to be avoided. So, Moon's \$50,000 were sunk costs.

*Relevant costs*

Relevant costs are those costs that are important in making the decision. In this case, only the variable costs would be relevant or important in the short run.

*Set-up costs*

Set-up costs are the labour and other costs involved in getting facilities ready for a run of a different product.

### *Common costs*

Two or more departments use the same facility, such as a mailroom. The costs must be apportioned between the two departments on some basis such as which department uses the mailroom most.

### *Joint costs*

During the first part of a factory production process, often several products are made together. The costs of getting these products from the beginning of manufacturing to the break-off point are called joint costs.

### *Prime costs and conversion costs*

**Prime costs** are all direct materials costs and direct manufacturing labour costs.

**Conversion costs** are all manufacturing costs other than direct materials costs. These costs are for converting direct materials into finished goods.

### **Costs versus expenses**

Costs usually have to do with the value of merchandise purchased in a mercantile business or the value of the goods manufactured in a manufacturing firm. They are usually placed in the top portion of the income statement as part of the computation of cost of goods sold and are part of the computation of gross income.

Expenses are listed toward the bottom of the income statement after gross profit - below the gross profit line - and usually consist of selling expenses and office expenses. They are to be found in both manufacturing and mercantile firms.

### *Cost behaviour patterns*

A cost behaviour analysis focuses on how does a particular cost element behave, react, or respond to a change in the level of activity, which is volume of production? As production changes (increase or decrease) in the factory month by month, the total variable costs change (increase or decrease) proportionately to the change in production. However, the variable cost per unit remains the same.

As production changes in the factory month by month, the total fixed costs remain the same; however, the fixed costs per unit are proportionately inverse. That is, as production increases the fixed costs per unit decrease. Or, as production decreases, the fixed costs per unit increase.

Semi-Variable costs (such as electricity) have some of the behaviour of fixed costs and some of the behaviour of variable costs. They should be divided into their variable cost component and their fixed cost component before computation.

### Accounting for cost flows

**Cost flows** refer to the movement of costs from one account to the other as merchandise comes into the business or goes out of the business, or as merchandise goes from one department to another within the business.

*Cost flows in a mercantile business*

The following activities are common in a mercantile business:

- Merchandising companies purchase goods already manufactured:
- No direct material, or direct labour, or manufacturing overhead.
- No work in process account.
- Finished goods is simply called Merchandise Inventory.
- Measurement of buyer's performance.

**Variance:** Compare actual costs debited to inventory with budget costs allowed for goods purchased.

Cost of the units sold during the period is transferred to Cost of Goods Sold. Debit Cost of Goods Sold and Credit Merchandise Inventory.

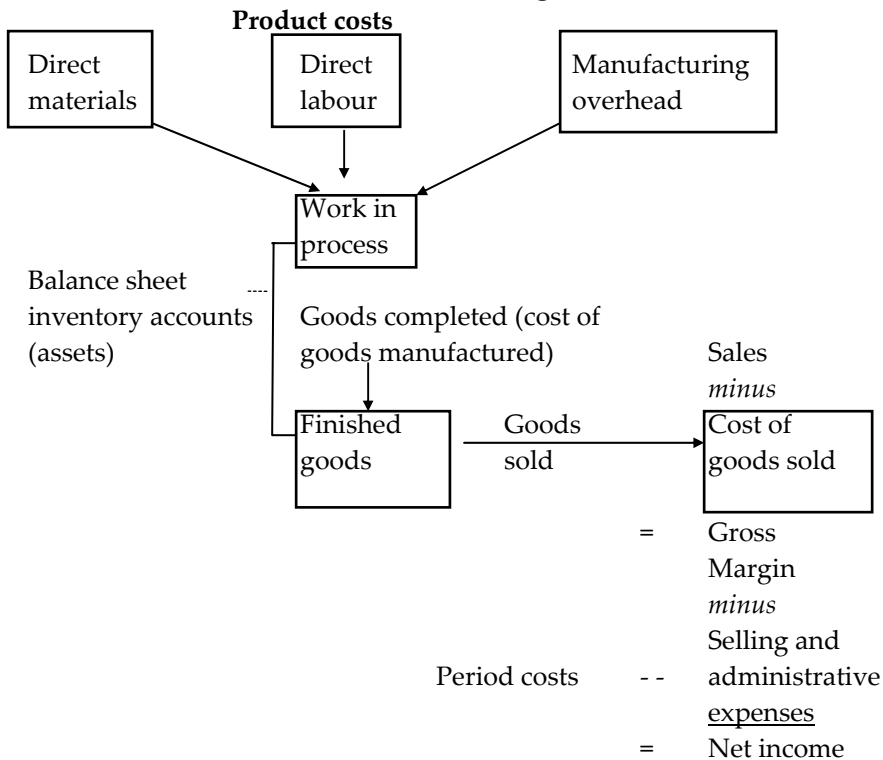
Marketing and Administrative Expenses are "value added" in merchandising, but they are not added to the value of the inventory.

In a mercantile business a product's cost is generally its purchase price plus the cost of transporting the merchandise.

*Cost flows in a manufacturing firm*

The following example in Exhibit 1 demonstrates the cost flows in a manufacturing firm.

**Exhibit 1: The cost flows in a manufacturing firm.**



## Summary

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This chapter presented various definitions of costs; it also discussed how one can classify costs and determine costs through various manufacturing and non-manufacturing accounts. These cost classifications are very important for effective production and selling decisions. Cost consumes resources to accomplish a particular objective and it is also important to know how cost behaves in a manufacturing environment. Horngren, Foster and Datar (1994, p. 43) remarks, "...Managers, accountants, suppliers, and other people will avoid many misunderstandings if they use the same meaning of technical terms."

## Further reading

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Atkinson, A., Banker, R. D., Kaplan, R. S. and Young, S.M, *Management Accounting* (Second Edition), Prentice Hall International.

Charles T. Horngren, George Foster and Srikant, M. Datar, *Cost Accounting: A Managerial Emphasis* (11<sup>th</sup> Edition), Prentice Hall.

Hansen, D. R. and Mowen, M. M. (2003), *Cost Management: Accounting and Control* (Fourth Edition), Thomson South-Western, USA.

## PART 2

### Planning and cost control

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- Chapter 3            Cost-volume-profit ((CVP) analysis  
*Zahirul Hoque*
- Chapter 4            Budgetary Process and Decision Making  
*Manzurul Alam*
- Chapter 5            Control of operations through the application of  
standard costing and variance analysis  
*Zahirul Hoque and Mohamed AboElhamd Omran*



## Chapter 3

### Cost-volume-profit (CVP) analysis

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Zahirul Hoque

#### LEARNING OBJECTIVES

After completing your study of this chapter, you should have learned:

1. The concepts of CVP (cost-volume-profit) analysis and Break-even-point
2. How to compute break-even points, margin of safety and profit volume ratio
3. The CVP in a multi-products environment
4. The assumptions underlying CVP analysis



## Introduction

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Having discussed the different cost concepts and terms, this chapter will discuss how an organisation can conduct an analysis of the behaviour of total costs, total revenues, and operating income as changes in the production or output level, selling price, variable costs, or fixed costs. Planning and decision-making by management do not involve only the determination of relevant cost behaviour. One of the objectives of an organisation is the generation of cash. Planning and decision making involve a consideration of the combined effect on both cost and revenue functions of changes in the level of activity. This is achieved by an examination of the often intricate relationship of costs, volume and revenues which, in turn, gives insights into the incremental impact on cash flows of the various choices open to management. The technique used in this examination is usually termed 'cost-volume-profit' (CVP) analysis. In this chapter, I will describe this technique.

## Cost-volume-profit (CVP) Relationships

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As mentioned above, CVP analysis is based on the relationships among sales revenue, costs and profit in the short run, in which the output of a firm is restricted to that available from the current operating capacity. CVP analysis seeks to establish what will happen to the financial results if a specified level of activity or volume changes. A CVP analysis is important to management, since one of the most important variables influencing total sales revenue, total costs and profit is output or volume. Such analysis will enable management to identify the critical output levels, such as the level at which profit will be maximized, or the level at which neither a profit nor a loss will occur (i.e. the break-even point).

## The break-even point

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The break-even point is the point (quantity of output or volume) where a business makes neither profit nor loss. This is the place where total costs and total revenues are equal, that is, where the operating income is zero.

The management accounting textbooks discuss three methods for determining the break-even point. They are (a) the equation method, (b) the contribution margin method, and (c) the graph method. I outline these processes next.

### *Equation Method*

We can express the income statement of a firm in equation form as follows:

$$R - VC - F = I$$

or

$$R = TE + T + I$$

where  $R$  = Total sales revenue = Price (P)  $\times$  Sales quantity (Q)

$TE$  = Total expenses = Fixed expenses (F) + Variable expenses (V)

$T$  = Taxes

$I$  = Profit (operating income)

or

$$P \times Q - V \times Q - F = I$$

Break-even formulas can be derived from the above equation by making taxes and profit = 0 as:

$PQ - VQ - F = 0$  and solving for Q (Breakeven units) yields:

$$\text{Breakeven number of units} = \frac{F}{P - V}$$

*Contribution margin method*

Contribution margin is computed by subtracting variable costs and expenses from sales revenue. Contribution margin can be computed either in total or per unit. Total contribution margin is equal to total revenues minus total variable costs and expenses, whereas unit contribution margin is equal to sales price per unit minus variable cost and expense per unit. This method uses the fact that:

$$\text{Selling price} \times \text{Number of units} - \text{Unit variable costs} \times \text{Number of units} - \text{Fixed expenses} = \text{Operating income}$$

$$\text{Selling price} - \text{Unit variable costs} \times \text{Number of units} = \text{Fixed expenses} + \text{Operating income}$$

$$\text{Unit contribution margin} \times \text{Number of units} = \text{Fixed expense} + \text{Operating income}$$

As operating income is assumed to be zero at the breakeven number of units, we can obtain:

$$\text{Unit contribution margin} \times \text{Breakeven number of units} = \text{Fixed expenses}$$

thus we have the following Break-even formula:

$$\text{Breakeven sales quantity} = \frac{\text{Total fixed expenses}}{\text{Contribution margin per unit}}$$

$$\text{Breakeven sales revenues} = \frac{\text{Total fixed expenses}}{\text{Contribution margin ratio}}$$

$$\text{Contribution margin ratio} = \frac{\text{Unit contribution margin}}{\text{Selling price}} \quad \text{or} \quad \frac{\text{Total contribution}}{\text{Total revenues}}$$

***Target operating income and the breakeven point***

Target operating income is useful in planning for sales and costs for future years. How many units must be sold to yield a targeted operating income, for example, can be computed using the following equation:

Let TQ = number of units required to yield a targeted operating income

$$TQ = \frac{\text{Fixed expenses} + \text{Targeted operating income}}{\text{Contribution margin per unit}}$$

**The profit-volume ratio**

The profit-volume ratio is the contribution expressed as a percentage of sales.

$$\text{Profit-volume ratio} = \frac{\text{Contribution}}{\text{Sales revenue}} \times 100$$

**Margin of safety**

Margin of safety is the excess of targeted or actual sales over Breakeven Point. For example,

$$\text{Margin of safety} = \text{Targeted sales} - \text{Break-even sales.}$$

Margin of safety can also be expressed as percentage of sales, as follows:

$$\text{Margin of safety \%} = \frac{\text{Targeted dollar sales} - \text{Breakeven dollar sales}}{\text{Targeted dollar sales}} \times 100$$

**Graph method**

In the graph method the total costs and total revenues lines are plotted to obtain their point of intersection, which is the breakeven point as shown below.

**Sales revenues and expenses in \$**

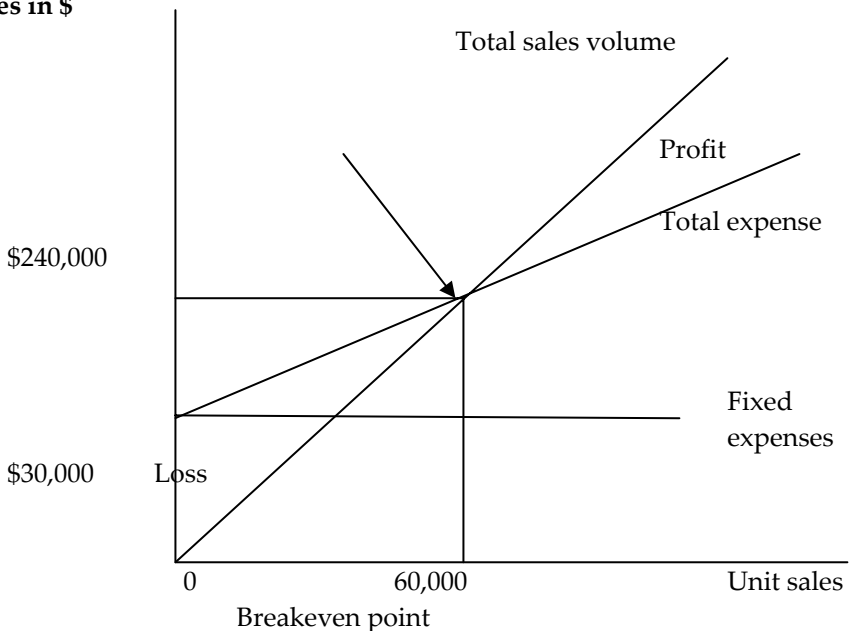


Figure 1.1 CVP relationships

## Multi-product operations and CVP analysis

CVP analysis is more complicated if it focuses on proposals that encompass two or more products. Multi-product proposals introduce two major kinds of difficulties: (1) the contribution margin is likely to differ from product to product; and (2) a common physical measuring unit may be impossible to find.

### Example:

The management accountant of ABC Ltd has prepared the following report for management:

	<u>Product A</u>	<u>Product B</u>
Estimated sales (units)	1,200	800
Price	\$400	\$800
Variable expenses	\$390,000	\$480,000
Fixed expenses	\$30,000	\$40,000

Required:

Compute the breakeven points for each product and the company as a whole.

### Solution:

Contribution margin per unit:

$$\text{Product A: } \$400 - \$390,000/1200 = \$75;$$

$$\text{Product B: } \$800 - \$480,000/800 = \$200$$

Breakeven point (units):

$$\text{Product A} = \frac{\text{Total Fixed Cost } \$30,000}{\text{Contribution per unit } \$75} = 400 \text{ units}$$

$$\text{Product B} = \frac{\$40,000}{\$200} = 200 \text{ units}$$

The overall breakeven volume at the forecasted mix can be calculated by dividing total fixed cost by the average contribution margin at that mix.

Average contribution margin per unit:

	Product A	Product B
Sales revenue	\$480,000	\$640,000
Variable expenses	\$390,000	\$480,000
Contribution margin	<u>\$ 90,000</u>	<u>\$160,000</u>

Average contribution margin per unit:

$$\frac{\$90,000 + \$160,000}{1,200 + 800} = \$125$$

Overall breakeven point =

$$\frac{\text{Total fixed cost}}{\text{Average contribution per unit}} = \frac{\$30,000 + \$40,000}{\$125} = 560 \text{ units}$$

### CVP assumptions

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The management accounting textbooks identify the following assumption underlying a CVP analysis:

1. Total costs are divided into a fixed component and a variable component.
2. The behaviour of total revenues and total costs is linear (straight-line) in relation to output units within the relevant range.
3. There is no uncertainty regarding the cost, revenue, and output quantity used.
4. The analysis either covers a single product or assumes that a given sales mix of products will remain constant as the level of total units sold changes.
5. All revenues and costs can be added and compared without taking into account the time value of money.

### Summary

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Managers make decisions relating to their firm's costs, production and profit. This chapter illustrated how a manager can predict the relationship among these three important factors in any businesses. In this chapter, I introduced the commonly used three techniques of the cost-volume-profit (CVP) analysis: the equation method; the contribution margin method; and the graph method. The CVP analysis assumes that costs are either fixed or variable with respect to a volume or activity-related behaviour and that total sales revenue and total cost relationships are linear (Horngren et al, 1994).

### Further reading

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Charles T. Horngren, George Foster and Srikant, M. Datar, *Cost Accounting: A Managerial Emphasis* (11th edition), Prentice Hall.

Hansen, D. R. and Mowen, M. M. (2003), *Cost Management: Accounting and Control* (Fourth Edition), Thomson South-Western, USA.

## Chapter 4

### Budgetary Process and Decision Making

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Manzurul Alam

#### **LEARNING OBJECTIVES**

After completing your study of this chapter, you should have learned:

1. What a budget is and why it is important as a planning and control tool
2. How budget and strategic planning are interrelated
3. What a Principal Budget Factor (PBF) is and how it can be estimated
4. How to prepare different type of budgets
5. How budgets can be implicated with behavioural issues

## Introduction

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Budgeting is essentially about planning and decision making for future periods. As managers often face uncertain future, coordination of diverse activities within the organisation for achieving desired objectives requires better planning and decision making. Budgeting is often used as a management tool to anticipate likely events better and hence to respond in a more positive and cost effective fashion. Budgeting allows management to adopt a pro-active management style for anticipating future opportunities and threats. As precise details of the future may not be known, management can use past experience and analyse present operations to make some an outline of the future.

Budgeting translates long goals and objectives into detailed action plans (usually one year) for different functions and activities of the organisation. Such an activity helps management to assign responsibilities and allocate resources and personnel for the execution of the budget.

## Definition of Budget

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A budget may be defined as: a financial plan for the future, expressed in formal quantitative terms. It is a short-term business plan and it translates the goals and strategies of an organisation into action and includes a coordinated set of detailed operating schedules and financial statements. As a financial plan, budget provides a plan, which includes various cost, revenue and output data for the forthcoming budget period, usually a year. Budgets are usually based on forecasts. However, often forecast are made by experts based on their expertise and experience about a future state of the environment and it is possible for different experts to arrive at different forecasts on a specific target area. However, a budget is more than a forecast as it represents a plan, which is accepted by the organisation as a plan of action for a period of time. Once budget is formulated, it can be viewed as an expected level of future performance against which actual performance will be measured.

## Functions of Budget

A good budgeting system performs a number of functions, which are described below:

**Planning:** Planning is essentially the most important function, which influences all other activities in the organisation. Budgeting is considered to be a planning tool as involves in setting objectives and preparing various budget to achieve the stated objectives.

**Control:** Budgets can be used as a control devise. The control function of budgeting involves various activities such as, collecting data, providing feedback and taking correcting action.

**Coordination:** Organisations are comprised of a complex aggregation of diverse elements, which needs coordination to achieve organisational goals and objectives. It is through budgetary exercise the interconnectedness of different functions become visible. For example, the activities of sales, production,

purchasing, and inventory planning needs coordination. These activities need to be coordinated otherwise numerous problems, such as, shortage of raw material, over (under) stock of finished goods, will occur. Budgetary process helps managers to interrelate different activities so that each function can be aligned to the other.

**Communication:** A budget helps to communicate the goals and objectives to different levels of organisation. As budgets are prepared involving different levels and departments across the whole organisation, it helps to communicate the objectives and priorities in the organisation.

**Motivation:** Budgets can act as a motivating device by allowing managers to participate in the budget setting process. As budget sets targets and attaches rewards for achieving such targets, it acts as a motivating forces for employees to achieve such targets.

### Strategic Planning and Budgeting

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There is a close relationship between budgets and other planning activities, especially strategic and long-term planning, within the organisation. As such, the budgetary process does not start in a vacuum. Once the overall objectives of the business are defined and decided, they are given proper structure through long-term plans. While strategic plan normally addresses and defines business objectives in a broad-based manner, long-term plans provide general direction over the next five or so years. As strategic planning is more concerned with defining what the organisation wants to achieve in a long-term point of view and such objectives can only be defined in broader perspectives, such as maximisation of shareholders' wealth.

The strategic plan works as a foundation for long-term and short-term plans. A series of long-term plans are formulated to help management achieve the overall objective. It is within the framework of long term plans budgets provides detailed operational plan on a yearly basis for implementing long-term plans and ultimately achieve the overall objective set by the strategic planning process.

#### **Example:**

The relationship between plans can be seen in a hierarchical way, one influencing the other. Suppose an organisation sets its objectives to increase market share by increasing corporate image. At this stage, the objective appears to be a wishful thinking. In order to provide some shape as to 'how' and 'when' such objective can be achieved, a series of long-term plans can be prepared. Suppose the organisation has a long-term plan which aims to achieve 15% increase in market share in next 10 years. In order achieve the long-term plan budgets can be prepared with operational targets. In this case management wants to achieve 3% increase in market share over the next year. However, such an increase in market share can only be achieved by undertaking some actions such as, increasing revenue, increasing advertisements, increasing customer service, and increasing quality-related costs.



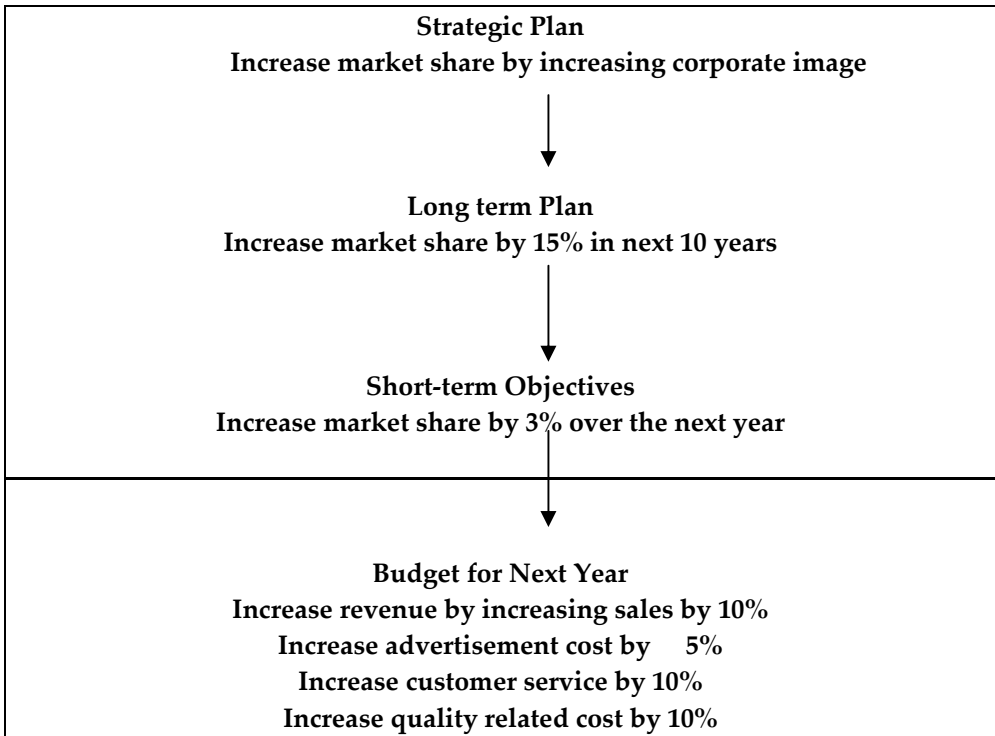


Figure 1: Relationship between strategic, long term and short term (budget) plans

Strategic planning is usually carried out by upper level management, as they are involved with the strategic direction of the organisation. As strategic plan looks at long-term horizon, it is difficult to foresee the distant future precisely, as the environment remains constantly changing. Information on different areas affecting the organisation is not usually available in great detail. In the end, the whole process of strategy formulation can concentrate on defining broad objectives by drawing upon a variety of information sources. Some of the major factors influencing the strategy formulation process relate to understanding of local and global economy, trends in technology and legislative and other factors constraining the organisation. Budgeting, on the other hand, uses detailed information over a short period of time to develop plans for production, sales, revenue, cash flow and other operating activities. Even though yearly budgetary process deals with shorter planning period, managers need to be made well aware of the commercial and economic environment in which they will be operating. However, as the budgetary planning period is shorter, it is possible to predict with reasonable accuracy how the contextual environment might change (current market, competition, material and resource conditions) within the next year. The relationship between strategic planning and the budgetary process is described the Table 1.

Strategic Plan	Budgetary Plan
Setting and revising corporate objectives	Converting strategies into short-term action plans
Broad-based plans are formulated	Detailed operational plans (such as, production sales, marketing) are created
Long-term focus (usually 10 to 15 years)	Short-term focus (usually a year)
Information is likely to be uncertain	Detailed and operational information on cost, revenue and output levels
Senior management is involved	All levels of management are involved

Table 1: Features of strategic and budget plans.

### The Budget-Setting Process

As each organisation is different and unique, the preparation of budgets will vary among different organisations. However, as part of the planning and decision making process, organisations usually develop procedures to follow in the budgetary process. The budgetary process often permeates all phases of budget preparation from start to finish including how budget data will be collected, who will be responsible for budget preparation, and how performance will be reviewed relative to budgets. Depending on the size and complexity of the organisation the budgetary process might extend from two to six months. The budgetary process usually comprises of the following steps:

- a) Create budget responsibilities for different aspects of the budget-setting process
- b) Prepare and communicate budget guidelines
- c) Identify the principal budget fact (key or limiting factor)
- d) Prepare draft budgets for all other areas
- e) Review and coordinate different budgets
- f) Communicate budgets to all interested parties
- g) Evaluate performance relative to the budgets.

Organisations usually develop budget manuals to guide different aspects of the budgetary process. The budget manual provides detailed procedural and quality control aspects of the budgetary process. As such the budget manual provides guidelines, datelines, and information processing schedules. A budget manual can detail who is responsible for each of these aspects in the budgetary process. The entire process needs to be monitored and it is usually done by a budget

committee. This committee is usually represented by different function areas of the organisation.

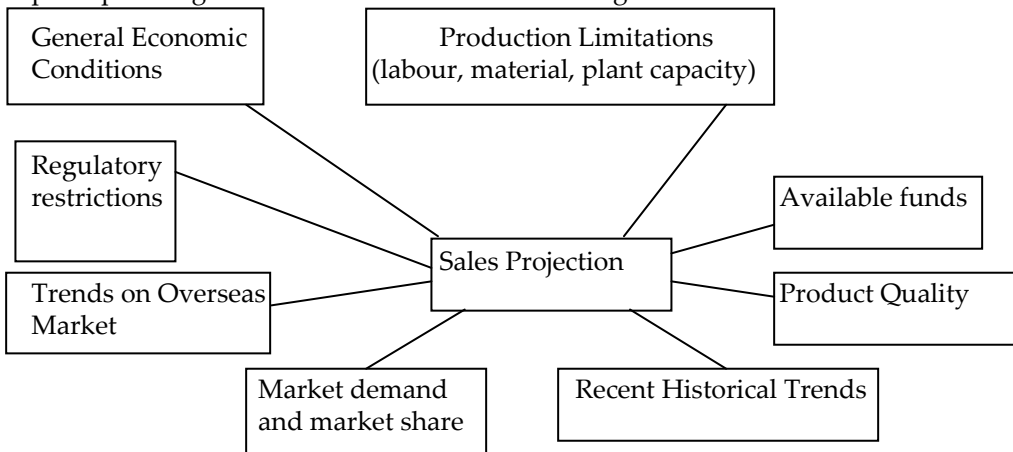
The budget committee performs the following functions:

- Review various budgets
- Coordinate and allocate budget responsibilities
- Resolve conflict and differences that arise during the budget preparation stage
- Approve major revisions and provide final approval
- Review the operating results relative to budgets

*Budget Assumptions*

A budget is based on a number of assumptions and predictions. As the budget brings together all elements of the organisation including financial and operations aspects, it is important to outline how assumptions made on one area influence other areas of the budget. In the process of formulating different budgets, management needs to specify assumptions about product market, production facilities, and raw material availability and so on. Different assumptions will lead to different projections on sales, production, and other operations and financial estimates. However, for all practical purposes it is important that the principal budget factor (PBF) or the limiting factor needs to be identified as most budgets are affected by such a factor.

The principal budget factor is an overriding limitation, which restricts the organisation from achieving its objectives to the maximum extent. As such a restriction can have pervasive effect on all operational budgets, managers and budget preparers need to be informed of such restriction early in the process. The principal budget factor can be one of the following restrictions:



*Figure 2: Factors Affecting the Principal Budget Factor (Sales)*

As the accuracy of the principal budget factor can influence other budgets management needs to ascertain the nature of such a factor. In general, sales

target is considered to be pivotal in the preparation of budgets. Once sales can be forecast with reasonable accuracy, other budgets, such as, production, purchasing and cost budgets can be prepared based on the sales projection. A principal budget factor in other areas, such as production facilities can be managed by leasing an asset or sub-contracting. It is usually the sales budget which acts as the limiting factor since the ability to sell is frequently determined by market conditions. The level of sales virtually affects every aspect of an organisation's activities. The reason is simple; a company cannot simply prepare a production budget without knowing how many products it can sell. Consequently, all other budgets, such as, cash, selling and administration, budgeted income statement, are dependent on sales budget.

It is apparent that the accuracy of sales forecast usually enhances the usefulness of the budget as a planning and control tool. So, how do we estimate sales and what factors affect sales projection? When estimating sales a manager generally looks at two aspects of the environment influencing the organisation. One is the general economic trend as it has a significant impact on most industries and the other is the specific contextual environment facing the organisation. For example, if a manager is forecasting sales of a computer product he has to look at the overall economy, inflation, and income levels affecting computer sales in a particular environment. The specific contextual analysis looks at the environment where the organisation operates and asks questions like, is the market growing or declining? Can the company increase its market share? Who are the major competitors and how the technology is developing in that market segment. Overall, a manager should consider the following factors in sales projection:

- a. General economic conditions
- b. Changes in the product market and technology
- c. Nature of competition
- d. Past pattern of sales
- e. Advertising and sales promotion plans

The initial activities in sales projection are to develop few key indicators affecting sales in the immediate and future periods. Sales forecasting is normally done based on the past sales levels and external factors. In this process various organisational members can be involved including sales managers, sales representatives, and market research staff. The general economic indicators can be obtained by analysing published materials from treasury and publications from different commercial banks. It is useful to generate a range of sales projections rather than one single expected outcome. Usually, sales projections are made on different levels, such as, optimistic, pessimistic, and the most likely projection.

Once the sales projection is complete, management can proceed to finalise the sales budget. The sales projection should not be seen solely in terms of a constraining factor. Consequently, management can take a number of steps to increase sales in a complete market including price reduction, sales promotion,

and other activities. As such, it possible to have different sales projections based on different advertising and marketing plans.

### Different Type of Budgets

#### *Master Budget*

A master budget is a comprehensive plan of operation for the budget period and the nature of such budget depends on the nature and size of the organisation. The basic components of a master budget are presented into two major categories: the operating budget and the financial budget. An operating budget deals with all operational and resource allocation activities. Financial budgets, on the other hand, are plans with monetary details from operating budgets and other plans. Financial budgets usually comprise of cash budget, budgeted income statement and capital budgets.

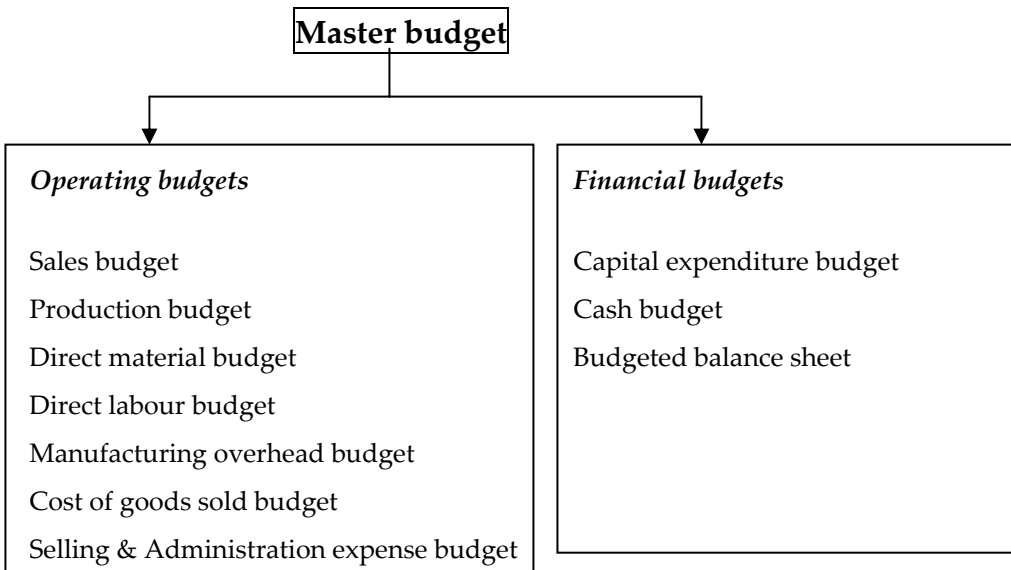


Figure 3: Components of a master budget

#### *Operational Budget:*

An operating budget deals with all operational and resource allocation activities including sales, production, manufacturing costs, selling and administrative expenses. An operational budget is expressed in both units and dollars. As discussed earlier, the basis of operational budget preparation is to locate principle budget factor (limiting factor) constraining future activities. The level of sales appears to be the limiting factor in most circumstances. As such, the operational budget takes sales projection for developing other related budgets. Apart from vertical relationship between operational budgets ( i.e., sales influences production and production influences other manufacturing budgets), it can have horizontal relationship. For example, sales budget can be subdivided

into a number of subsidiary budgets, such as yearly budgets into quarterly budgets.

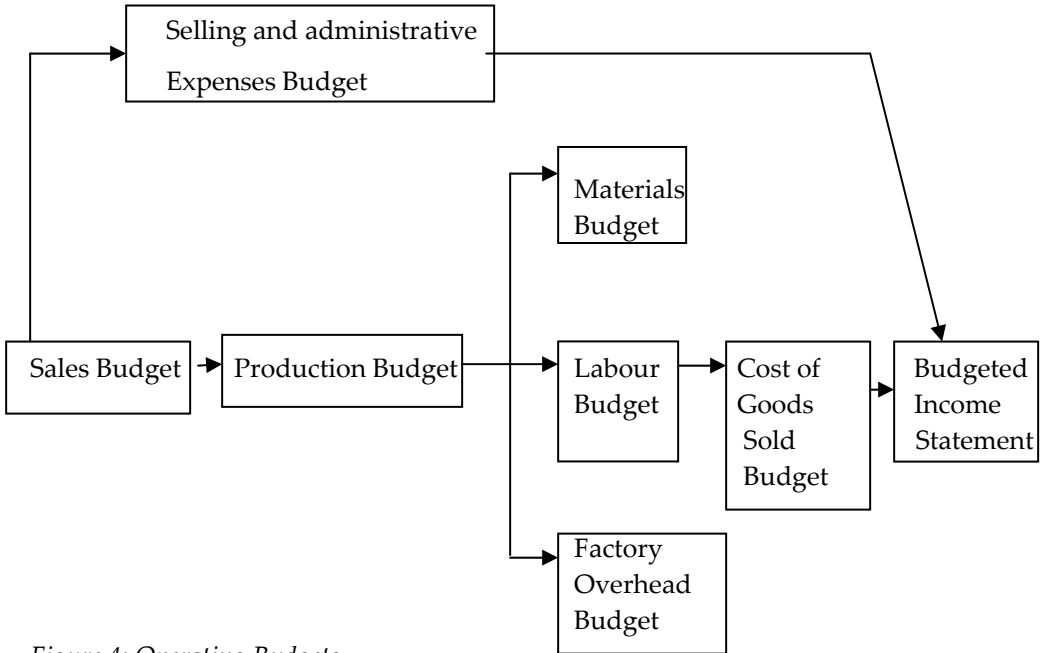


Figure 4: Operating Budgets

**Example:**

The Churchill Manufacturing Company (CMC) produces and markets a single type of small motor in its local factory. It uses formal budgetary system to assist profit planning and cash management. During the year 2004, the accountant produced a cost statement for the motor:

Selling Price	\$50
Estimated Costs	
Materials (2 lbs at \$2.50)	5
Labour (2.5 hour at \$4)	10
Variable overhead (\$1 DLH)	2.5
Variable Sales commission and shipping	2
Total variable costs	19.5
Contribution	30.5
Fixed Costs	
Fixed overhead (per month)	
Maintenance	9,875
Supervision	12,000
Depreciation	50,000
Others	25,000
Marketing costs	25,000

Sales per month (units)

December	20,000	January	22,000
February	24,000	March	26,000
April	26,000		

*Sales Budget*

A sales budget is a schedule, which shows expected sales in both units and sales dollars for the coming period. The determination of sale levels is the starting point for preparing a sales budget and it is usually prepared during sale projection period. The sales budget is composed of two components:

- a) price per unit and
- b) sales in units.

Sale quantities are multiplied with unit sales price to calculate dollar sale figures. We can prepare a sales budget by using the information provided in CMC case (above).

**Sales Budget:** Projected Sales (units) x Price per unit

	January	February	March	Quarter
Number of Units	22,000	24,000	26,000	72,000
Unit selling Price	\$35	\$35	\$35	\$35
Sales Budget	770,000	840,000	910,000	2,520,000

*Exhibit 1: Sales Budget*

*Production Budget*

Once sale budget is prepared, management accountant can proceed to prepare production budget. The key variable in production budget is sales. The production budget is used to prepare other cost budgets such, material, labour, and overhead budgets.

The production for each period is calculated after adjusting finished goods inventory levels. It is usual practice to keep some inventory in stock for smooth sales operation. The desired ending inventory is influenced by demand situations and how fast the organisation can supply the required quantity depending on its production capacity. The ending inventory is usually based on next period's required sales and always stated as a percentage. For example, a company decides to maintain an ending inventory equal to 75% of the following month's sales.

The number of units to be produced can be determined using the following equation:

$$\begin{array}{rclcl}
 \text{Finished} & & \text{Expected} & & \text{Desired ending} & & \text{Beginning} \\
 \text{units to be} & = & \text{sales in} & + & \text{inventory of} & - & \text{inventory of} \\
 \text{produced} & & \text{units} & & \text{finished units} & & \text{finished units}
 \end{array}$$

**Example:**

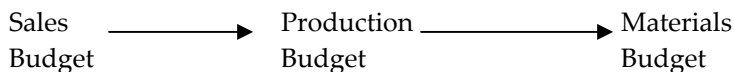
The Churchill Manufacturing Company (CMC) started with an inventory of 14,000 units in January and the company policy states to have 75% of the following month's predicted sales. The company expects to manufacture 28, 000 units in April.

	January	February	March	Quarter
Budgeted sales in units	22,000	24,000	26,000	72,000
Add Desired Inventory	18,000	19,500	19,500	19,500
75% of the following month	40,000	43,500	45,500	91,500
Less Opening Inventory	14,000	18,000	19,500	14,000
Units to be Produced	26,000	25,500	26,000	77,500

*Exhibit 2: Production Budget*

*Direct Materials Budget*

Direct materials budget can be prepared after the production target is set. Usually, the material budget is related to sale through production budget and the relationship can be depicted as:



The materials budget is prepared to find out the quantity and types of raw materials that will be required to produce the required quantities set in the production budget. The material budget has two components and these are

- a) Materials usages budget and
- b) Material Purchase budget.

The material usages budget is prepared by multiplying per unit raw materials need to manufacture one unit of finished product.

**a) Raw Material Usage budget**

Example: In the case example of CMC each output requires 2 lbs of raw material.

Raw material usage = Projected production (units) x Per unit material requirements

	January	February	March	Quarter
Budgeted production (units)	26,000	25,500	26,000	77,500
Per unit raw materials (lbs)	2	2	2	2
Total pounds of raw materials needed	52,000	51,000	52,000	155,000

*Exhibit 3: Material Usages Budget*



The materials purchase budget can now be prepared with the information about how much material is needed to fulfil the production requirements. Like production budget, raw material inventory adjusts are required to find out the required purchase quantities in each period. The desired ending material inventory in unit is usually determined on the basis of materials expected to be used in the following period. If there is already some opening raw material inventory, the purchase requirement will be reduced by that amount. The amount to be purchased is calculated as follows:

$$\begin{array}{rclclcl} \text{Required} & & \text{Amount} & & \text{Desired ending} & & \text{Beginning} \\ \text{purchases of} & = & \text{required for} & + & \text{inventory of} & - & \text{inventory of} \\ \text{direct materials} & & \text{production} & & \text{direct materials} & & \text{direct materials} \end{array}$$

**b) Total Direct Materials**

Example: The Churchill Manufacturing Company (CMC) started with an inventory of 14,000 lbs of raw materials in January and the company policy states to have 40% of the following month’s predicted production requirements. The company expects to manufacture 28,000 units in April.

	January	February	March	Quarter
Needs (lbs)	52,000	51,000	52,000	155,000
Add Ending inventory (40% of the following Month’s production)	20,400	20,800	22,400	22,400
	72,400	71,800	74,400	177,400
Less Direct Material Beginning inventory	20,000	20,400	22,400	20,000
Total Direct Materials Purchased	52,400	51,400	52,000	157,400
Purchase price per lb	2.50	2.50	2.50	2.50
Total cost of Direct Material	131,000	128,500	130,000	393,500

*Exhibit 4: Materials Purchase Budget*

*Direct Labour Budget*

The next budget after production and material budget is the direct labour budget. Once production is known, this budget is prepared to estimate labour resources to accommodate the projected production level. Through this budget the company can assess the need of different type of workers. This budget consists of direct labour estimates based on how many hours of labour hours are needed to produce one unit of finished product. The following information is required for preparation of this budget:

- Product target (units)
- Direct labour hours required for each unit
- Direct labour hour rate per hour

Direct labour cost is estimated as follows:

$$\begin{array}{l} \text{Direct} \\ \text{Labour} \\ \text{Cost} \end{array} = \begin{array}{l} \text{No. of} \\ \text{Units} \\ \text{Produced} \end{array} \times \begin{array}{l} \text{Direct labour} \\ \text{Hours per} \\ \text{Unit} \end{array} \times \begin{array}{l} \text{Rate} \\ \text{Per hour} \end{array}$$

The direct labour budget is usually stated in both direct labour-hours and in monetary value.

	January	February	March	Quarter
Budgeted Production	26,000	25,500	26,000	77,500
Direct Labour per unit	2.5	2.5	2.5	2.5
Total hours	65,000	63,750	65,000	193,750
Per hour rates	4	4	4	4
Total Labour costs	260,000	255,000	260,000	775,000

*Exhibit 5: Direct labour Budget*

### *Factory overhead Budget*

The manufacturing overhead budget includes all production costs other than direct materials and direct labour. Such costs can include indirect factory costs such as: supervision costs, depreciation on machinery, lighting and heating costs, factory cleaning. The overhead budget is prepared to show the estimated overhead costs for the budget period. Manufacturing costs need to be classified by cost behaviour for factory overhead budget purposes. Costs are categorised into variable, fixed, and mixed costs according cost behaviour.

The variable portion of manufacturing overhead varies in proportion to budgeted production activity. Traditionally, the variable overhead is related to one of the volume dependent activities such as, labour hours, machine hours, unit of production. As more units or labour (or machine) hours are used in the production process more variable overhead is considered to occur. The fixed component of manufacturing overhead is considered to be independent of volume and remains fixed over the period. The mixed overhead costs need to be separated into their fixed and variable parts for the preparation of factory overhead budget.

With the advent of modern technologies, the overhead costs are now considered to driven by different activities that drive such costs. As such, more analysis is required to understand the nature of cost behaviour of such costs.

**Factory Overhead Budget**

	<b>January</b>	<b>February</b>	<b>March</b>	<b>Quarter</b>
Variable Factory Overhead				
Budgeted DLH	65,000	63,750	65,000	193,750
Per hour rate	2.5	2.5	2.5	2.5
Budgeted Variable Overhead	162,500	159,375	162,500	484,375
Budget Fixed Overhead				
Maintenance	9,875	9,875	9,875	29,625
Supervision	12,000	12,000	12,000	36,000
Depreciation	50,000	50,000	50,000	150,000
Others	25,000	25,000	25,000	75,000
Total Overhead	259,375	256,250	259,375	775,000

*Exhibit 6: Factory Overhead Budget*

*Selling and Administrative Expense Budget*

The selling and administration budget is prepared for selling and administrative expenses for the budget period. Such costs normally take place to support sales and normal administrative expenses and as such they are non-production oriented expenses. Similar to manufacturing overhead budget, certain parts of selling expenses are variable and are related to the sales volume. As sales volume goes higher, such expense increases to support the increased level of sales. The fixed component of selling and administrative budget is unrelated to volume of activity and remains fixed for the budget period.

**Selling and administrative Expense Budget**

	<b>January</b>	<b>February</b>	<b>March</b>	<b>Quarter</b>
Budgeted sales	22,000	24,000	26,000	72,000
Variable selling and	2	2	2	2
Shipping expenses (per unit)				
Total Variable expenses	44,000	48,000	52,000	144,000
Fixed selling &	25,000	25,000	25,000	75,000
administrative expenses				
Total selling & administrative				
Expenses	69,000	73,000	77,000	219,000

*Exhibit 7: Selling and Administration Budget*

*Cost of Goods Sold Budget*

The cost of sold budget is prepared once all manufacturing budgets are complete. Such budget shows the manufacturing costs of goods sold in a particular period. As not all goods produced in a period will be sold some adjustments are required for opening and closing finished goods inventories. While opening finished inventory can in most cases be valued from previous

period's cost structure, the closing finished goods inventory is valued at the current period's manufacturing cost.

**Cost of Goods Sold Budget**

Direct Materials	177,400 x 2.50	443,500
Direct Labour		775,000
Factory Overhead		775,000
Budgeted Manufacturing costs		1,993,500
Add, beginning Finished Inventory	14,000 x 19	266,000
Goods Available for Sale		2,259,500
Less Ending Finished Goods	19,500 x 19	370,500
Budgeted cost of Goods Sold		1,889,000
Material	5	
Labour	10	
VMOH	2.5	
FMOH	1.5	
Total	19	
Factory Overhead: Total factory overhead / total number of hours		
290,625/193,750=1.5		

*Exhibit 8: Cost of Goods Sold Budget*

*Budgeted Income Statement*

A budgeted income statement is prepared to find out the amount of profit to be derived in a particular period after considering all anticipated revenues and expenses. This budget is prepared once all revenue and expense budgets are prepared and shows the net results of operation.

Sales	2,520,000
Less Cost of Goods Sold	1,889,000
Gross Margin	631,000
Less Selling and Administration Expenses	219,000
Income before taxes	412,000

*Exhibit 9: Budgeted Income Statement*

*Cash Budget*

The cash budget is considered to be an important area of planning and control in any organisation. While the budgeted income statement can project high profitability in a particular period, such profits may not be realised into cash. As the timing of receipts and payments are dependent of credit systems, the cash balance may fluctuate causing either cash shortage or surplus. A cash shortage can be costly for the organisation because it can lead *either* to a liquidity problem and may restrict the organisation from acquiring inputs that are important for its

survival *or* to loss of confidence from vital stakeholders when the organisation is unable to honour its commitments. A cash shortage can be expensive for the organisation as such shortage can only cover with loans, equity sales or sale of assets. A surplus situation, on the other hand, is equally expensive as this idle cash can be used in profitable ways.

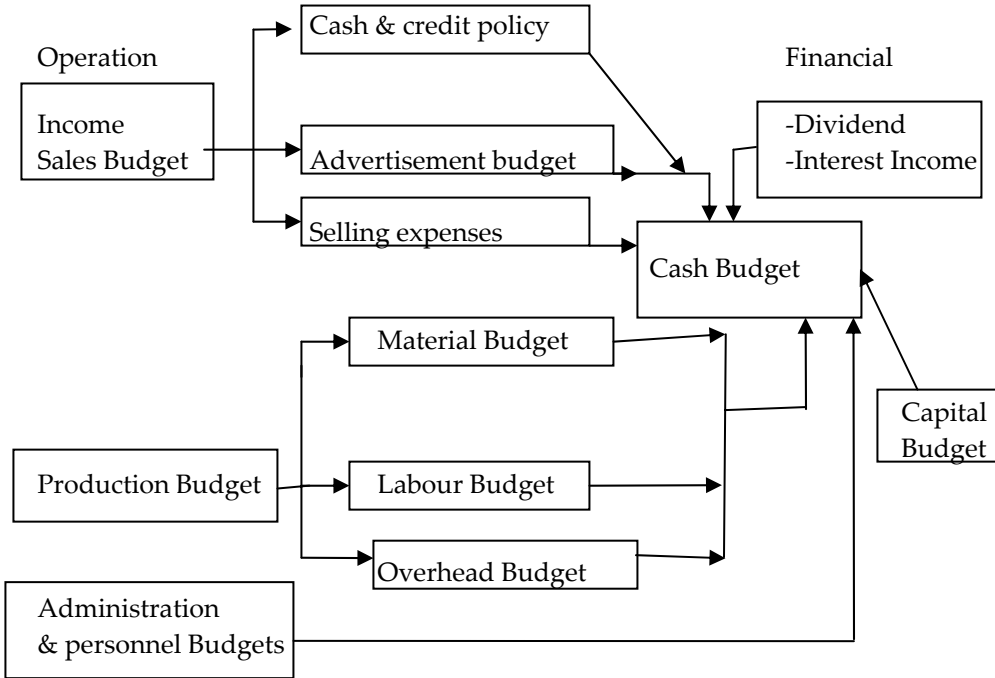


Figure 4: Sources of cash flows in a cash budget

The cash budget is composed of three major sections. In the first section, expected cash receipts from various sources are added the opening cash balance. Cash inflows can arise from various sources. However, one of the major sources of cash inflows is cash generated from sales function. As most businesses offer credit facilities to generate more sales, the ultimate cash inflow will depend on the discount offered for prompt payments and on credit terms. The pattern of cash collection can follow a credit timeline, such as, 50% of all sales in a given period to be cash sales, 35% of the sales to be collected in the following month and 15% in two months after sales. The other sources of cash inflows are dividend and interest incomes. Once cash inflows are added to the opening cash balance it shows the amount of cash available in a particular period. In the second section, expected cash outflows are deducted from the available cash position. Cash outflows can be numerous representing various costs and expenditures that are made during the period. Management can use credit options when paying for goods and services. For example, a certain portion of

current month's purchase can be paid in cash and the rest is paid over next two months. In the last section, the difference between cash available and cash disbursement shows a running balance of cash which becomes the opening cash balance for the next period. This balance helps management to identify when there is a cash deficit or surplus, and to address such situations. The cash budget is usually sub-divided into different periods. For example, a yearly cash budget can be broken down into four quarters and a quarterly budget can be broken into months.

**Example:**

Let us assume that the Churchill Manufacturing Company started the year with a cash balance of \$40,000. The following information is available:

- a) In December the company bought raw material for \$ 120,000
- b) About 40% revenue is collected in the month of sales and rest is collected in the following month
- c) Purchase of raw materials are paid 60 % in the month of purchase and the rest is paid in the after purchase
- d) All other expenses were paid when they became due.

Cash payments and receipts in a period need to be calculated by the credit terms allowed for both cash inflows and outflows. The cash inflows are calculated in the following table.

Revenue collected: About 40% revenue is collected in the month of sales and rest is collected in the following month. As such, there are two receipts from sales revenue, i.e., 40% from current month's sales and 60% from previous month's sales.

Sales		Cash inflows		
		January	February	March
	\$	\$	\$	\$
December	700,000	40%	420,000	308,000
20,000 x \$35		60%		
January	770,000	40%	462,000	336,000
		60%		
February	840,000	40%	504,000	364,000
		60%		
March	910,000	40%		
		60%		
<b>Cash Receipts</b>			<b>728,000</b>	<b>798,000</b>
				<b>868,000</b>

Exhibit 10: Calculation of Cash Inflows

Cash Payments: Purchase of raw materials is paid 60 % in the month of purchase and the rest is paid in the after purchase

Purchases		Cash outflows		
		January	February	March
	\$	\$	\$	\$
December	120,000	60%	40%	
January	131,000	60%	40%	
February	128,500	60%	40%	
March	130,000	60%	40%	
<b>Total</b>				

	January	February	March
December 40%	48,000		
January 60%	78,600		
January 40%		52,400	
February 60%		77,100	
February 40%			51,400
March 60%			78,000
<b>Total</b>	<b>126,600</b>	<b>129,500</b>	<b>129,400</b>

Exhibit 11: Calculation of Cash Outflows

Once we have determined cash inflows and outflows by credit terms we can prepare a full cash budget.

	January	February	March	Total
Opening cash balance	\$40,000	\$53,025	\$137,275	\$ 40,000
Cash receipts				
-sales revenue	728,000	798,000	868,000	2,520,000
Cash Available	768,000	851,025	1,005,275	2,560,000
Cash Payments				
Purchases	126,600	129,500	129,400	385,500
Direct labour	260,000	255,000	260,000	775,000
Factory overhead	259,375	256,250	259,375	775,000
Selling & administrative expenses	69,000	73,000	77,000	219,000
Total Payments	714,975	713,750	725,775	2,154,500
Closing Balance	53,025	137,275	279,500	405,500

Exhibit 12: Cash Budget

## Behavioural Aspects of Budgeting

Organisations are comprised of a complex aggregation of diverse elements, which are supposed to contribute to the achievement of organisational goals and objectives. It is generally assumed that these elements, including employees who carry out organisational activities, are mutually consistent and supportive. However, people come from different backgrounds (e.g. aspiration, preference, culture) and join the organisation to fulfil their individual objectives. It is possible that the individual objectives held by employees may not be compatible with organisational objectives. The budgetary process as a planning and control device is often considered to be a process through which diverse nature of objectives can be reconciled. But, why does the budgetary process have behavioural implications?

Budgets are often used to allocate resources and judge a manager's performance by comparing actual results with the budgeted plans. As a consequence of such performance measurement through budget both monetary and non-monetary incentives are provided when a performance is considered to have achieved the budgetary target. While monetary incentives allow managers to have salary increase, bonus, and other entitlements of monetary nature, non-monetary incentives can appeal to psychological needs, such as prizes, recognition etc. It is usually thought that budget will encourage employees through such incentive structures so that they accept organisational goals as their own. However, if the budgetary process is narrowly conceived or applied in a rigid manner, employees soon concentrate on the items that are measured or even reject such action plans. Management's role under such circumstances is to devise a system, which shows how budgets can help employees to achieve better results.

### *Participation and Budgetary Goal Congruence*

Numerous studies have established that if the budgetary system is not acceptable to employees who are involved, it is likely to be manipulated or rejected. It is usually thought that if employees are involved with the budgetary process, they are more likely to accept the budget. Empirical research also has shown that there is positive relationship between budget participation, job satisfaction, and organisational performance. However, participation can be an illusive concept if it is not properly implemented. To be successful, top management needs to be involved and extend support for its success. Participation in the budgetary process can bring the following benefits:

- a) Employees are more motivated when they are involved with the budget setting process
- b) Budget estimates are more accurate and reliable
- c) Budgets are accepted and supported by organisational members
- d) Creativity fostered among all levels of employees
- e) A participative budget communicates a sense of responsibility to subordinate employees

Participation can be influenced by the way the budgetary process is conducted in the organisation. There are two approaches in setting budgets, namely top down



and bottom up approaches. The top-down approach involves only the top-level managers in budgetary decision-making as they have a comprehensive knowledge of the overall objectives of the organisation and a fair knowledge of the contextual environment where the organisation operates. Once the budget is finalised, lower level employees are involved for implementing the budget. The bottom up approaches to budgeting involves lower level employees in the budget setting process, as these employees often possess vital information because of their closeness to the contextual environment. For example, the junior level managers will be preparing their budgets, which are then incorporated and aggregated into the budget of other managers. It is usually thought that that the bottom-up style of budgetary process leads to better result as various level of managers are more likely to be committed when they are involved with the process.

### *Dysfunction Behaviour*

When a budgetary process is organised in a non-participative and rigid style it is likely to produce a dysfunctional behaviour, which can reduce the overall efficiency of the organisation. Some examples of such behaviour are:

- a) creation of sub-optimal behaviour (e.g. a department taking some action regardless of intended implications on other departments)
- b) manipulation and falsification of results
- c) creation of budgetary slack
- d) creation inter-departmental rivalry

### Summary

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This chapter has examined the role and importance of budgets in management planning and decision-making. Different facets of a budget ranging from planning and control to behavioural perspective have been discussed. As different organisations face different types of complexities, the budgeting system is expected to significantly vary across different organisation. However, the role of sales projection in a competitive market has been highlighted. The beginning point of budgeting is the estimation of sales as it influences other estimates and budgets. The nature of various types of budgets and their designs are also discussed.

### Further reading

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Horgren, C. T., Foster, G., Datar, S. (1999). *Cost Accounting: A Managerial Emphasis*. (10<sup>th</sup> edition). New Jersey: Prentice-Hall, Inc.

Kim Langfield-Smith, K, Thorne, H and Hilton, R W, *Management Accounting: An Australian Perspective*, 3rd Edition, McGraw Hill, Sydney, 2003.

## Chapter 5

Control of operations through the application of standard costing and variance analysis

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Zahirul Hoque and Mohamed AboElhamd Omran

### LEARNING OBJECTIVES

After completing your study of this chapter, you should have learned:

1. What a standard cost is and how it differs from actual costs and budgeted costs
2. The differences among actual costing, normal costing, and standard costing
3. How to use standard costs to compute differences between actual costs and standard costs
4. How to compute and journalise the direct materials and direct labour variances
5. How overhead variances are computed

## Introduction

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Traditional management accounting is seen as a major tool of managerial control of operations. The idea is to assess how actual results deviate from targets during a given period. Standards are used to assess organisational performance as well as an individual's performance. Standards reflect desired or budgeted results during a particular period. In this chapter, we will discuss how different standard costs are used to compute a variance for inputs – materials, direct labour and manufacturing overheads.

## Standards costs versus budgeted costs

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Standard costs are predetermined or targeted costs expected to incur under normal operating conditions. On the other hand, a budget relates to an entire business; it provides decision makers with the expected total activity. However, a standard specifies the expected amount of inputs per unit basis. A standard cost consists of two components: quantity standard (such as pounds, gallons, board feet) and price standard (e.g. dollars per pound). Budgets help managers in planning and, at the same time, set standards that are used to control and evaluate managerial performance (Hansen and Mowen, 2003).

A **standard costing** uses standards for direct materials, direct labour, and overhead. An **actual costing** process uses the actual costs of these three inputs. On the other hand, a **normal costing** process uses the actual costs of direct materials and direct labour but applies predetermined overhead costs for product costing.

## Variance analysis

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In management accounting, a standard costing system assists management in measuring performance via a detailed analysis of the variances. For example, to determine variances, each responsibility centre is identified according to the price and quantity content. We will now demonstrate how to compute variances for the direct materials, direct labour, and manufacturing overhead.

## Computing variances for direct materials

In calculating variances for direct materials, we compare actual costs with standard costs. Direct materials variance focus on two variances: variance for price and variance for quantity.

Total direct materials variance is the difference between total standard costs and total actual costs, that is,  $SC - AC$ , where,  $SC$  = the standard material costs for the actual production and  $AC$  = the actual cost. A **favourable variance** occurs whenever actual costs are less than standard costs. In contrast, an **unfavourable variance** occurs when the opposite occurs.

### *Direct materials price variance*

The formula to compute direct materials Price Variance is:  $(SP - AP) \times QP$

Where,  $SP$  = the standard price per unit of direct materials  
 $AP$  = the actual price per unit of direct materials

QP = the actual quantity of direct materials purchased.

Here a favourable variance means the actual price per unit of direct materials does not exceed the standard price per unit. An unfavourable variance means the actual price per unit exceeds the standard price per unit. All of the material price variances could be caused by out-of-date or inappropriate standards. Other potential reasons could be that the firm could be purchasing in larger quantities (larger quantity discounts), purchasing lower grade materials, or that the supplier could be forced to offer a lower price due to the economics of their product.

### *Direct materials usage variance*

Materials usage or quantity variances can result from the difference between the direct materials actually used and the direct materials that should have been used for the actual production. The formula for computing the direct materials variance is:  $(SQ - AQ) \times SP$

Where, SQ = the standard quantity required for actual production  
 AQ = the actual quantity used  
 SP = the standard material price

Material usage variance could be caused by low-quality materials; lower skilled workers; less efficient machines; and low employee morale.

### **Example 1**

Darwin Corporation produced 100 units of Product XX. The total standard and actual costs for materials for the 100 units of Product XX are as follows:

Materials:	<u>Standard</u>	<u>Actual</u>
Standard: 400 pounds at \$6.00 per pound	\$2400	
Actual: 440 pounds at \$5.70 per pound		\$2508

### **Required:**

- Calculate the materials price variance.
- Calculate the materials usage variance.
- Calculate the total direct materials variance.

### **Solution:**

- The material price variance =  $(SP - AP) \times AQ$   
 =  $(\$6.00 - \$5.70) \times 440$   
 = \$132 (F)
- The materials usage variance =  $(SQ - AQ) \times SP$   
 =  $(400 - 440) \times \$6.00$   
 = \$240 (U)

$$\begin{aligned}
 \text{c. The total materials variance} &= (\text{SC} - \text{AC}) \\
 &= (\$ 2400 - \$ 2508) \\
 &= \underline{\underline{\$108}} \text{ (U)}
 \end{aligned}$$

*General Ledger entries for direct materials price and direct materials usage variances*

For an unfavourable direct materials price variance, the following entry is made:

Materials Inventory Control	XXX	
Direct materials price variance	XXX	
Accounts Payable Control		XXX

For a favourable direct materials price variance, the following entry is made:

Materials Inventory Control	XXX	
Accounts Payable Control		XXX
Direct Materials Price Variance		XXX

For an unfavourable direct materials usage variance, the following entry is made:

Work in Process Control	XXX	
Direct materials usage variance	XXX	
Direct materials inventory Control		XXX

For a favourable direct materials usage variance, the following entry is made:

Work in Process Control	XXX	
Direct materials inventory Control		XXX
Direct materials usage variance		XXX

**Computing direct labour variances**

*Total direct labour variance*

The total direct labour variance is the difference between the standard direct labour costs (**SH x SR**) and the actual direct labour costs (**AH x AR**).

- Where,
- SH = the standard direct labour hours that are allowed for the actual production
  - SR = the standard wage rate per hours
  - AH = the direct labour hours used
  - AR = the actual wage rate per hour

Using the above equation, the **direct labour rate variance** would be = **(SR - AR) x AH** and the **direct labour efficiency variance** would be = **(SH - AH) x SR**. An unfavourable labour rate variance occurs due to the firm's use of higher skilled workers and longer tenured workers with higher wages for less skilled tasks. An

unfavourable labour efficiency variance occurs due to the firm's use of less experienced or unskilled workforce, machine breakdowns, poor quality of direct materials, and changes in work conditions.

The following entries are made for direct labour rate variance and direct labour efficiency variance:

(a) Under unfavourable situation:

Work in Process Control	XXX	
Direct Labour Rate Variance	XXX	
Direct Labour Efficiency Variance	XXX	
Wages Payable Control		XXX

(b) Under favourable situation:

Work in Process Control	XXX		
Direct Labour Rate Variance		XXX	
Direct Labour Efficiency Variance		XXX	
Wages Payable Control			XXX

## Example 2

Omar Company has developed the following standards for one of its products.

Direct materials:	20 pounds × \$6 per pound
Direct labour:	5 hours × \$16 per hour
Variable manufacturing overhead:	5 hours × \$4 per hour

The following activity occurred during the month of July:

Materials purchased:	125,000 pounds at \$5.60 per pound
Materials used:	110,000 pounds
Units produced:	10,000 units
Direct labour:	50,000 hours at \$15 per hour
Actual variable manufacturing overhead:	\$221,000

The company records materials price variances at the time of Purchase.

### Required:

- Calculate the direct labour efficiency variance.
- Calculate the direct labour Wage Rate variance.
- Calculate the total direct labour variance.

### Solution:

$$\begin{aligned}
 \text{a. The direct labour efficiency variance} &= (SH - AH) \times SR \\
 &= (50,000 - 50,000) \times \$16 \\
 &= \$ - 0 -
 \end{aligned}$$

- b. The direct labour Wage Rate variance =  $(SR - AR) \times AH$   
 =  $(\$ 16 - \$ 15) \times 50,000$   
 = \$50,000 (F)
- c. The total direct labour variance =  $(SC - AC)$   
 =  $(\$16 \times 10,000 \times 5) - (\$15 \times 50,000)$   
 = \$50,000 (F)

### Overhead variances

In the above, we discussed how variances are computed for direct materials and direct labours. The manufacturing overhead is another important factor of the total cost of production. Next, we discuss how standard costs are used to calculate variances for variable overhead costs and fixed overhead costs. To do so, a predetermined overhead rate is computed as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated annual overhead cost}}{\text{Estimated annual production volume or estimated direct labour hours}}$$

#### *Variable overhead costs variance*

$$\text{Total variable overhead costs variance} = SC - AC$$

Where, SC = the standard variable overheads charged (or applied) to production  
 AC = the actual variable overheads incurred.

The total variable overhead costs variance is broken down into (a) variable overhead expenditure variance, and (b) variable overhead efficiency variance.

#### **(a) Variable overhead expenditure variance = BVO - AVO**

Where, BVO = the budgeted variable overheads for the actual direct labour hours of inputs  
 AVO = the actual variable overhead costs incurred.

#### **(b) Variable overhead efficiency variance = (SH - AH) X SR**

Where, SH = the standard hours of output  
 AH = the actual hours of input  
 SR = the standard variable overhead rate

**To illustrate these two variances we use the following example.**

#### **Example 3**

Paker Company's standard variable overhead rate is \$12 per direct labour hour, and each unit requires four standard direct labour hours. During October, Paker recorded 10,000 actual direct labour hours, \$150,000 actual variable overhead costs, and 3,000 units of product manufactured.

**Required:**

- a. Calculate the total variable overhead budget variance.
- b. Calculate variable overhead Expenditure variance.
- c. Calculate variable overhead Efficiency variance.

**Solution:**

- a. The total variable overhead budget variance      = SC – AC  
    = (3,000 × \$12 × 4) - \$150,000  
    = \$6,000 (U)
- b. Variable overhead expenditure variance              = BVO – AVO  
    = (10,000 × \$12) - \$150,000  
    = \$30,000 (U)
- c. Variable overhead efficiency variance                 = (SH – AH) X SR  
    = (3,000 × 4) - 10,000] × \$12  
    = \$24,000 (F)

Thus, (a) \$6,000 U = (b) \$30,000 U + (c) \$24,000 F

*Fixed overhead expenditure or spending variance = BFO - AFO*

Where,      BFO = budgeted fixed overheads  
    AFO = the actual fixed overheads incurred

Excessive consumption of fixed overhead cost items due to negligence, waste, and poorly maintained machines; payment of excessive prices for fixed overhead cost items.

*Volume variance = (AP - BP) x SR*

Where,      AP = the actual production  
    BP = the budgeted production  
    SR = the standard fixed overhead rate

**Example 4**

Ramsey Manufacturing Company has the following information pertaining to a normal monthly 10,000 unit of: Standard factory overhead rates are based on a normal monthly volume of one standard direct hour per unit.

Standard factory overhead rates per direct labour hour are:

Fixed	\$60.00	
Variable	\$100.00	\$160.00
Units actually produced in current month		9,000 units



Actual factory overhead costs incurred (includes 40% fixed)	\$1,500,000
Actual direct labour hours	9,000 hours

**Required:**

- Calculate the fixed overhead spending variance.
- Calculate the fixed overhead volume variance.
- Calculate the total fixed overhead variance.
- Calculate the total variable overhead variance.
- Calculate the variable overhead spending variance.
- Calculate the variable overhead efficiency variance.
- Calculate the total overhead variance for Ramsey.

**Solution:**

- Fixed overhead spending variance = BFO – AFO  
 = (9,000 × \$60) - (\$1,500,000 × 40%)  
 = \$60,000 (U)
- The fixed overhead volume variance = (AP – BP) × SR  
 = (9,000 - 10,000) × \$ 60  
 = \$60,000 (F)
- The total fixed overhead variance = SC – AC  
 = (10,000 × \$60) - (\$1,500,000 × 40%)  
 = \$-0-
- The total variable overhead variance = SC – AC  
 = (10,000 - \$100) – (\$1,500,000 × 60%)  
 = \$100,000(F)
- Variable overhead spending variance = BVO – AVO  
 = (9,000 × \$100) - (\$1,500,000 × 60%)  
 = \$-0-
- Variable overhead efficiency variance = (SH - AH) × SR  
 = (10,000 × 9,000) × \$100  
 = \$ 100,000(F)
- The total overhead variance = SC – AC  
 = (10,000 - \$160) – (\$1,500,000)  
 = \$100,000(F)

**Example 5**

The following standard costs were developed for one of the products of the Star Corporation:

Data Office Equipment	Direct materials	Direct labour
Actual price per input unit	\$14	\$18
Standard price per input unit	\$12	\$20
Standard inputs allowed per output unit	5	2
Actual units of input used	48,000	22,000
Actual units of output (product)	10,000	10,000

**Required:**

- Calculate price & efficiency variances.
- Discuss possible reasons for materials price variance and the efficiency variance.
- Discuss possible reasons for labour price variance and the efficiency variance.

**Solution:****a. Price and efficiency variances****1. Direct materials**

- Price Variance  $= (SP - AP) \times QP$   
 $= (\$12 - \$14) \times 48,000$   
 $= \underline{\$96,000(U)}$
- Efficiency Variance  $= (SQ - AQ) \times SP$   
 $= (50,000 - 48,000) \times \$12$   
 $= \underline{\$24,000(U)}$

**2. Direct labour**

- Rate Variance  $= (SR - AR) \times AH$   
 $= (\$20 - \$18) \times 22,000$   
 $= \underline{\$44,000(F)}$
- Efficiency Variance  $= (SH - AH) \times SR$   
 $= (20,000 - 22,000) \times \$20$   
 $= \underline{\$40,000(U)}$

**b. Possible reasons for direct materials price variance and direct materials efficiency variance**

**Possible reasons for direct materials price variance** may include: better quality materials used in production; materials prices increased during the period; new supplier used. On the other hand, **possible reasons for direct materials**

**efficiency variance are:** higher quality materials used in production were easier to cut and polish, less wastage and time used in production, or budgeted standards did not take into account current efficiency levels or technology.

**c. Possible reasons for labour rate variance and the efficiency variance**

The labour **rate variance is favourable** because the actual price of the direct labour input is lower than the budgeted price (i.e. Actual input \$18.00, Budgeted input \$20.00). Reasons for favourable price variance are: used different mix of employees; employees incurred less overtime than expected. While the labour **efficiency variance is unfavourable** because more input was used than was budgeted for, resulting in a decrease in operating profit. Actual input was 22,000, while Budgeted input allowed for actual output achieved was 20,000. Possible reasons for the efficiency variance are: less skilful workers were employed; production was scheduled less efficiently than expected; better quality materials were found to be more difficult to cut and polish; and budgeted time standards were not set accurately.

**Example 6**

The following standard costs were developed for one of the products of the Sun Corporation:

**Standard Cost Card Per Unit**

	\$
Materials: 4 feet × \$14 per foot	56.00
Direct labour: 8 hours × \$10 per hour	80.00
Variable overhead: 8 hours × \$8 per hour	64.00
Fixed overhead: 8 hours × \$12 per hour	<u>96.00</u>
Total standard cost per unit	<u>\$296.00</u>

The following information is available regarding the company’s operations for the period:

Units produced:	11,000
Materials purchased:	52,000 feet @ \$13.70 per foot
Materials used:	40,000 feet
Direct labour:	84,000 hours costing \$840,000

Manufacturing overhead incurred:	
Variable	\$756,000
Fixed	\$1,000,000

Budgeted fixed manufacturing overhead for the period is \$960,000, and the standard fixed overhead rate is based on expected capacity of 80,000 direct labour hours.

**Required:**

- a. Calculate the materials price variance.
- b. Calculate the materials usage variance.
- c. Calculate the direct labour rate variance.
- d. Calculate the direct labour efficiency variance.
- e. Calculate the variable manufacturing overhead spending variance.
- f. Calculate the variable manufacturing overhead efficiency variance.
- g. Calculate the fixed manufacturing overhead spending variance.
- h. Calculate the fixed manufacturing overhead volume variance.

**Solution:**

- a. \$15,600 F  $52,000 \times (\$13.70 - \$14.00)$
- b. \$56,000 F  $(40,000 \times \$14) - (11,000 \times 4 \times \$14)$
- c. \$-0-  $\$840,000 - (84,000 \times \$10)$
- d. \$40,000 F  $(84,000 \times \$10) - (11,000 \times 8 \times \$10)$
- e. \$84,000 U  $\$756,000 - (84,000 \times \$8)$
- f. \$32,000 F  $(84,000 \times \$8) - (11,000 \times 8 \times \$8)$
- g. \$40,000 U  $(\$1,000,000 - \$960,000)$
- h. \$96,000 F  $\$960,000 - (11,000 \times 8 \times \$12)$

**Example 7**

The Moon Company manufactures a single product that has a standard materials cost of \$20 (4 units of materials at \$5 per unit), standard direct labour cost of \$9 (1 hour per unit), and standard variable overhead cost of \$4 (based on direct labour hours). Fixed overhead is budgeted at \$17,000 per month. The following data pertain to operations for March 2004:

Materials purchased: 8,000 units costing	\$39,400.
Materials used in production of 1,500 units of finished product: 6,200 units	
Direct labour used: 1,500 hours costing	\$15,000
Variable overhead costs incurred:	\$5,960
Fixed overhead costs incurred:	\$17,500

**Required:**

- a. **Compute the following variances (show calculations):**
  1. Materials usage variance
  2. Labour rate variance
  3. Labour efficiency variance
  4. Variable overhead spending variance
  5. Variable overhead efficiency variance
  6. Fixed overhead budget variance
- b. **Give one possible explanation for each of the six variances computed in part (a).**

**Solution:**

a.	1.	Materials usage variance:	
		Std. cost of materials used (6,200 units × \$5)	\$31,000
		Std. cost of materials allowed (1,500 × 4 × \$5)	<u>30,000</u>
		Material usage variance	<u>\$ 1,000 (U)</u>
	2.	Labour rate variance:	
		Actual labour costs	\$15,000
		Std. cost of actual labour hours (1,500 × \$9)	<u>13,500</u>
		Labour rate variance	<u>\$ 1,500 (U)</u>
	3.	Labour efficiency variance:	
		Standard cost of actual hours (1,500 × \$9)	\$13,500
		Standard labour cost allowed (1,500 × 1 × \$9)	<u>13,500</u>
		Labour efficiency variance	<u>\$ -0-</u>
	4.	Variable overhead spending variance:	
		Actual variable overhead costs	\$5,960
		Std. variable overhead cost for actual hours (1,500 × \$4)	<u>6,000</u>
		Variable overhead spending variance	<u>\$ 40 (F)</u>
	5.	Variable overhead efficiency variance:	
		Std. variable overhead cost for actual hours	\$6,000
		Std. variable overhead cost allowed (1,500 × 1 × \$4)	<u>6,000</u>
		Variable overhead efficiency variance	<u>\$ -0-</u>
	6.	Fixed overhead budget variance:	
		Actual fixed overhead	\$17,500
		Budgeted fixed overhead	<u>17,000</u>
		Fixed overhead budget variance	<u>\$ 500 (U)</u>

**b. One possible explanation for each of the six variances computed in part (a).**

1. Low-quality materials; lower skilled workers; less efficient machines; low employee morale.
2. Higher skilled workers; longer tenured workers with higher wages.
3. Normal efficiencies of labour force (no variance).
4. Savings in consumption of variable overhead cost items due to careful work; payment of lower prices for variable overhead cost items.
5. Caused by same factors that caused labour efficiency variance. (See item 3).
6. Excessive consumption of fixed overhead cost items due to negligence, waste, and poorly maintained machines; payment of excessive prices for fixed overhead cost items.

**Note:** Any of the preceding variances also could have resulted from out-of-date or inappropriate standards.

**Journal entries for overhead variance**

The following journal entries are made in the General Ledger for overhead costs variances:

(a) For overhead applied or charged to production:

Work in Process Control	XXX	
Variable Overhead Control		XXX
Fixed Overhead Control		XXX

(b) For actual overhead expenses:

Variable Overhead Control	XXX	
Fixed Overhead Control	XXX	
Accounts Payable Control/Miscellaneous Accounts		XXX

(c) To record variances

Fixed Overhead Control	XXX	
Variable Overhead Efficiency Variance	XXX	
Fixed Overhead Spending Variance	XXX	
Variable Overhead Control		XXX
Variable Overhead Spending Variance		XXX
Fixed Overhead Volume Variance		XXX

(d) Disposition of overhead variances to cost of goods sold account

For favourable variance:

Fixed Overhead Volume Variance	XXX	
Variable Overhead Spending Variance	XXX	
Cost of Goods Sold		XXX

For unfavourable variance:

Cost of Goods Sold	XXX	
Variable Overhead Efficiency Variance		XXX
Fixed Overhead Spending Variance		XXX

**Summary**

This chapter has outlined how an organisation could perform an analysis of variances for its costs of inputs: direct materials, direct labour, and manufacturing overhead. To do so, a standard cost system is to be applied, which compares actual outcomes with standards. The chapter has demonstrated the processes of computing variances for: direct materials variances (price and

usage); direct labour variances (rate and efficiency); variable overhead variances (spending and efficiency); and fixed overhead variances (volume and spending). Managers find such a variance analysis useful in planning and controlling their inputs costs. The standard costing and variance analysis has been labelled as 'attention directors' not 'problem solvers' (Horngren et al., 1999).

### Further reading

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## **PART 3**

### Product Costing Processes

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Chapter 6            Job order cost accounting systems  
*Zahirul Hoque*

Chapter 7            Process costing systems  
*Zahirul Hoque*





# Chapter 6

## Job Order Costing

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Zahirul Hoque

### LEARNING OBJECTIVES

After completing your study of this chapter, you should have learned:

1. The concepts of a job costing system
2. How to make journal entries for jobs
3. How to compute a predetermined overhead rate and its application to allocation of overhead costs to products
4. How to adjust over or under applied overhead to cost of goods sold, work in process inventory and finished goods inventory
5. The basic characteristics of process costing systems, including cost flows and the cost of production report
6. Prepare cost reports using the weighted average method and the process costing method

## Introduction

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As discussed in Chapter 2, **product costing** is associated with the techniques of estimating or measuring the costs of producing individual product sets. Given that focus, product cost consists of any cost caused by a productive activity that is necessary to produce product sets, from the purchase of raw materials and parts to placing the finished product in the finished goods storeroom.

Product costs can be computed and assigned to products and services by either of two costing systems: job order cost accounting system or process costing system. The basis of measurement can be either full production cost or short-term variable production cost. This chapter demonstrates how products or services may be costed, how overhead rates are computed, and the ways that the costs of providing services can be estimated.

## Job order costing systems

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Firms manufacturing custom-made products such as printers, engineers, manufacturers of ships and trains, defence contractors, highway and dam contractors, and advertising agency use job order costing systems. Under the job costing system, the average cost per unit for each job is computed, as follows:

$$\text{Average unit cost for a job} = \frac{\text{Total manufacturing costs for the job}}{\text{Total units manufactured for the job}}$$

How does a company use direct rates and indirect rates in computing costs? Three possible combinations of actual and budgeted rates for job costing and process costing systems are used. These are illustrated next.

## Accounting Entries for a Job Costing System

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Product costs consist of two broad classes: (1) direct product costs that are traceable to individual job orders; and (2) indirect product costs that are factory overhead costs.

A job cost sheet (see Exhibit 4.1) is maintained for each job. This contains details of materials, labour, and overhead costs for each job.

## Illustration of a job costing system in manufacturing

The following transaction-by-transaction summary illustrates the job costing system in a manufacturing firm. These transactions track (a) the purchases of materials and other inputs, (b) their conversion into work in process, (c) their conversion into finished goods, and (d) the sale of finished goods.

### Accounting for materials

- Purchases of materials (direct and indirect) \$90,000 on credit.
 

Materials Control Dr	\$90,000	
Accounts Payable Cr		\$90,000
- Materials sent to manufacturing floor: direct materials, \$77,000, and indirect materials \$3,000.

Work in Process Control Dr	\$77,000	
(for direct materials used)		
Factory Overhead Control Dr	\$3,000	
(for indirect materials used)		
Materials Control Cr		\$80,000

***Accounting for labour***

3. Manufacturing labour wages liability incurred, direct, \$40,000, and indirect, \$15,000.

Work in Process Control Dr	\$40,000	
(for direct wages)		
Factory Overhead Control Dr	\$15,000	
(for indirect wages)		
Wages Payable Control Cr		\$55,000

4. Payment of total manufacturing payroll for the month, \$52,000.

Wages Payable Control Dr	\$52,000	
Cash/Bank Cr		\$52,000

***Accounting for manufacturing overheads***

5. Additional manufacturing departmental overhead costs incurred during the month, \$65,000. These costs consist of utilities and repairs, \$25,000; insurance expired, \$5,000; and depreciation, \$35,000.

Factory Overhead Control Dr	\$65,000	
Accounts Payable Cr		\$25,000
Accumulated Depreciation Cr		\$35,000
Prepaid Insurance Cr		\$ 5,000

6. Allocation of manufacturing overhead to products, \$65,000.

Work in Process Control Dr	\$65,000	
Factory Overhead Allocated Cr		\$65,000

***Accounting for goods completed***

7. Completion and transfer to finished goods of six individual jobs, \$174,800.

Finished Goods Control Dr	\$174,800	
Work in Process Control Cr		\$174,800

8. Cost of Goods Sold \$148,000.

Cost of Goods Sold Dr	\$148,000	
Finished Goods Control Cr		\$148,000

Job No.....							
Description of job:							
Customer details:			Job status:				
Customer No.			Contract Agreement Date:				
Job address:			Estimated Start Date:				
Contact:			Estimated Completion Date:				
Phone:			Actual Start Date:				
Fax:			Actual Completion Date:				
Email:			Delivery Instruction:				
			Contract Price:				
<b>Direct Materials</b>							
Date Received	Material Requisition No.	Part No	Quantity Used	Unit Cost	Total Costs		
<b>TOTAL</b>							
<b>Direct Labour</b>							
Date/Period	Labour Time Record No	Employee No	Hours Used	Hourly Rate	Total Costs		
<b>TOTAL</b>							
<b>Manufacturing Overhead based on</b>							
<b>No of Direct Labour Hours</b>				<b>No of Machine Hours</b>			
Date	Based Hours	Base Rate	Total Costs	Date	Based Hours	Base Rate	Total Costs
<b>TOTAL</b>				<b>TOTAL</b>			
<b>SUMMARY</b>							
			<b>Actual (\$)</b>		<b>Budget (\$)</b>		
Direct Material							
Direct Labour							
Overhead (based on labour hours)							
Overhead (based on machine hours)							
<b>TOTAL JOB COST</b>							

*Exhibit 2.1 A sample job order cost sheet for a manufacturing firm*

## Overhead application rates

Since total overhead costs cannot be computed accurately until the end of the fiscal period, the overhead for each job leaving the factory must be computed from overhead rates. These are usually computed at the beginning of each fiscal year by dividing the budgeted fixed overhead by some denominator value such as budgeted labour hours, budgeted labour costs, or budgeted machine hours.

Some organisations use a single blanket rate for the whole factory, and others compute a separate rate for each department. The term *blanket overhead rate* (or *plant-wide rate* in US terminology) is used to describe a single overhead rate that is established for the factory as a whole. If we assume that the total factory overheads for a particular period are \$160,000, and 80,000 direct labour hours are worked during the period, then the blanket rate will be \$2.00 per direct labour hour ( $\$160,000/80,000$ ), and all products will be charged at this rate.

A blanket overhead rate is not a satisfactory method of allocating overheads in a situation where a factory consists of a number of different production centres, and products consume cost centre overheads in different proportions. Let us assume that the \$160,000 overheads and the 80,000 direct labour hours are the totals of three production departments, and that these totals can be analysed to departments A, B and C as follows:

	Dept A	Dept B	Dept C	Total
Overheads	\$30,000	\$90,000	\$40,000	\$160,000
Direct labour hours	20,000	30,000	30,000	80,000
Overhead rate per direct labour hour (Total budgeted overhead/ Budgeted direct labour hours)	\$1.50	\$3.00	\$1.33	\$2.00

In this illustration it may be more meaningful to establish separate departmental overhead rates rather than to use an overall blanket rate of \$2.00 per hour. Consider a situation where product M requires 20 direct labour hours in department C but does not pass through departments A and B. If a blanket rate overhead rate is used then overheads of \$40 (20 hours at \$2 per hour) will be allocated to product M. On the other hand, if a department overhead rate is used, only \$8 would be allocated to product M. Which method should be used? The logical answer must be to establish separate departmental overhead rates, since product M only consumes overheads in department C. If the blanket overhead rate were applied, all the factory overhead rates would be averaged out and product M would be indirectly allocated with some of the overheads of department B. We can conclude from this example that a blanket overhead rate is only satisfactory when all products consume cost centre overheads in approximately the same proportions. In the above example, each department

accounts for one-third of the total direct labour hours. If all products spend approximately one-third of their time in each department, a blanket overhead rate can be used.

Under-allocated or over-allocated manufacturing overhead

The use of budgeted indirect (overhead) cost rates enables job costs to be computed on an ongoing basis during the accounting period. At the end of the accounting period, the actual costs in the indirect cost pool and/ or the actual quantity of the cost allocation base will always differ from their respective budgeted amounts. This difference, of course, is to be expected. The result is that indirect costs will be under-allocated or over-allocated to individual jobs during the period.

Under-allocated indirect (overhead) costs occur when the allocated amount of indirect costs is less than the actual (incurred) amount. Over-allocated indirect (overhead) costs occur when the allocated amount of indirect costs exceeds the actual (incurred) amount.

Under-allocated or over-allocated manufacturing overhead	=	Manufacturing overhead incurred	-	Manufacturing Overhead allocated or applied.
--	---	---------------------------------	---	--

Equivalent terms are under-applied (or Over-applied) indirect (overhead) costs and under-absorbed (or over-absorbed) indirect (overhead) costs.

**End-of-period adjustments of under or over-allocated factory overhead**

Factory Overhead Control is a temporary account and must be closed at the end of the fiscal year. There are two main ways of writing off under or over-allocated overhead.

*Alternative 1*

If most of the goods produced have been sold, the easiest way is merely to write off to Cost of Goods Sold. Here the total under or over-allocated overhead is included in this year’s cost of goods sold. In the case of under-allocated overhead the journal entry would be:

Cost of Goods Sold Dr		xxx
Factory Overhead Allocated Dr		xxx
Factory Overhead Control Cr		xxx

However, if the factory overhead was over-applied, the necessary entry would be:

Factory Overhead Control Dr		xxx
Cost of Goods Sold Cr		xxx
Factory Overhead Allocated Cr		xxx

In our example above, the journal entry would be:

Cost of Goods Sold Dr	xxx
Factory Overhead Allocated Dr	xxx
Factory Overhead Control Cr	xxx

**Alternative 2**

Pro-ration of the balance of Factory Overhead Control to three accounts: Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold. In our example above, the \$ under-allocated overhead is prorated over the three pertinent accounts in proportion to their total ending balances (before pro-ration). The journal entry for this pro-ration would be:

Work in Process Control Dr	xxx
Finished Goods Control Dr	xxx
Cost of Goods Sold Dr	xxx
Factory Overhead Allocated Dr	xxx
Factory Overhead Control Cr	xxx

**Summary**

Job costing is generally applied to those situations where goods are manufactured in batches and each product is different in nature. In job order costing systems, each product is termed as a job and a job cost is kept for each job. A unit cost for each job is calculated by dividing the total manufacturing costs by the total units produced. Overhead costs are assigned using a predetermined overhead rate, which is computed by dividing the budgeted total manufacturing overhead costs by the budgeted total quantity. At the end of the production process, such an applied overhead is compared with the total overhead costs incurred. The difference between applied overhead and actual overhead is referred to as under-applied overhead or over-applied overhead. If this difference is not very significant it is adjusted to cost of goods sold. However, for a significant difference, it is allocated between the work in process, finished goods, and cost of goods sold.

**Further reading**

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# Chapter 7

## Process costing systems

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Zahirul Hoque

### LEARNING OBJECTIVES

After completing your study of this chapter, you should have learned:

1. The basic characteristics of process costing systems
2. The cost flows in a process costing system
3. How to prepare the cost of production report
4. The application of the weighted average method and the first-in first-out methods of process costing

## Introduction

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In the previous chapter, we illustrated the cost accumulation procedure for a job costing system where costs are charged to each individual customer's order, since each order is unique and requires different amounts of labour, material and overhead. In this section, we shall consider the cost accumulation procedure for an alternative system called process costing.

### The basic principle of process costing

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A process costing system is used in those industries where the final products are identical. With this system, no attempt is made to allocate the manufacturing cost to a specific order. Instead, manufacturing costs are organised into various producing departments. To determine the cost of an individual unit, the manufacturing cost for each department is accumulated for a particular period and is divided by the number of units produced to calculate the cost per unit.

### Flow of costs in a process costing system

In a process costing system production moves from one process (or department) to the next until the process is finished to make final products. Each production department performs its own operation and then transfers its completed production to the next department, where it becomes the input for further processing. Finally, the completed production of the last department is transferred to the finished goods inventory.

The cost accumulation procedure follows this production flow. Control accounts are established for each process (or department), and direct costs and manufacturing overhead are allocated to each process. As production moves from process to process, costs are transferred with it. The costs of process A, for example, are transferred to Process B; process B costs are then added to this cost, and the resulting total cost is transferred to process C; process C costs are then added to this cost. Therefore, the cost becomes cumulative as production proceeds and the addition of the costs from the last department's costs determine the total cost. The whole process costing systems involves the following five steps:

- Prepare the flow of physical units of a product from 'inputs' to 'outputs'
- Calculate equivalent units in terms of completed output
- Summarise the total costs of manufacturing to account for, that is, the total costs charged to work in process.
- Calculate the cost per equivalent unit
- Assign total costs to units completed and to units remain in work in process

### *Equivalent units*

Equivalent units measure the output in terms of the quantities of each of the factors of production (materials, labour, and overheads) that have been consumed by the units. An equivalent unit is the number of units of work actually done by a producing department in one month.

To calculate equivalent units, add the number of work units needed to complete the beginning inventory and the number of units both begun and completed this month, and the number of work units in the ending inventory.

In the process costing system, the cost of per unit is calculated using either the first-in, first-out (FIFO) inventory method or the weighted average method of costing inventory. Under the FIFO method, the unit cost is computed by confining equivalent units to work completed during the current period only. Further, the current period's costs are separately identified to reflect the fact that the unit costs are related only to the current period's work. On the other hand, the weighted average costing combines the costs assigned to the beginning work in process with the current period's costs incurred, and combines the units in the beginning work in process with the units started in the current period. This process results in the calculation of the cost per unit, which is an average between the costs, incurred in the prior period and assigned to the beginning work in process and the costs incurred during the current period.

### Example 1: Process costing using the weighted average method

ACI Pharmaceuticals Company has a product that passes through two processes: Mixing and Finishing. All materials are added at the beginning of the process. The following information was available for the Mixing Department for January 2003:

1. Work in process, January 1, 2003 (60 percent completed as to conversion costs). Costs associated with the 3,000 partially completed units are as follows: materials, \$2,700; direct labour, \$360; and overhead, \$1,800.
2. On January 31, work in process consisted of 6,000 units (40 percent complete as to conversion costs).
3. During the month, 64,000 units were transferred to finished goods.
4. Costs added during the month were as follows:
 

▪ Materials .....	\$64,000
▪ Labour .....	12,000
▪ Overhead .....	62,900

### Required

Using the weighted average method

- a. Prepare a physical flow schedule
- b. Prepare a schedule of equivalent units assuming that the Company uses the weighted average method of costing inventories.
- c. Compute the unit cost for January.
- d. Determine the cost of ending work in process and the cost of finished goods transferred out.

**Solution:**

**Process costing: using the weighted average method**

*a. Physical flow schedule*

Units to account for:	Units accounted for:		
Work in process, January 1	3,000	Finished goods	64,000
Units started	67,000	Work in process, January 31	6,000
Total units to account for	70,000	Total units accounted for	70,000

*b. Schedule of equivalent units*

	<b>Equivalent Units</b>		
	<u>Materials</u>	<u>Labour</u>	<u>Overhead</u>
Finished goods	64,000	64,000	64,000
Work in process, January 31 (40% completed)	6,000	2,400	2,400
Total equivalent production units	70,000	66,400	66,400

*c. Unit cost computation*

Costs:

	<u>Materials</u>	<u>Labour</u>	<u>Overhead</u>	<u>Total</u>
Work in process, January 1	\$2,700	\$360	\$1,800	\$4,860*
Costs incurred during January	<u>64,000</u>	<u>12,000</u>	<u>62,900</u>	<u>138,900*</u>
Total costs to account for	\$66,700	\$12,360	\$64,700	\$143,760*
Divided by equivalent production units	<u>70,000</u>	<u>66,400</u>	<u>66,400</u>	
Cost /equivalent production unit	<u>\$0.953</u>	<u>\$0.186</u>	<u>\$0.974</u>	<u>\$2.113*</u>

Costs of Finished goods (64,000 × \$2.113)      \$135,232\*

Costs of ending work in process:

Materials (6,000 × \$0.953)	\$5,718.00	
Labour (2,400 × \$0.186)	446.40	
Overhead (2,400 × \$0.974)	<u>233.60</u>	8,502*
Total costs accounted for		<u>\$143,734*</u>

\*\$26 round-off error

**Example 2: Process costing: using the first-in first-out method**

We use the above example to demonstrate how process costing can be done using the first-in first-out method.

*a. Physical flow schedule for January (FIFO)*

Units to account for:	Units accounted for:		
Work in process, January 1	3,000	Finished goods	64,000
Units started	67,000	Work in process, January 31	6,000
Total units to account for	70,000	Total units accounted for	70,000

**b. Schedule of equivalent production units for January (FIFO)**

	<u>Equivalent Units</u>		
	Materials	Labour	Overhead
Units started and finished (64,000 – 3,000)	61,000	61,000	61,000
Work in process, January 1 to complete (previous 40%)	0	1,200	1,200
Work in process, January 31	<u>6,000</u>	<u>2,400</u>	<u>2,400</u>
Equivalent production units	<u>67,000</u>	<u>64,600</u>	<u>64,600</u>

**c. Unit cost computation**

Costs to account for:

	Materials	Labour	Overhead	Total
Work in process, January 1	\$2,700	\$360	\$1,800	\$4,860*
Costs incurred in January	<u>64,000</u>	<u>12,000</u>	<u>62,900</u>	<u>138,900*</u>
Total costs to account for	<u>\$79,500</u>	<u>\$16,600</u>	<u>\$91,000</u>	<u>\$143,760*</u>

Cost per equivalent production unit:

Current costs	\$64,000	\$12,000	\$62,900	
Divided by				
equivalent production units	67,000	64,600	64,600	
Cost per equivalent unit	<u>\$0.956</u>	<u>\$0.186</u>	<u>\$0.974</u>	<u>\$2.116*</u>

Costs of finished goods transferred out:

Work in process, January 1:				
From prior period				
(\$2,700 + \$360 + \$1,800)	\$4,860			
From current period				
[1,200 × (\$0.186 + \$0.974)]	1,392			
Units started and finished				
(61,000 × \$2.116)	<u>129,076</u>		\$135,328*	
Ending work in process:				
Materials (6,000 × \$0.958)	\$5,748.00			
Labour (2,400 × \$0.186)	446.40			
Overhead (2,400 × \$0.974)	<u>2,337.60</u>		<u>8,532*</u>	
Total costs accounted for			<u>\$143,860*</u>	

\*\$100 round-off error

**Summary**

This chapter has discussed the basic concept of a process costing system. A process costing focuses on the average unit cost for equivalent units completed for a particular period. Within the process costing system, an organisation can use either the weighted average method or the first-in first-out method. Thus,

costs are accumulated by process instead of jobs for a given time. In a job costing situation the cost object is 'job' while in a process costing system the cost object is a 'product'.

### Further reading

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Hansen D.R., & Mowen M.M. (2003), *Cost Management, Accounting and Control, 4th Edition*, ITP-South Western College Publishing, Cincinnati, Ohio.

Horngren, C.T., Foster G., and Datar, S.M., *Cost Accounting - A Managerial Emphasis*, 11th Edition, Prentice-Hall.

Rayburn, L.G. (1996), *Cost Accounting, Using a Cost Management Approach*, 6th Ed. Times Mirror Higher Education Group Inc.

## **PART 4**

### Cost Allocation Processes

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Chapter 8    Service department cost allocation  
*Zahirul Hoque*

Chapter 9    Activity-based costing: concepts, processes and  
issues  
*Maria Major and Zahirul Hoque*

Chapter 10   Activity-based costing in a Portuguese  
telecommunication company  
*Maria Major*





## Chapter 8

### Support department cost allocation

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Zahirul Hoque

#### *LEARNING OBJECTIVES*

After completing your study of this chapter, you should have learned:

1. The nature of service departments
2. Purposes of cost allocation
3. Methods of allocating costs of support departments to another support departments or operating departments

## Introduction

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This chapter focuses on how an organisation can allocate its service departments' costs to cost objects or product sets. As discussed in Chapter 1, often organisations classify costs into two groups: direct and indirect. Direct costs can be traced directly to a cost object, while indirect costs are not directly traceable. This is where cost allocation becomes an important issue. The following sections discuss the processes of allocating indirect costs to the desired product sets.

## The nature of service or support departments

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Service departments are support centres. For example, a factory canteen or a facilities management supports other departments or centres. Costs of these service departments are accumulated and must be allocated or assigned to other various producing departments, which then in turn, are to be allocated to the chosen products or services. Horngren et al. (1994) identified the following purposes of allocating costs to cost objects:

- To provide information for economic decision: Examples include to decide whether to add a new airline flight; to decide whether to buy a component from outside suppliers or to make it internally.
- To motivate managers and employee: An example of such a purpose would be to encourage sales personnel to push high margin products or services.
- To justify costs or compute reimbursement: An example would be to cost products at a "fair" price.
- To measure income and assets for external reporting: An example would be the cost of inventory.

## Methods of allocating costs of support departments

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The cost/management accounting textbooks discuss three methods of allocating the costs of support department: direct method; sequential or step down method; and reciprocal method. We now introduce each of them.

### *Direct method*

Under the direct method, the direct costs of departments are first accumulated in service department accounts. Then the service department accounts are allocated directly to user (operating) departments without going through intermediate departments. There are no cost allocations between service departments in this method. The main advantage of this method is its simplicity (Horngren et al., 1994).

### *The step down or sequential method*

The step down or sequential method allows an organisation for partial recognition of services rendered by one support department to another service department. Under this method, first, the direct costs are accumulated in the service department accounts, and then the allocation begins with closing the account of the service department that services the greatest number of other departments. Once an allocation is made from a service department, no further

allocations are made back to that department. Each service department in turn is closed out into the remaining service departments and into the production departments, until finally all the service department accounts are closed out.

### *The reciprocal method*

Under the reciprocal method, the direct costs of departments are first accumulated in the service department accounts. Accounts are closed out into each other simultaneously using matrix algebra, accounting for cost flows in both directions among service departments that provide services to one another. At the end of this, all service department accounts are closed out into production department accounts. The reciprocal method allows an organisation for reassigning the costs of one service department to one or more other service departments.

### *A comprehensive example*

We use the following example to demonstrate how an organisation can allocate service department costs to other departments using the above three allocation methods:

John Kerry Pty Ltd has two support departments (Human Resources and Accounts) to support the three operating departments: Machining, Assembly, and Finishing. The following budget data pertain to the five departments:

	Human Resources	Accounts	Machining	Assembly	Finishing
Direct costs	\$30,000	\$20,000	\$30,000	\$40,000	\$15,000
No of employees		8	20	25	12
Space (sq. feet)	1,500		8,000	22,000	12000
Direct labour hours			3,000	4,000	1,200

The Company allocates human resources costs using the number of employees and accounts department costs are allocated using the space area (square feet). The overhead rate is applied based on direct labour hours.

### **Required:**

- Allocate the costs of the service departments to the operating departments using (1) the direct method; (2) the sequential method; and (3) the reciprocal method.
- Compute the overhead application rates for the operating departments using each of these three allocation methods.

**Solution (a) and (b)**

*The direct method of allocation*

	<b>Machining</b>	<b>Assembly</b>	<b>Finishing</b>	<b>Total</b>
No of employees	20	25	12	57
Percentage	35.09	43.86	21.05	100.00
Square feet	8,000	20,000	12,000	42,000
Percentage	19.05	52.38	28.57	100.00
Human resources cost allocation*				
	\$10,527	\$13,158	\$6,315	\$30,000
Accounts cost allocation**	\$3,810	\$10,476	\$5,700	\$20,000
Direct overhead cost	<u>\$30,000</u>	<u>\$40,000</u>	<u>\$15,000</u>	
Total overhead cost	\$44,851	\$63,970	\$26,179	
Divided/direct labour hours	<u>3,000</u>	<u>4,500</u>	<u>1,200</u>	
Dept OH rate per DLH	<u>\$ 14.78</u>	<u>\$14.14</u>	<u>\$22.51</u>	

\*Number of employee % × \$30,000

\*\*Departmental area of space % × \$20,000

*The sequential method of cost allocation*

As the Human Resources Department provides the highest percentage of service to other service departments, its costs will be allocated first. This is followed by the Accounts Department cost allocation.

	<b>HR</b>	<b>Accounts</b>	<b>Machining</b>	<b>Assembly</b>	<b>Finishing</b>	<b>Total</b>
No of employees	8	20	25	12	65	
Percentage	12.31	30.77	38.46	18.46	100%	
Square feet	1,500	8,000	22,000	12,000	43,500	
Percentage	3.45	18.39	50.57	27.59	100%	

**Sequential Cost Allocation**

	<b>HR</b>	<b>Accounts</b>	<b>Machining</b>	<b>Assembly</b>	<b>Finishing</b>	<b>Total</b>
Direct overhead	30,000	20,000	30,000	40,000	15,000	
First step:						
Allocate HR	\$(30,000)	\$3,693	\$9,231	\$11,538	\$5,538	
Second step:						
Allocate Accounts						
Determine allocation %:						
Square feet			8,000	22,000	12,000	42,000
Allocation %			19.05	52.38	28.57	100%
Accounts cost allocation		<u>(23,693)</u>	<u>\$4,514</u>	<u>\$12,410</u>	<u>\$6,769</u>	23,693
Total overhead costs	\$0	\$0	\$43,745	\$63,948	\$27,307	
Divided by direct labour hours			<u>3,000</u>	<u>4,000</u>	<u>1,200</u>	
Departmental overhead rate			<u>\$14.58</u>	<u>\$15.99</u>	<u>\$22.76</u>	

*The reciprocal method of cost allocation*

**Allocation bases:**

	HR	Accounts	Machining	Assembly	Finishing	Total
No of employees	8	20	25	12	65	
Percentage	12.31	30.77	38.46	18.46	100%	
Square feet	1,500	8,000	22,000	12,000	43,500	
Percentage	3.45	18.39	50.57	27.59	100%	

Simultaneous equations based on the above bases:

$$H = \$30,000 + .0345A$$

$$A = \$20,000 + 0.1231H$$

where H = Human Resources Department total costs

A = Accounts Department total costs

$$H = \$30,000 + .0345 \times (\$20,000 + 0.1231H)$$

$$H = \$30,000 + \$690 + 0.00425H$$

$$A = \$20,000 + (0.1231 \times \$30,821)$$

$$0.99575H = \$30,690$$

$$A = \$20,000 + \$3,794$$

$$H = \$30,821$$

$$A = \$23,794$$

**Reciprocal Cost Allocation**

	HR	Accounts	Machining	Assembly	Finishing
Direct overhead cost					
	\$30,000	\$20,000	\$30,000	\$40,000	\$15,000
Human cost allocation					
	(30,821)	3,794	9,484	11,854	5,689
Accounts cost allocation					
	<u>821</u>	<u>(23,794)</u>	<u>4,376</u>	<u>12,033</u>	<u>6,565</u>
Total overhead costs					
	\$0	\$0	\$43,860	\$63,887	\$27,254
Divided by direct labour hours			3,000	4,000	1,200
Departmental overhead rate			\$14.62	\$15.97	\$22.71

**Summary**

This chapter has outlined the three main methods of allocating service department costs to operating or producing departments. They are the direct method, the sequential or step-down method, and the reciprocal method. Under each method, the first task for an organisation is to determine which indirect costs to allocate, and it then allocates such costs to the respective department using its preferred method.

**Further reading**

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Charles T. Horngren, George Foster and Srikant, M. Datar, *Cost Accounting: A Managerial Emphasis* (11<sup>th</sup> Edition), Prentice Hall.

Hansen, D. R. and Mowen, M. M. (2003), *Cost Management: Accounting and Control* (Fourth Edition), Thomson South-Western, USA.

## Chapter 9

### Activity-based costing: concepts, processes and issues

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Maria Major and Zahirul Hoque

#### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

1. Describe the limitations of traditional cost allocation processes
2. Trace the origins of ABC and explain its relevance
3. Describe the ABC process
4. Distinguish between ABC and traditional costing systems
5. Explain why traditional management accounting may provide distorted information in the present business environment
6. Discuss the ABC implementation process
7. Criticise implementation literature based upon behavioural / organisational perspectives and factors research
8. Explain the main merits and pitfalls of ABC



## Introduction

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Following claims that traditional functional-based cost systems<sup>3</sup> are inadequate in providing more relevant and timely cost information for assisting managers in the changing business environment, Cooper (1989, 1990; 1993) proposed a 'revolutionary' alternative to a functional-based cost system in the 1980s, in what it has been termed 'Activity-based costing' or ABC in short. An ABC uses both unit and non-unit based activity drivers to improve the quality, content, relevance, and timing of cost information (Schnoebelen, 1993).

ABC advocates contended that in the 1970-1980s, when Japanese and other Far Eastern companies were very successful globally, Western firms were seeing their profitability and performance dropping (Johnson, 1992a, 1992b). Accordingly, whereas Japanese firms were adopting 'advanced' and 'modern' management techniques, such as just-in-time, total quality management, computer-integrated manufacturing systems and short product life-cycles, among other practices, Western companies continued using the same cost accounting techniques that were used in 1925, when cost accounting had become subservient to financial accounting (Johnson and Kaplan, 1991). It was in this context, perceived by some authors as a 'crisis' that ABC emerged.

This chapter aims to describe the main features of the ABC approach. The remainder of the chapter is structured as follows: section two discusses problems with traditional cost allocation processes; section three examines the origins of ABC; section four presents its process; section five deals with the ABC implementation process; an evaluation of ABC is provided in the final section.

### Problems with traditional cost allocation processes

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As mentioned above, a traditional functional-based cost system uses volume-driven allocation bases, such as direct labour hours and machine hours, to assign common organisational expenses to individual products or services. The overall objective of such allocations is to value inventories for financial reporting. In practice, many of the organisational resources demands by individual products and customers are not proportional to the volume of units produced or sold (Cooper and Kaplan, 1992). Conventional cost allocation practices suffer from the following limitations:

- They ignore non-volume-related support activities, such as material handling, material procurement, set-ups, production scheduling and inspection activities;
- Assumption that products consume *all* resources in proportion to their production volumes may result in distorted product costs;
- It is inappropriate in today's organisational environment where companies produce a wide range of products and experience intense global competition.

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<sup>3</sup> A costing system that uses only volume or unit-based activity drivers such as direct labour hours and machine hours to assign costs to products or services is called a functional-based costing system.

Traditional manufacturing involves routing manufacturing processes with high labour content and they are relatively simple. In such an environment, cost allocation using direct labour hours or direct labour costs are adequate. However, in a highly technical manufacturing environment, the labour content is declining rapidly. Consequently, product costing based on traditional costing systems involve very high overhead allocation rates (Hoque, 2003).

The Chartered Institute of Management Accountants (CIMA) defines ABC as:

*Cost attribution to cost units on the basis of benefit received from indirect activities, e.g. ordering, setting-up, assuring quality.*

ABC endeavours first to establish the cost of the activities going on in the various factory departments, which are creating the overheads, and then relating these activities to the products (Hoque, 2003). We now outline how the ABC system has evolved in response to significant changes in today's business environment.

## The origins of ABC

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### ***Harvard Business School and CAM - I***

The origins of the ABC approach, at least as we know it nowadays, have been directly associated with the work of Cooper and Kaplan, who, together with the Harvard Business School, published several cases on ABC adoption by American companies in the mid-1980s. These cases were based on practical experiments during the 1970s and early 1980s in companies such as Schrader Bellows, John Deere, Weyerhaeuser. The Harvard case studies showed the positive effects of organisations adopting new accounting practices, particularly on the improvement of product costing accuracy.

Apart from Harvard Business School, a second entity - the 'Computer-Aided Manufacturing, International (CAM - I)'<sup>4</sup> became involved in investigating new costing methods at the end of the 1980s. Whereas the 'Harvard Group' emerged as a result of the investigation and report of innovative costing practices in American companies, the roots of CAM- I lie in its concern with the introduction of computer-aided technology, and, as a by-product of this, with costing.

However, the concepts on which ABC is based are not new in the history of management accounting (Major, 2002). The following is a brief description of some early developments that preceded the ABC approach.

### ***Management Accounting in the Early 20<sup>th</sup> Century***

Johnson and Kaplan (1991) contended that most cost and management accounting procedures known today had already been developed by 1925. The development of these cost control techniques occurred from the early 1800s, in the integrated textile mills, to the 1920s, in multidivisional hierarchies such as DuPont, General Motors and United States Steel, but it was principally in the metal-working firms of the early 1900s that complex cost accounting systems oriented to assisting managers were most developed. Alexander Hamilton

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<sup>4</sup> Later became known as 'Consortium for Advanced Manufacturing, International'.

Church, in particular, was concerned with determining the costs of products through the allocation of the resources used to make each of those products. Church might have historically been the first to seriously attempt to link the profitability of individual products with overall profitability, and to endeavour to develop procedures to allocate 'factory' costs to products.

### *General Electric*

Johnson (1992a, 1992b) traced the origins of ABC to the early 1960s, when General Electric (GE) developed a model of 'activity cost analysis' in order to improve the quality of its information on indirect costs. This cost system was apparently based on concepts analogous to the present ABC systems. According to Johnson (1992a: 27), "GE accountants 30 years ago may have been the first people to use the term "activity" to describe work that causes costs". In 1963 General Electric appointed a team to analyse its indirect costs in order to reduce them. This team concluded that most of the indirect costs were triggered by upstream decisions, which were not controllable in the departments in which the costs were incurred. As a result, GE's team decided to analyse all the company's activities and to focus on the investigation of how activities were causing costs. They called the cause of the activities 'key controlling parameters'. GE also developed efficient interview techniques for collecting information about both activities and cost drivers, and standardised lists of activities known as 'dictionaries of activities'.

Johnson (1992b) contended that Arthur Andersen & Co., the company that licensed GE's activity-based cost management techniques, had been developing these techniques in its own consulting practice since the 1970s. According to him, the only change that Arthur Andersen introduced to GE's early 1960s system was to add the term 'cross-functional cost analysis' to describe the technique, and to replace the term 'key controlling parameter' by 'cost generator'. In his opinion, "GE's technique for activity-based cost analysis anticipates virtually everything that is claimed for present-day activity cost management systems" (Johnson, 1992b: 137).

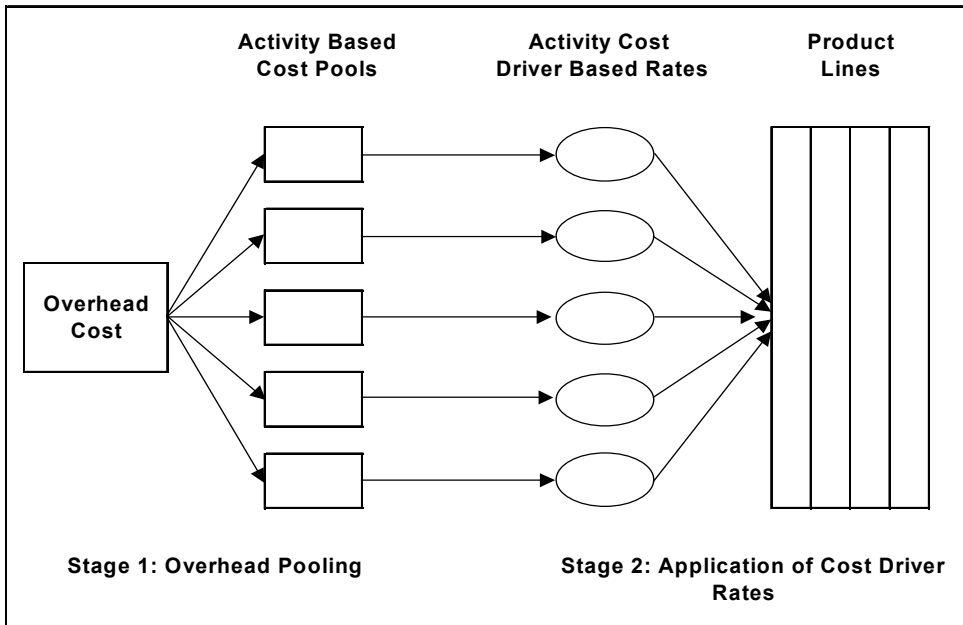
### *Staubus', Shillinglaw's and Drucker's Work*

Other contributions have also been mentioned as significant to the development of ABC. Researchers such as Staubus (1971), Shillinglaw (1982) and Drucker (1963), among others, have been identified as having earlier referred to activity costing or, at least, mentioning some of the basic concepts on which ABC is based. For example, Drucker, about forty years ago when writing 'Managing for Business Effectiveness' for the 'Harvard Business Review', pointed out how cost accounting has been ineffective in helping managers in their jobs, which he described as being intended "to direct the resources and the efforts of the business toward opportunities for economically significant results" (p. 54). As an alternative, he suggested that managers should revise how resources are allocated now, how they should be allocated in the future to support activities of greatest opportunity, and how to get from what is to what ought to be (p. 57).

Particularly important, on account of its similarity with Cooper’s and Kaplan’s understanding of costing, is the work of Staubus, who published “Activity Costing and Input-Output Accounting” in 1971. In this book, Staubus claimed that “decisions are made to do things” and that “objectively measuring the economic effects of doing things are among the most valuable of accounting operations” (p. 23). He also defined the concepts of cost, objects of cost and costing. Besides this, he suggested a conceptual framework for cost accounting, defining activities as the objects of costing. This framework was based on the principle that each major resource used should be identified and measured, and then traced to the objects of costing - activities. Staubus was particularly concerned with understanding the fundamental features of activities.

**The ABC process**

The CAM – I has defined ABC in its glossary as a method that measures the cost and performance of process-related activities and cost objects, through the assignment of costs to activities, and costs to cost objects (Cokins *et al.*, 1993). The concept of activity is crucial in the ABC approach. CAM-I has defined an activity as “those actions needed to achieve the goals and objectives of the function” (Berliner and Brimson, 1988: 6). Other writers have proposed other definitions of an activity: for example, Brimson (1991: 46) has contended that activities are “a combination of people, technology, raw materials, methods, and environment that produces a given product or service”; and Miller (1996: 51) has defined it as representing the work performed in an organisation.



**Exhibit 1 – Activity-Based Product Costing System**

Source: Innes, J. and Mitchell, F. (1998: 9).

ABC operates on a two-stage basis:

1. The first stage involves the pooling of indirect costs;
2. The second stage consists of the allocation of overheads to outputs through the use of a determined costing rate for each activity cost pool.

Exhibit 1 (on the previous page) presents these two stages.

In the first stage of ABC systems, resources are assigned to activities based upon 'resource cost drivers' (also called 'first-stage allocation bases'), whereas in the second stage each activity cost pool is traced to the cost objects through 'activity cost drivers' (or 'second-stage allocation bases').

Four steps can be identified in the development process of an ABC system<sup>5</sup>:

(1) Identifying activities: activities are identified by carrying out an activity analysis. In this stage, interviews are usually conducted with the aim of facilitating the identification of the tasks performed by managers and employees in the organisation;

(2) Costing activities: resource costs are assigned to each activity on the basis of cause-and-effect cost drivers;

(3) Selecting activity cost drivers: cost drivers should be selected to assign the costs attached to each activity cost centre to products. When choosing cost drivers the costs of measurement should be taken into account;

(4) Allocating the costs of activities to products: the costs attached to activities are assigned to products based on data obtained on cost driver consumption by products.

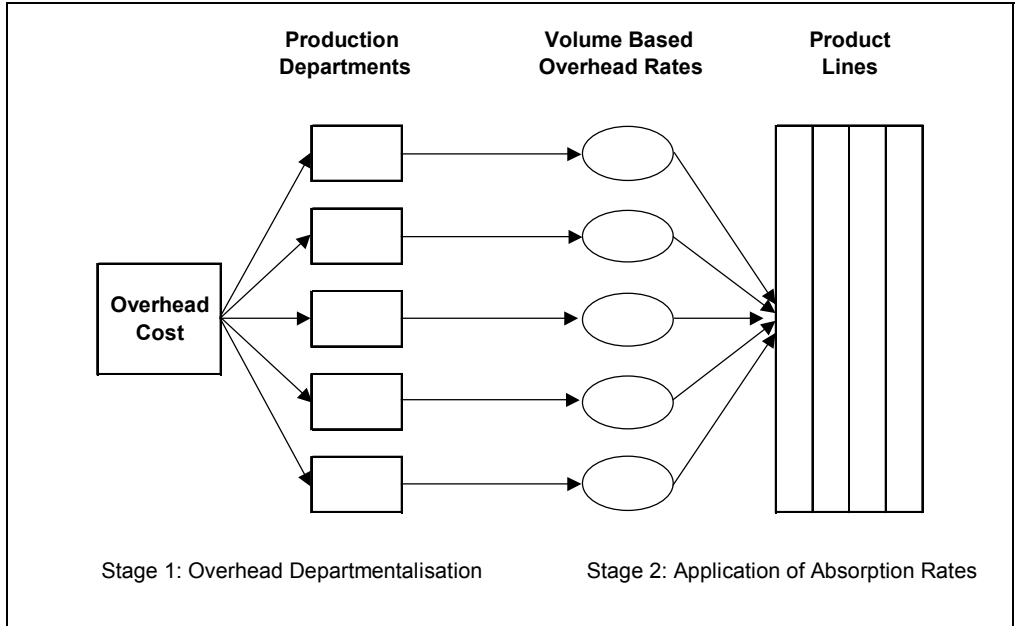
Despite some similarities, ABC differs from traditional costing in the following aspects:

With ABC systems activities are established. However, with traditional costing systems overheads are allocated to departments (cost centres) (see Exhibit 2). This means that ABC relies on a greater number of cost centres than traditional costing;

ABC systems are based upon volume and non-volume related allocation bases, whereas conventional costing relies on the use of traditional allocation bases (e.g. direct labour hours, direct labour costs, machine time, etc.).

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<sup>5</sup> According to Cooper (1989) five and not four steps should be followed when designing an activity-based cost system, which are (p. 38): (1) aggregating actions into activities; (2) reporting the cost of activities; (3) selecting the first-stage allocation bases; (4) identifying the activity centres; and (5) selecting second-stage cost drivers.

**Exhibit 2 – Traditional Product Costing System**

Source: Innes, J. and Mitchell, F. (1998: 9).

ABC proponents have pointed out that the adoption of conventional MAS, which are heavily influenced by the volume of production output, lead to erroneous costing. Traditional MAS have been heavily criticised for over-costing high volume products and under-costing low-volume products. Conventional cost accounting systems are appropriate for costing purposes only when a stringent number of conditions apply (Innes and Mitchell, 1998). These conditions are:

- product ranges within production being narrow,
- direct labour costs being a large proportion of costs, and
- non-volume related costs being relatively small.

However, given dramatic changes in the business environment these characteristics are seldom met. Contemporary manufacturing business has been described as very competitive and marked by high levels of automation and computerisation, leading to high levels of overhead costs that are not primarily determined by volume. Therefore, the use of volume-sensitive bases will cause distortion in product costing.

Miller and Vollman (1985) contended that it is the transactions that are relatively independent of production volumes that are responsible for most overhead costs. These transactions consist of exchanges of information and materials that assist the efficient production of a range of products. Miller and Vollman argued that with increasing customer demands concerning quality, time delivery, variety and design, the number and complexity of activities have been increasing. Therefore, overhead costs have come to represent a considerable amount of the product

cost, and so their attribution to products should be primarily determined by the transactions they consume and not by output volume.

Cooper (1990) has identified four different categories of activities in an ABC system:

1. Unit-level activities, which are directly linked with the production of each product unit;
2. Batch-level activities, whose performance depends on the production of a batch of products;
3. Product-level activities, which are related to the production of each different type of product; and
4. Facility-level activities, which support a general facility-level manufacturing process.

There are also several types of cost drivers: unit-level, batch-level, and product-level bases (*ibid*).

For each activity cost pool, a costing rate is determined by dividing a period’s activity cost by the period’s cost driver volume. This rate has a double function: to link the overhead costs to the cost objects and to reveal opportunities for improvement.

According to Cooper (1993), the main difference between ABC and traditional costing systems lies in how, in an ABC system, costs resulting from batch-level, product-sustaining and facility-sustaining activities are allocated to the cost object through cost drivers other than unit-level ones. In a ‘well-designed’ ABC system, the different types of activities are matched with the corresponding drivers. As Cooper and Kaplan (1999: 215) have warned, “failure to perform such matching guarantees that product and customer costs will be distorted”.

The example below follows how product costs might be distorted when adopting traditional cost accounting systems and how ABC can assign costs to products more accurately.

*ABC Illustration*

XPTO Ltd is a UK based company, which manufactures two products (product A and product B) in two production departments (department 1 and department 2). Product A is a simple, high-volume product and product B is a complex, low-volume product. Both products are processed in departments 1 and 2, but whereas product A uses only one raw material (W), product B uses raw materials W and Z.

Table 1 provides data on the production, sales and costs incurred for the last year.

**Table 1 – Production, Sales and Costs**

	<b>Product A</b>	<b>Product B</b>	<b>Cost</b>
▪ Production and Sales	1,000,000 units	25,000 units	
▪ Selling Price per Unit	£87	£133	

▪ Direct Material			
Raw Material W	120,000 Kilograms	4,000 Kilograms	£1,488,000
Raw Material Z	---	2,500 units	£240,000
▪ Direct Labour			
Department 1	300,000 hours	10,000 hours	£4,650,000
Department 2	150,000 hours	5,000 hours	£3,100,000
▪ Production Overheads			
Department 1			£19,220,000
Department 2			£12,555,000
▪ Non-Production Overheads			£3,964,600

Under traditional costing, XPTO Ltd allocated production overhead to products using departmental overhead rates based on direct labour hours (for both departments). Non-production overhead were absorbed on a sales volume basis. Table 2 presents the full units costs of products A and B:

**Table 2 – Full Unit Cost by Traditional Costing**

	Product A (£)	Product B (£)	Total (£)
1. Direct Material	(1) 1,440,000	(2) 288,000	1,728,000
2. Direct Labour (see note 3)	(4) 7,500,000	(5) 250,000	7,750,000
3. Production Overhead (see note 6)	(7) 30,750,000	(8) 1,025,000	31,775,000
4. Total Product Costs [1+2+3]	39,690,000	1,563,000	41,253,000
5. Product Cost per Unit [4/Production Volume]	39.69	62.52	
6. Non-Production Overheads (see note 9)	(10) 3,870,000	(11) 94,600	3,964,600
7. Non-Production Costs per Unit [6/Sales Volume]	3.87	3.87	
8. Total Full Unit Cost [5+7]	43.56	66.39	

**Notes:**

(1)  $[\pounds 1,488,000 / (120,000 + 4,000) \times 120,000] = \pounds 1,440,000$

(2)  $[\pounds 1,488,000 / (120,000 + 4,000) \times 4,000] + [\pounds 240,000] = \pounds 288,000$

(3)

Direct Labour Cost Rate	<u>Department 1</u> $\pounds 4,650,000 / (300,000 + 10,000) = \pounds 15$	<u>Department 2</u> $\pounds 3,100,000 / (150,000 + 5,000) = \pounds 20$
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COST ALLOCATION PROCESSES

(4)  $(£15 \times 300,000 \text{ DLH}) + (£20 \times 150,000 \text{ DLH}) = £4,500,000 + £3,000,000 = £7,500,000$

(5)  $(£15 \times 10,000 \text{ DLH}) + (£20 \times 5,000 \text{ DLH}) = £150,000 + £100,000 = £250,000$

(6)

		<u>Department 1</u>	<u>Department 2</u>
Production Overhead Rates		$£19,220,000 / (300,000 + 10,000) = £62$	$£12,555,000 / (150,000 + 5,000) = £81$

(7)  $(£62 \times 300,000 \text{ DLH}) + (£81 \times 150,000 \text{ DLH}) = £30,750,000$

(8)  $(£62 \times 10,000 \text{ DLH}) + (£81 \times 5,000 \text{ DLH}) = £1,025,000$

(9)

Non-Production Overhead Rate	$£3,964,600 / (1,000,000 + 25,000) = £3.8679$
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(10)  $£3.8679 \times 1,000,000 \text{ units} = £3,867,902$

(11)  $£3.8679 \times 25,000 \text{ units} = £96,698$

Traditional costing ignored the different complexity of products A and B as it allocated production and non-production overheads based on volume-based overhead application rates such as direct labour hours and sales volume.

ABC attempts to overcome the problem of cost distortions introduced by conventional costing practices by attributing costs to products based on the activities they demand. Table 3 presents the activities and cost drivers identified by XPTO Ltd management accountants:

*Table 3 – Activities and Cost Drivers*

Activities	Activity Cost Drivers	Activity Cost (£)
▪ Receive Materials	▪ Number of materials receipts	2,500,000
▪ Materials Handlings	▪ Number of materials movements	3,000,000
▪ Set up Machines	▪ Set up hours	4,800,000
▪ Run Machines	▪ Number of machine hours	10,275,000
▪ Quality Control	▪ Number of units inspected	6,200,000
▪ Machine Maintenance	▪ Hours of machine maintenance	5,000,000
▪ Delivery Customer	▪ Number of miles	2,378,760
▪ Customer Liaison	▪ Number of customers visits	1,585,840

Driver quantities by product are given in table 4. Table 5 shows how cost driver rates were computed.

*Table 4 – Activity Cost Drivers Volumes*

Activity Cost Driver	Product A	Product B	Total
▪ Number of materials receipts	26,000	14,000	40,000
▪ Number of materials movements	180,000	70,000	250,000
▪ Set up hours	60,000	20,000	80,000

▪ Number of machine hours	975,610	24,390	1,000,000
▪ Number of units inspected	50,000	30,000	80,000
▪ Hours of machine maintenance	200,000	50,000	250,000
▪ Number of miles	220,000	80,000	300,000
▪ Number of customers visits	7,500	2,500	10,000

**Table 5 – Computation of Activity Cost Driver Rates**

Cost Driver	Activity Cost (1)	Driver Quantity (2)	Cost Driver Rate (3) = (1) / (2)
▪ Number of materials receipts (see note 12)	£2,500,000	40,000	£62.50
▪ Number of materials movements	£3,000,000	250,000	£12.00
▪ Set up hours	£4,800,000	80,000	£60.00
▪ Number of machine hours	£10,275,000	1,000,000	£10.275
▪ Number of units inspected	£6,200,000	80,000	£77.50
▪ Hours of machine maintenance	£5,000,000	250,000	£20.00
▪ Number of miles	£2,378,760	300,000	£7.9292
▪ Number of customers visits	£1,585,840	10,000	£158.584

(12) Cost driver rate was calculated thus:

Activity Cost / Driver Quantity = £2,500,000 / 40,000 receipts = £62.50

Based on the activity cost drives rates computed in table 5 and in the products individual demand for activities presented in table 4 indirect costs can be assigned to products (see table 6).

**Table 6 – Activity Costs Allocation to Products**

Activities	Product A	Product B	Total
▪ Receive Materials (see note 13)	£1,625,000	£875,000	£2,500,000
▪ Materials Handlings	£2,160,000	£840,000	£3,000,000
▪ Set up Machines	£3,600,000	£1,200,000	£4,800,000
▪ Run Machines	£10,024,393	£250,607	£10,275,000
▪ Quality Control	£3,875,000	£2,325,000	£6,200,000
▪ Machine Maintenance	£4,000,000	£1,000,000	£5,000,000

COST ALLOCATION PROCESSES

▪ Delivery Customer	£1,744,424	£634,336	£2,378,760
▪ Customer Liaison	£1,189,380	£396,460	£1,585,840
▪ Total	£28,218,197	£7,521,403	£35,739,600

(13)

	<u>Product A</u>	<u>Product B</u>
▪ Receive Materials	£62.50 X 26,000 receipts = £1,625,000	£62.50 X 14,000 receipts = £875,000

Table 7 presents the calculated product full unit costs under ABC.

**Table 7 – Full Unit Cost by ABC**

	Product A (£)	Product B (£)	Total (£)
1. Direct Material	1,440,000	288,000	1,728,000
2. Direct Labour	7,500,000	250,000	7,750,000
3. Activities Costs	28,218,197	7,521,403	35,739,600
4. Total Product Costs [1+2+3]	37,158,197	8,059,403	45,217,600
5. Product Cost per Unit [4/Production Volume]	37.16	322.38	

Tables 8 and 9 compare product costs to their current selling prices based on conventional costing and ABC, respectively.

**Table 8 – Products Profitability According to Traditional Costing**

	Product A	Product B
▪ Selling Price per Unit	£87.00	£133.00
▪ Full Unit Cost	£43.56	£66.39
▪ Profit per Unit	£43.44	£66.61

**Table 9 – Products Profitability According to ABC**

	Product A	Product B
▪ Selling Price per Unit	£87.00	£133.00
▪ Full Unit Cost	£37.16	£322.38
▪ Profit per Unit	£49.84	(£189.38)

According to traditional costing products A and B seem to earn similar profit margins percentages. Nonetheless, after computing product costs through ABC, it is apparent that product A is more profitable than previously thought while product B is not in reality profitable. This is because ABC captures the real consumptions of overhead resources by each product. Product B demands more resources than product A (since it is a complex product), and hence should have

allocated more overhead costs. Traditional costing, based on the allocation of overheads through volume basis, did not recognise the different products complexity levels. As result of this, high volume products systematically cross-subsidise low volume products.

### ABC implementation

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Despite the enormous amount of literature on ABC, comparatively little has been written and researched concerning its implementation process.

In some of the literature available on ABC implementation it is claimed that an implementation strategy focused upon behavioural and organisational variables is fundamental to assure the success<sup>6</sup> of the new MAS (Shields and Young, 1989, 1993). Accordingly, an overemphasis on architectural and software design when implementing ABC, at the expense of the consideration of behavioural and organisational factors, leads to unsuccessful ABC implementations.

We can identify two important approaches in this instance. They are the following:

*Shields and Young's (1989) behavioural model for implementing cost management systems.* Shields and Young presented a behavioural model (called 'The Seven Cs Model') based upon the pursuit of specific behavioural and organisational strategies for implementing cost management systems successfully. Their basic idea is that human behaviour plays an important role in implementing a new cost management system, and hence it is important to develop an appropriate organisational culture based on the commitment of all employees to continuous improvement. According to them, in every process of change there is a key person who is primarily responsible for implementing the new cost management system. They have called this particular person the 'champion'. The champion has the function of spreading innovative ideas and creating the organisational commitment to continuous improvement throughout the organisation. Accordingly, throughout this process, organisational controls, appropriate compensation programs and continuous education should occur, since they are fundamental to successfully implementing the new cost management system. Furthermore, Shields and Young (1993) have stated that cost management systems (like organisations, products and technologies) have a life cycle with four stages – design, implementation, maturity and decline. The focus on managing behavioural and organisational factors depends on the particular life cycle stage of the cost management system (see Shields and Young, 1993 for an elaboration of this theme);

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<sup>6</sup> Despite the very common reference to ABC success, throughout the literature on ABC implementation the concept of success is often not identified. However, there are some criteria that have been proposed to evaluate ABC 'success'. They are: (1) improved decision-making; (2) maintenance of the technique over time; (3) improved financial position; (4) meeting previous objectives; and (5) management evaluation.

*Argyris and Kaplan's (1994) approach to implementing new knowledge.*

According to Argyris' and Kaplan's model, in order to successfully implement an innovative technical initiative the follow series of processes are required:

- (1) demonstration of the consistency and validity of the technical theory;
- (2) education and sponsorship;
- (3) creation of internal commitment.

Concerning the former process, these researchers have observed that it is generally accepted that ABC is based on internal consistency and external validity. However, from Argyris' and Kaplan's perspective, even if these conditions are met, they are not sufficient to guarantee that ABC will be accepted by organisational actors, and that its implementation will be successful. An education and sponsorship process should be followed to enable the organisation's members to learn how to understand the new ideas and hence accept them. The aim of the education process is to develop the organisational members' belief in the validity and usefulness of the new technique. Organisation members should be informed about the potential uses of the information obtained with the new system, and key individuals should be identified, both to champion the whole ABC implementation process and to persuade top managers about the benefits of the new approach to the organisation. Argyris and Kaplan have also emphasised the idea that in the ABC implementation phase people should be designated to function in four different roles: advocacy, sponsorship, project support and target. However, despite the identification of key people to initiate, sponsor and support the change process, organisational change does not always occur, so a third process is required: the creation of internal commitment and alignment of incentives. Commitment, understood as the energy that individuals devote to tasks, can be separated into two types: external and internal commitment (Argyris and Kaplan, 1994). When only external commitment exists, which is based on the assignment of causal reasons for their energy and attention to external variables<sup>7</sup>, managers will tend to "hold the senior manager responsible for monitoring and maintaining the effectiveness of the change process" (Argyris and Kaplan, 1994: 103). It is with internal commitment, which exists "when individuals assign the causal reasons for their energy and attention to themselves" (ibid), that the best implementations are achieved. Furthermore, Argyris and Kaplan have contended that resistance to the implementation of a new management technique (including ABC) exists when internal commitment is not developed. Accordingly, resistance to change is the result of defensive routines that organisational actors engage in to inhibit their threat from new information and embarrassment.

Another approach to ABC implementation is the so-called 'factors studies'. Factors studies aims to identify factors which influence ABC success or failure. Some of the literature in this type of approach is based upon the empirical

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<sup>7</sup> Such as, for instance, to organisational incentives and rewards.

analysis of ABC implementations, for example Shields and McEwen (1996), Krumwiede (1998), Anderson (1995), and McGowan and Klammer (1997).

*Shields and McEwen (1996)* identified 9 out of an initial 17 implementation factors as determinants of ABC success. These factors, summarised in a model with two dimensions – organisational support/integration and training - are in order of statistical importance:

1. *Organisational Support and Integration*

- Top management support;
- Link to competitive strategy;
- Link to quality initiatives;
- Link to JIT and speed initiatives;
- Link to performance evaluation and compensation;
- Consensus about objectives.

2. *Training*

- Training in designing ABC systems;
- Implementation training;
- Training in using ABC information.

The remaining 8 of the original 17 factors are considered as playing a supportive role when implementing ABC. These less important factors are:

- Standalone system;
- Commercial software;
- Accounting ownership;
- Clear and concise objectives;
- Non-accounting ownership;
- Resource adequacy;
- External consultants; and
- Custom software.

**Shields (1995)** has stated that the success of ABC will be increased when the first nine of the above variables are present all together during the implementation of this system.

Similarly, **Krumwiede (1998)** has studied the factors that determine ABC success, but paying attention to the analysis of the factors that affect success throughout the various stages of ABC<sup>8</sup>. Krumwiede (1998) has surveyed both ABC and non-

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<sup>8</sup> Krumwiede (1998) has divided ABC implementation into the following ten stages: (1) ABC not considered; (2) Considering ABC; (3) Considered ABC, then rejected; (4) Approved for implementation; (5) Analysis; (6) Getting acceptance; (7) ABC implemented, then abandoned; (8) Acceptance; (9) Routine system; (10) Integrated system. The integration stage consists of the extensive use of ABC and its integration with the primary financial system.

ABC companies from a cross-section of US companies. In his research he tested two hypotheses: (1) whether reaching higher levels of ABC implementation is associated with factors that differ among the various stages; and (2) whether the degree of importance for each factor varies by each ABC implementation stage. Both hypotheses found support in this study. He concluded that:

- The quality of the companies' informational systems are negatively associated with managers' desire to adopt and implement ABC. The companies that have rejected ABC after having considered its adoption, and those abandoning it after having implemented ABC, tend to have a higher quality of information technology (IT) than the average of the companies studied. Nonetheless, it seems that in order to achieve successfully the integration stage of ABC it is important to have implemented a high quality IT system;
- Larger companies are more likely to adopt ABC than smaller ones. However, it is not apparent whether smaller companies tend to avoid ABC due to fewer resources or to lesser need;
- There is a strong link between top management support, non-accounting ownership, and implementation training, and reaching the highest stages of ABC implementation;
- Some of the reasons that might explain the abandonment of ABC are: lower top management support, lower usefulness of cost information and higher quality of the information provided by the IT system.

*Anderson (1995)*, based on a case study conducted at General Motors, developed a theory of ABC implementation based on theories of IT implementation, organisational change, and the cost management systems literature. The role of evolutionary stages of ABC implementation was analysed according to Kwon and Zmud's (1987) factor-stage model of information technology implementation. Anderson's model is based on six stages of implementation and on five contextual factors that influence success at each stage. These six stages are: initiation, adoption, adaptation, acceptance, routinisation and infusion. Anderson also identified 21 factors related to the external environment, technology employed, individuals involved, the task, and the organisational structure that influenced ABC implementation throughout those six stages.

*McGowan and Klammer (1997)* empirically examined employees' satisfaction levels in relation to ABC implementation with the aim of understanding the factors that explain its success. These researchers extended Shields' model (1995) by adding technical and situational variables. They built a model based on the assumption that users' satisfaction varies according to three types of variables: (1) the characteristics of the implementation (which includes top management support, user involvement, objectives clearly stated ex-ante, objectives shared, adequacy of training and resources); (2) the characteristics of the system itself

(whether performance evaluation is linked to ABC and whether the information obtained is appropriate); and (3) individuals' – both preparers and users - characteristics.

The results obtained in this study provide evidence that top management support, the degree to which objectives are understood, the adequacy of training and training resources, and linkages of the ABC system to performance evaluation criteria are correlated with the level of satisfaction with the ABC implementation. In addition, the correlation of situational and technical factors (such as, for example, user involvement and information quality) with ABC implementation satisfaction was corroborated.

ABC implementation literature based either upon behavioural/organisational perspectives or factors research has been criticised. Researchers have argued that frequently implementation literature is too managerial, prescriptive and 'naïve', and it neglects issues of power and conflict in explaining resistance to accounting change. Furthermore, it is contended that user participation may alleviate resistance to accounting change, but it is not by itself a determinant of either system success or failure (Markus and Pfeffer, 1983). MAS will be implemented successfully to the extent that it is consistent with the distribution of power in an organisation, the dominant organisational culture, and with shared judgments about technical certainty and goal congruency. According to Markus and Pfeffer (1983: 216):

*The available evidence certainly indicates that unless design and implementation efforts address these structural features of organisations, they will not be successful, whether or not they employ process strategies.*

### An evaluation of ABC

For some writers, it is relatively well accepted that conceptually ABC represents an advance over traditional cost accounting systems in its consideration that it is 'activities that consume resources and products that consume activities', and by the use of multiple cost drivers, which do not vary only proportionally with output volumes. It is said that the recognition that an organisation can be broken down into activities brings better possibilities of improving cost allocation, managing costs and even boosting overall efficiency. Furthermore, ABC has been presented as a superior MAS in comparison with traditional systems by providing greater overhead cost visibility, and giving a better indication of overhead cost causality.

Nevertheless, after the huge initial enthusiasm for ABC as a new practical approach to costing during the second half of the 1980s and the early 1990s, and as more organisations and researchers have gained experience of ABC, more criticisms of it have emerged (Jones and Dugdale, 2002).



ABC has been criticised for not being a truly novel approach, but only a improvement of the conventional framework for overhead costing. Several argue that even though ABC allocates resources to activities, and activities to cost objects, through a causal relation based upon the use of either volume or non-volume related drivers, it does not guarantee that indirect costs are correctly attributed to products.

It is likely that some overheads are not properly attributed to products for the following reasons: first of all, because some overheads are incurred at a level (facility-level), which make them impossible to be allocated (Cooper, 1990); secondly, because the costs of activities can only be suitably allocated to cost objects when the relationship between the cost and the cost object is strictly respected (Cooper, 1990; Noreen, 1991). In practice, it is unlikely that these relationships are 100 per cent respected when choosing cost drivers (Innes and Mitchell, 1996). Moreover, it is difficult, if not impossible, to achieve perfect homogeneity in the activity cost pools (Cobb *et al.*, 1992). According to Noreen (1991) stringent conditions must apply under ABC systems if they are to provide relevant costs for product drop and for product design decisions. These conditions include: (1) the linearity of cost functions; (2) the existence of zero fixed costs at the level of cost pool; and (3) the non-existence of joint processes.

Other difficulties associated with the process of establishing and operating ABC have been diagnosed by management accounting researchers, in particular problems associated with the selection and availability of drivers, and the definition of activities (Innes and Mitchell, 1998).

Some researchers have also pointed out that cost causality is not solely explained by activities, but by other factors such as decisions or even the passage of time (Piper and Walley, 1990, 1991). There is therefore some awareness of the arbitrariness of ABC systems, which has motivated some sections of academia to question the relevance of getting accurate unit costs by this method.

It is tempting to think that the current emphasis on ABM is related to the recognition of the technical deficiencies of ABC as a means of product costing (Jones and Dugdale, 2002).

Innes and Mitchell (1998), from their empirical work with practitioners, have claimed that managers often refuse to adopt ABC systems because their implementation is costly in human and physical resources and involves considerable disruption. This might explain why companies are not adopting activity-based techniques as much as might be expected given the widespread interest this approach has engendered in management consultancy and academic circles.

In sum, ABC cannot be seen as a panacea that solves all costing problems. Further research is needed for researchers to ascertain whether ABC is merely a management fashion or if, on the contrary, it constitutes a true alternative to traditional costing systems offering real benefits to managers.

The recent management accounting literature focuses more on management side of activity-based costing rather than the technical aspect only. The next chapter elaborates on this in turn.

### Summary

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We began this chapter by discussing how traditional cost accounting systems systematically distort product costing. The chapter continued exploring the possible origins of the activity-based concept. We saw that ABC is not new, even though it is commonly associated with the work developed by Cooper and Kaplan in the 1980s. Some of the concepts on which ABC is based seem to have already been in existence. The chapter then goes on to describe the mechanics of ABC systems, with a comparison of traditional costing and ABC. We discussed how ABC, like traditional cost accounting systems, operates on a two-stage basis. ABC, however, is based on the use of both volume and non-volume sensitive bases and upon activity cost pools as an alternative to traditional bases and departments. The chapter also described the ABC implementation process according to the literature on the subject. Shields and Young's (1989) behavioural model for implementing cost management systems, and Argyris and Kaplan's (1994) approach to implementing new knowledge were examined. We further analysed some of the major 'factors studies' based on the empirical study of ABC implementation, namely Shields and McEwen (1996), Krumwiede (1998), Anderson (1995), and McGowan and Klammer (1997). The chapter ended with an assessment of ABC. We discussed how researchers have criticised ABC for not being a truly novel approach, but only a refinement of traditional costing, as well as for being difficult to implement.

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## Chapter 10

### A case study of ABC implementation in a telecommunication company

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Maria Major

#### LEARNING OBJECTIVES

1. After reading this chapter, you should be able to:
2. Understand that ABC implementation is a complex process and that its success may not be dependent upon the employment of implementation-based strategies, such as user involvement
3. Recognize that the sources of resistance to management accounting change are often related to structural factors, namely to the distribution of power and the organisational culture
4. Comprehend that the emergence of workers' resistance to disclosing labour time per activity, when such a mechanism is adopted, might ultimately lead to the failure of ABC
5. Appreciate that there might be environmental pressures towards conformity that force ABC adoption.

## Introduction

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In the previous chapter, we described the main features of the Activity-based Costing (ABC) approach. We discussed how traditional management accounting systems (MAS) have been criticised due to their unsuitability for dealing with the current business environment, and how ABC emerged in the 1980s as a means to increase firms' competitiveness. Conventional MAS were depicted as providing misleading cost accounting data due to their reliance on volume-sensitive allocation bases, such as direct labour hours and direct labour costs. ABC was described as a valid alternative to overcome the limitations of traditional MAS, as it seeks to enhance the accuracy of product costing and to provide managers with a better view of the cause of costs. ABC implementation literature was also examined. We saw how several researchers stressed the importance in an ABC implementation of getting top management support and having all the firm's departments involved in the implementation and ownership of the new system. Despite its popularity, ABC has been the object of various criticisms and reservations. These concern basically the following aspects: firstly, whether ABC is original and if in reality it represents effective technical enhancement; secondly, the recognition that ABC only generates relevant costing information in supporting decision-making under certain restrictive conditions; and thirdly, its implementation is costly, and often faces resistance and difficulties. It is contended that more investigation into ABC is needed in order to enhance comprehension about ABC in practice, and how practitioners can successfully implement and use it. This chapter endeavours achieve this through the discussion of a case study of ABC implementation in a telecommunications company.

The remaining of this chapter is structured into two main sections. Section two presents the case study as follows: a brief description of the company and its context is provided; this is followed by an explanation of why and how ABC was implemented by this particular firm; section two concludes by depicting the operation of ABC by managers. Section three discusses the main issues raised in this case study, providing some indications and suggestions to practitioners of how to succeed when implementing ABC.

## The case study

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*Companhia Portuguesa Radio Marconi* (CPRM) is a Portuguese telecommunications company established in 1925 to provide telegraphic radio communications. Since its creation, its core business has always been long-distance telecommunications services. It had a monopoly regime until the liberalisation of Portuguese telecommunications industry in 2000, which helped make it a very profitable company.

Until the Portuguese Revolution in 1974, CPRM's main activity was telecommunications traffic between the former Portuguese colonies in Africa and the 'mainland'. After the Portuguese revolution, CPRM's strategy was based on internationalisation through worldwide co-operation programmes, supported by technological modernisation of satellite and submarine cables.

In the mid-1980s, CPRM decided to move into new business areas, which encompassed not only telecommunications services but also information systems, the electronics industry and financial services and property. At the same time, CPRM sought to expand its activities in the telecommunications business. Hence, inroads were made into new telecommunications areas, in particular public telecommunications (both local and international) outside Portugal, maritime mobile services, telecommunications engineering, telephone and business directories, TV broadcasting, corporate communications, value added services and research and development. As a result, CPRM became an important component of the Portuguese economy by the early 1990s.

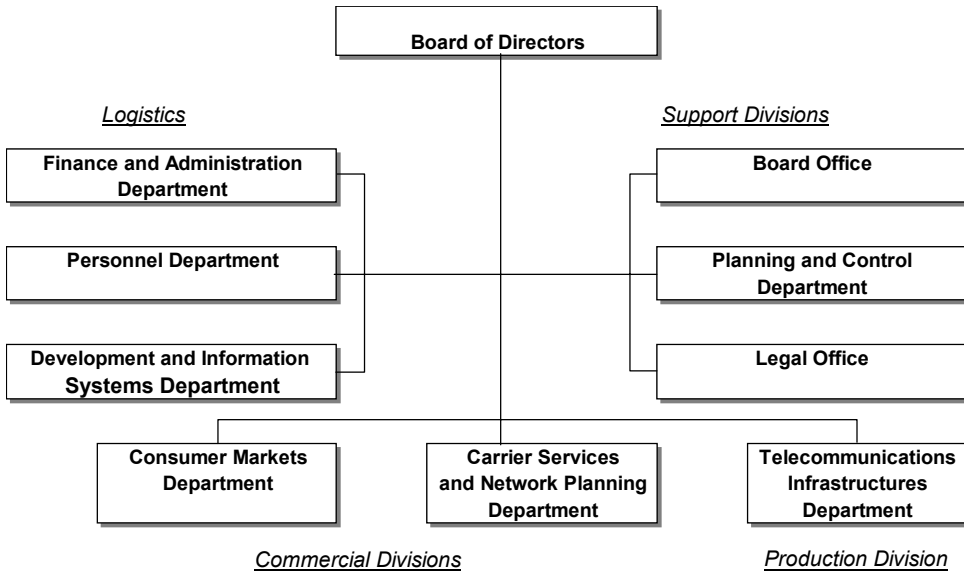
In the beginning of 1990's the prospect of full liberalisation in the Portuguese and European telecommunications market pressed the Portuguese Government to reorganise the national telecommunications sector. Following these changes Portugal Telecom (PT) Group was created and CPRM was integrated into this group in the mid-1990s. Also, the Portuguese telecommunications regulator (ICP) began to play a more active role in monitoring and supervising the market, requiring concessionaires and dominant operators (i.e. telecommunications firms with 25% or more market share) to send them detailed costing data on a regular basis.

A contract was signed between PT and CPRM establishing the sub-concession to CPRM to operate telecommunications infrastructures for international services using submarine cables or satellite technology.

As a consequence of CPRM's integration into the PT Group, the company changed its organisational structure to a typical functional form. From then until its full integration into PT Group in 2002, CPRM consisted of two commercial divisions (Consumer Markets and Carrier Services & Network Planning Departments), one production division (Telecommunications Infrastructures Department), three support divisions (Board Office, Planning & Control Department and Legal Office), and three logistic divisions (Finance & Administration, Personnel and Development & Information Systems Departments). The engineers and managers from the production department were for several decades the most powerful professional group in CPRM. However, the prospect of liberalisation led the commercial departments to take on a vital importance in the firm. The ascendancy of commercial managers in CPRM produced huge power conflicts between the production and commercial divisions. Exhibit 3 shows CPRM's organisational structure between 1996 and 2002:



Exhibit 3 – CPRM Organisational Structure after its Integration into PT



Source: CPRM's Annual Report 1998, p. 81.

With the concentration of its activities in only one business area – international telecommunications – CPRM reduced its workforce from 1,482 in 1990 to less than 300 at the end of 2002. CPRM made a huge effort to increase its flexibility and decrease its labour costs to face the competition.

### *The Introduction of ABC*

The introduction of competition into the Portuguese telecommunications sector, and CPRM's integration into the PT Group, pressured CPRM into initiating a full programme of organisational change. Following the entry of new operators into the market, international telecommunications prices decreased drastically. For several decades CPRM had provided this service, on a monopoly basis. CPRM needed to adapt to the new business environment if it wanted to survive.

External consultants were called in and several managerial projects were launched. Of all the projects introduced, the introduction of ABC was the major one, not just in terms of human and financial resources but also due to the time and importance CPRM's Board of Directors devoted to this project. The support of top managers facilitated ABC implementation in CPRM. It was decided that the information needs of commercial departments (Consumer Markets Department and Carrier Services & Network Planning Department), together with those imposed by the regulator and CPRM's parent company, should be given priority. The information demands of other CPRM departments, although important, were considered as less pressing.

*ABC Implementation Process*

CPRM began the process of ABC implementation with external consultants in July 1997. The consultants and CPRM's management accountants decided to adopt a full installation strategy and to implement ABC throughout the whole organisation. They also decided that in a first phase the ABC system should operate simultaneously with the 'old' CPRM MAS, and that after a short test period it should replace the previous system. Additionally, it was planned that ABC would be integrated with financial accounting. Finally, the consultants devised an ABC system to report historical costs.

The consultants took six main steps to implement ABC: (1) in July, they began selecting teams and (2) training them; (3) from July to September they identified activities; (4) in September they devised the ABC conceptual model for CPRM; (5) at the end of September, they started collecting data; (6) finally, in December, the software to support the ABC systems was chosen. In March 1998, the 1997 accounts were provided by ABC. ABC implementation in CPRM took about nine months.

The consultants set up two committees to support the ABC implementation process. The first consisted of the general finance director and the directors of CPRM's operational areas (the Finance and Administration, Planning and Control, Consumer Markets, Carrier Services, Telecommunications Infrastructure, and Development and Information Systems departments). The second committee consisted of those responsible for implementing ABC, i.e. the consultants, CPRM's management accountants, and representatives of the commercial and production departments.

From the beginning of ABC implementation, the consultants attempted to involve all the CPRM departments actively. They were determined that all the operational departments, and not just the Finance and Administration Department, should share the ownership of the ABC system. Nevertheless, despite the involvement of the Telecommunications Infrastructure Department in the implementation of ABC, the production engineers were never strong supporters of CPRM's new MAS. On the other hand, the two commercial divisions were very committed to the effective implementation and operation of ABC.

After the personnel to implement ABC were selected, training programmes were held. In the training sessions, committees discussed the design of the ABC model, the objectives behind ABC implementation and how ABC was going to be implemented. Only those directly involved in the project participated in these sessions. The employees were not trained, even though ABC was going to require them to allocate their time by activity every three months. The consultants and management accountants called this process 'PMO'. PMO information was crucial for the ABC operation, since without it ABC would be unable to allocate resource costs to activities. The failure to discuss the aims of PMO with employees led to reluctance by the workforce to accept this mechanism and the operation of ABC.

The training meetings were followed by the definition of activities. Before specifying activities, the consultants first identified functions and processes for the whole organisation. This was done with the help of the management accountants. Interviews with employees were then conducted in order to obtain information about the activities performed. People's description of their jobs were obtained, analysed and compared with one another, so that subsequent activities could be identified across organisational boundaries. Work distribution charts were produced summarising the activities performed by employees in each department, which enabled consultants to draw up flow charts for each activity performed in CPRM. Consultants and management accountants identified 71 main activities (35 oriented to customers and 36 to the network) and 44 supporting activities. Exhibit 4 summarizes these activities:

*Exhibit 4 – Some of CPRM's ABC Activities*

**Activities:**

**1) Main Activities**

1.1) Activities Oriented to Customers

- Defining strategies in telecommunications business
- Researching and analysing new business opportunities
- Elaborating and controlling marketing plan
- Researching markets and customers
- Developing products and services
- Marketing products and services
- Billing
- Management of customers' debts
- Maintenance of customers' services
- Assuring the quality of services

1.2) Activities Oriented to Network

- Following telecommunications network technology trend
- Planning network telecommunications
- Managing telecommunications technology development
- Developing and implementing telecommunications network
- Managing the use of network resources
- Operating traffic
- Operating infrastructures
- Restoring telecommunications network
- Preventive maintenance
- Corrective maintenance

**2) Supporting Activities**

- Developing and managing human resources
- Managing internal communication and information
- Managing financial and physical resources
- Managing the image and the firm's external relations
- Legal support

*Source: CPRM's Dictionary of Activities.*

The identification of activities was seen as a very important step in the implementation of ABC by consultants and management accountants. They were involved for three whole months in disaggregating functions and business processes in activities. The consultants prepared a dictionary of activities that defined the scope of each activity. In the dictionary, each activity was named and a short statement defined it. The aim was to produce a definition of activities that was consistent among all concerned, which was particularly useful when people needed to complete the PMO. The dictionary was distributed to all directors and managers involved in developing ABC.

After defining CPRM's main functions, processes and activities, the consultants began identifying activity cost drivers. Their definition was dependent on the feasibility of obtaining data to support their calculation. After inquiring about the drivers that could enhance the causal relationship between the cost of activities and products/services, and the availability of information to make calculations, the consultants decided that labour hours, equipment capacity and traffic volumes should be used intensively. They believed these best expressed the causality between activity costs and cost objects.

Following the identification of activities and cost drivers, the consultants and management accountants constructed CPRM's ABC conceptual model. Given the market and regulatory pressures, it was decided with the Board of Directors that ABC should be oriented mainly to the commercial areas, and that the production department would be the main department feeding the system.

In September 1997 the data collection process began. In December 1997 the consultants chose the most appropriate computer software to support ABC. They decided that an SAP application should replace CPRM's previous computer system (Millennium) and that Oros should be adopted. After writing the software to support the ABC system, the company was able to generate the first outputs from ABC. The cost data for the first semester of 1997 was obtained, and then discussed by the managers involved in the ABC implementation process.

#### *Operation of ABC in CPRM*

After implementing ABC in 1998, CPRM began providing the regulator / PT and its managers with comprehensive costing data. Nonetheless, from the beginning of its operation the new CPRM's MAS met with serious criticism and internal resistance from some managers. The biggest criticism came from the engineers in the Telecommunications Infrastructure Department (the department most involved in feeding ABC).

The production engineers alleged that ABC was implemented primarily to serve the interests of CPRM's commercial managers and the information demands of ICP and PT, and thus it did not provide them with useful information. Moreover, they claimed that ABC outputs were too detailed, and too much of their time was needed to feed the system. The engineers refused to use ABC data, arguing that common costs despite the adoption of ABC were very high, representing more

than 20% of total costs. As a result of their discontent, the engineers postponed the provision of inputs to ABC, and seldom used the new system.

Besides the resistance of the production engineers, employees (particularly those in the production department) resisted disclosing their time to activity. Resistance to PMO took two forms: firstly, employees postponed allocating their labour time to activities for as long as possible; secondly, PMO was not always accurately completed.

Unlike the production engineers, the commercial managers seemed very satisfied with the cost data provided. When making pricing or investment decisions, they used ABC data to support them. However, they supplemented the ABC data with their own knowledge of CPRM's product costs and information on competitors' prices. Despite the problems affecting CPRM's ABC, the two commercial departments actively used the new system.

### Issues raised in the case

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This case raises important questions, namely:

- Why did the production and commercial managers react so differently to ABC?
- Why did the change process involving the support of top managers and the active involvement of all areas of CPRM prove ineffective?
- Why was ABC maintained, given its marginal relevance to operational cost control and its questionable accuracy?

Literature on ABC implementation claims that the success of ABC is dependent on involving the whole organisation in its implementation, and getting support from top managers (see last chapter, section 5). However, the CPRM case study has shown that despite the care of top managers, and the active involvement of the whole organisation (including the engineers and managers from the production department) in the implementation and ownership of ABC, the system was far from being effectively used and accepted by all divisions. Indeed, the engineers from the Telecommunications and Infrastructure Department expressed their non-acquiescence with ABC, by demonstrating resistance to feeding the system and using it. Yet they were involved in ABC implementation since its inception by the consultants and management accountants.

In some implementation literature unsuccessful cases of ABC are attributed to too little effort spent on involving people in the implementation process. This sort of literature is often too managerial and prescriptive, assuming that change can be managed smoothly by senior managers if they follow the 'correct' process. It has been argued that ABC success is not very dependent upon the employment of implementation-based strategies, such as user involvement, since the sources of resistance to management accounting change often come from structural sources (see Malmi, 1997). This is consistent with Markus and Pfeffer (1983), who draw attention to the importance of the distribution of power and the organisational culture as structural factors affecting change, rather than the tactics and the strategy followed by a MA implementation.

The resistance of CPRM's production department to the ABC system seems to be more related to disagreements over the power commercial departments acquired following the prospect of telecommunications industry liberalisation than to the implementation strategy followed by the consultants (see Major and Hopper, 2004a).

Practitioners, when they implement ABC systems, should therefore ensure that the new cost accounting system is consistent with the dominant organisational culture and respects the distribution of power in the organisation. If the new MAS that is implemented somehow threatens the power of established professional groups, or if it goes against certain embedded organisational values or beliefs, resistance will tend to emerge and so threaten the success of the system introduced. Thus, even though the involvement of all the organisational divisions, and the empowerment of departments other than the financial one in the ownership of the ABC system, may alleviate potential resistance to the new MAS, it is still likely to fail if it is incompatible with the organisational culture and the distribution of power.

This case also shows how some of the technical deficiencies of ABC might reduce its acceptability by practitioners, and so undermine its effective value in practice. The deficiencies that reduced the effective use of ABC system in CPRM to managers were the existence of a considerable amount of common costs, and the existence of a mechanism of labour time disclosure (PMO). Management accountants made efforts to find allocation bases that could reduce the amount of common costs in the firm. However these costs were still considerable in CPRM's cost structure. Also, the periodic completion of time sheets to allocate employees' time to CPRM's activities were considered by some managers to be a mechanism that was too subjective, and was also perceived by employees/staff to be a means of controlling their work. For some CPRM managers, particularly those in the production department, the existence of a high level of common costs and the PMO mechanism were seen as introducing distortions into the ABC system and causing inaccuracies in the cost accounting data they were provided with.

When implementing mechanisms of labour time disclosure, practitioners should thus take care to identify the real causes of resistance to such mechanisms. It is suggested here that in cases of resistance due to the misunderstanding of the aims of the system, it might be helpful to hold group discussions with the firm's employees. In these meetings managers should explain the real objectives of these devices, how employees have to report their time, and simultaneously the scope of each of the activities identified in the company. Even though these sessions may not entirely eliminate employees' resistance to disclosing their time, it is likely that in cases where resistance is due to difficulties in understanding the scope of the activities defined, and to the misunderstanding of the objectives behind these sorts of systems, these meetings can be very valuable to the firm.

Moreover, practitioners should be aware that the eventual emergence of resistance or difficulty in reporting labour time by employees might ultimately

lead to the failure of ABC in firms. In fact, if employees are not willing to report their perceptions of the activities undertaken in a timely and accurate manner, there is a large chance that the ABC system may not be used effectively in these organisations.

A final issue raised by this case relates to why ABC was maintained in CPRM despite all the problems affecting its operation. The case suggests that organisations may adopt ABC, not merely for technical reasons, but also to enhance legitimacy in their constituencies. CPRM adopted ABC not only to aid managers in decision-making, but also to assure the regulator / PT that accurate and reliable costing information was provided and that telecommunications interconnection prices were rationally established. ABC has become commonly accepted as a rational and 'modern' method of allocating costs: it incorporates the 'myth' of rationality, and hence its adoption provides organisations with legitimacy, resources and stability (see Major and Hopper, 2004b).

Practitioners should be sensitive to the existence of environmental pressures towards conformity and to the existence of forces that drive organisations to adopt certain managerial techniques that may not in the end represent real technical achievements, or that may not be consonant with the organisation's culture. Moreover, managers should know that organisations may be impelled to adopt organisational practices similar to those of their peers, not for technical reasons but because of the legitimacy the adoption of such techniques confers. Consultants, the business press and academic circles are some of the vehicles that press organisations to adopt mimetic isomorphism changes. Although these pressures are powerful, they are not coercively imposed on managers, and hence managers should distinguish which techniques are truly relevant to the organisation.

## Summary

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ABC has been depicted as an innovative approach that, if adopted, will enhance the efficiency and competitiveness of firms within the new business environment. However, after some years of enthusiasm about this approach, several case studies of ABC implementation, documenting failures and difficulties, have been reported. It is argued here that more investigation into ABC is needed in order to enhance our understanding of the real achievements of this approach and of how practitioners may take full advantage of its implementation in firms. The aim of this chapter was to contribute to this end by presenting and discussing a case study of ABC implementation. The case showed that, despite the care taken by the Board of Directors and the involvement of all departments in the implementation of ABC, there was resistance to the new system. The production engineers and managers from the Telecommunications and Infrastructure Department, the main feeders of ABC, were critical of the effective value of the new system. According to them, ABC is primarily aimed at providing relevant data to the commercial departments rather than the production department. They expressed their discontent with the ABC system by resisting using it and imputing data late. Besides the engineers' resistance, there

were other difficulties affecting the operation of CPRM's ABC system. These difficulties relate to the employees' fear and difficulty in allocating their time to activities and the existence of a high level of common costs. We also discussed how, in implementation literature, unsuccessful cases of ABC are often explained by the fact that little effort has been made to involve people. This sort of literature was criticised, and it was argued that when the sources of resistance to management accounting are structural in origin, the success of ABC implementation is less dependent upon the user involvement-based implementation strategies.

### Recommended reading

Bhimani and Piggot (1992), Cooper *et al.* (1992), Innes and Mitchell (1991) and Anderson (1995) developed important case studies on ABC implementation. See Eiler and Ball (1993) and Cooper (1990) for a depiction of how to implement ABC successfully from a technical point of view.

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## **PART 5**

### Decision Making And Capital Budgeting

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Chapter 11 Theory and practice in pricing decisions  
*Carly Webster*

Chapter 12 Transfer pricing in decentralised organisations  
*Zahirul Hoque and Ali Rkein*

Chapter 13 Capital budgeting: theory and practice  
*Fadi Alkaraan and Trevor Hopper*



# Chapter 11

## Theory and Practice in Pricing Decisions

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Carly Webster

### *LEARNING OBJECTIVES*

After completing this chapter, you should be able to:

1. Describe the importance of the pricing decision for an organisation
2. List and describe the four major influences on pricing decisions
3. Discuss the difference between short-run pricing decisions v. long-run pricing decisions
4. Describe various approaches to pricing
5. Discuss the difference between full (absorption) costing and marginal (variable) costing
6. Identify relevant costs to pricing
7. Analyse various special decisions
8. Describe possible non-cost factors in pricing decisions

## Introduction

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Managers are faced with the important challenge of pricing decisions in organisations. That is, setting the price of the products and services that the organisation provides. Whilst making these decisions, managers require an extensive knowledge of their customers, competitors, and product costs. Pricing decisions in some organisations can be heavily dependent on market and supply forces, thereby restricting the organisations influence on setting the prices for their goods or services. Other organisations have more discretion over setting their prices, these are usually organisations that produce highly customized or differentiated products. In either case, the accounting information system can provide valuable information to managers that can influence their pricing decisions. These pricing decisions have a profound effect on the organisation thereby influencing product demand, customers, shareholder value, and revenues.

This chapter aims to provide some coverage of the important issues underlying pricing decisions in organisations. This chapter will explore the major influences on pricing decisions, the implications for the different time horizons for pricing decisions and the different approaches there are to pricing. In addition to this, various cost considerations will also be explored in addition to the different types of special decisions that managers could be faced with. Finally, the presence of non-cost factors in pricing decisions will be explored.

## Major Influences on Pricing Decisions

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There are several major factors that can influence the pricing decisions within organisations. These include:

- customer demand
- actions of competitors
- costs
- political and legal related issues

Each of these factors can have a significant effect on pricing decisions and include both internal and external elements.

### *Customer Demand*

Customer demand is a factor that is externally orientated and that focuses on the extent of different customers requests for the organisations goods or services. It is very important that organisations examine the pricing decisions that they make through the eyes of their customers. This is because customers significantly influence the price of the product or service through their demand for that good or service. Customers often base their buying decisions on the price and also the perceived benefits that they are likely to receive. It is therefore important that the organisation considers the level of value that it is providing to its customers. Price setting is integral to customer value and it is both influenced by customer demand and also subsequently influences customer demand for the organisations goods or services.

### *Actions of Competitors*

It is essential that organisations are always aware of their competitors and competitor actions. These actions can have a significant affect on organisations pricing decisions. Organisations can be forced to lower their prices if they are faced with a high degree of alternative or substitute goods or services. These can thereby affect demand for goods or services, forcing the organisation to lower their prices to maintain their competitiveness. Australia has recently seen this form of price competition. From the 1990s until this current time, Australia has seen massive changes in the competition within the airline industry. It has seen the entrance of new competitors such as Virgin Blue and the exit of the long-standing competitor, Ansett. In addition to this, the method of service has also changed with a large number of bookings being made on the internet and 'internet only' prices. These competition changes have resulted in the Australian airline industry being forced to lower their prices and reconsider the way in which they operate in response to this unprecedented competition. Organisations should take care identifying their competitors and when an organisation has competitors, and then they should attempt to obtain valuable information from their competitors and consider this when setting their own prices. This information can include knowledge of their competitors' technology, policies, capacity and any further information that might help in trying to establish the competitors' costs of doing business. It also needs to be noted that today more than ever, competition expands international borders, meaning that organisations need to look beyond their traditional scope of competition to establish and examine threats to their organisation, thereby considering these factors when making their pricing decisions. If the organisation does not face any competitors, then they are more likely to have the luxury of setting higher prices.

### *Costs*

The costs of the goods or services obviously bear some relationship to the pricing decisions. The costs of the good or service usually sets the lower limit for the price. This is because to make a profit then the organisation must produce a cost that is below the price that the market is willing to pay. Managers must understand all of the relevant costs for pricing decisions. These are inclusive of costs across the value chain such as research and development and after sales costs. When managers understand these costs then they can set the prices of the goods or services at a level that is attractive to their customers and also maximise operating income. The importance of costs in pricing decisions can vary widely across industries. In some industries, such as agriculture, some prices are determined by statutory marketing authorities. Regulatory agencies can also be responsible for determining some prices, such as the price for electricity and gas. In highly competitive industries often the market sets the price, such as prices for similar commodity products such as wheat and rice. In less competitive industries where products or services are differentiated, such as the car industry, the cost of producing and delivering the product is relevant and thereby influences pricing decisions (in conjunction with other factors). In all situations

however, cost information relating to the product or service is important for managerial decision-making, such as determining the output level and justifying price increases.

### *Political and Legal Related Issues*

When setting prices, managers need to be aware of any political and legal issues that are relevant to their organisation. Legal considerations include the need of managers to adhere to certain laws such as the avoidance of price discrimination and collusion. For example, the law generally prohibits organisations for colluding to set prices, such as the price of petrol between petrol stations. Therefore, price-setters within these petrol stations need to set their prices independently, without collusion with their competitors. If this collusion was allowed then prices could be set at exceptionally high levels, leaving consumers with little option but to purchase at these excessive prices. Political considerations may also be relevant to setting prices. For example, when banks announce record profits then the public usually reacts to this by demanding reduced level of interest and account-keeping fees. This type of public reaction can put pressure on legislators to intervene in some way to attempt to reduce costs for consumers.

### Short-run and Long-run Pricing Decisions

Organisations can be faced with both short-run and long-run pricing decisions. Several factors need to be considered under each type of pricing decision. These are discussed below.

#### *Short-run pricing decisions*

Sometimes organisations can encounter situations where they need to make short-run pricing decision. Short-run pricing decisions typically have a time horizon of less than one year. An example of a short-run pricing decision is that the organisation might have the opportunity to bid for a special one-time offer with other competitors, or the opportunity to produce a special one-time-only order for a product that they produce with no long-run implications. In these situations, the incremental cost of undertaking this special order needs to be considered. Factors such as the current capacity of the organisation's operations needs to be determines and taken under consideration. It might be likely that resources that are required for the order are already available and the cost of these resources has already been incurred by the organisation. In this instance, the incremental and also opportunity cost of the order needs consideration. If there is excess capacity available then there is less likely to be any opportunity costs. If there is no excess capacity, then the price of the order or the order bid must at least cover this opportunity cost. Incremental costs could consist of cost of extra materials needed, extra labour costs and extra costs of energy for equipment. The direct and indirect variable manufacturing costs also need to be taken into consideration.

Once these costs are established then the organisation can look toward setting their price or preparing their bid. Prices should be set at a level that exceeds the

incremental cost. Because short-run pricing decisions are not likely to have any significant long-run consequences, the dominant factor in the pricing decision is likely to be the cost information. The excess in the revenue from the special order after the incremental costs, can contribute to the fixed or committed costs. These are costs that would have been present whether or not the order was taken or bid accepted and this excess revenue can make a contribution toward these committed costs that would not have otherwise been obtained. Other factors might also be of consideration when setting prices for short-term pricing decisions. For example the consideration of the possible bidding prices of competitors and also consideration as to whether accepting the order or bidding for the order will have any effects on existing customers.

### *Long-run pricing decisions*

Long-run pricing decisions are strategic decisions, they include a time horizon of over one year where all of the good or service costs are relevant. From a buyer's perspective, buyers typically prefer for prices to be predictable and stable over the long-run. This can assist in buyers being able to better plan and also operate without the need to continuously monitor the prices of their suppliers, and this can result in stable long-term relationships with suppliers. However, to be able to maintain a stable price then organisations need to have substantial knowledge of their long-run cost.

A good or service should be priced at a rate that covers all of the resources that are committed to the product over the long-run. It is therefore essential that there is a costing system in place that can measure all of the resources that are consumed by each good or service. If the long-run costs cannot be covered by the price, then the organisation would eventually become unprofitable. Each good or service may have unique processes or inputs, and hence the costing system would need to be able to accurately obtain the cost information for each of these outputs in order to help establish the unique prices for these goods or services. There is a danger that if the costing system underestimates the cost of the good or service, that the organisation might charge a price that does not cover the costs, thereby resulting in a loss. And there is also a danger that if the costing system overestimates the cost of a good or service, then the organisation might charge a price that deems the organisation uncompetitive thereby resulting in a loss of revenue.

### Approaches to Pricing

There are various approaches that are available to management that can assist them in their pricing decisions. Below are three approaches that can be utilised to establish a pricing policy for goods or services.

#### *Cost Plus Pricing*

Cost plus pricing generally uses the average cost of the product as the price base. In addition to this, in order to cover other costs that are not included in the average cost, such as period costs and also to incorporate a profit, a percentage is determined and added to the costs established. Although there may be other



factors that ultimately influence the market price for the good or service, such as market conditions, cost plus pricing is a simple approach that management can begin with, and at the very least, this approach can be used to determine the minimum price for the good or service, being the cost of the product.

Cost plus pricing is usually depicted in the following formula:

Target selling price = cost + (mark-up percentage × cost)

The percentage mark-up is dependent on many factors, particularly the type of industry in which the organisation operates. For example, supermarkets generally have a low percentage mark-up on their groceries. In contrast, clothing and jewellery stores are known for having high percentage mark-ups on their products, which is why they can often afford to have sales (such as fifty percent off sales) and still achieve a profit. Other factors, such as consumers, competitor's behaviour, and the ability to sell products quickly may also influence the percentage mark-up rate.

*Numerical Example:*

Jo's chain of supermarkets requires a percentage mark-up of 7.5%. The cost of steak is \$7.98 per kilogram. What should be the target sale price for the steak?

Solution: cost + (mark-up percentage × cost);  $\$7.98 + (0.075 \times 7.98) = \$8.58$

Another major factor that can determine the percentage mark-up is the desired operating income or return on investment that the organisation requires from its good or service. Here, the required rate of return is used to determine the mark-up on the cost and consequently the selling price of the good or service. The required profit can be calculated by multiplying the average invested capital by the target return on investment.

In addition to the percentage mark-up, another important consideration that needs to be made is what is the most appropriate definition of cost? There is no single best definition of the cost of good or service for the purposes of pricing. Two examples of definitions of cost can include absorption costing and variable costing. Briefly, absorption costing is where all of the manufacturing costs are considered, that is both fixed and variable costs. Variable costing can incorporate either variable manufacturing costs or total variable costs.<sup>9</sup> Both of these methods of costing are further discussed below.

An advantage of using cost plus pricing is that in established industries, it is likely that many firms have similar cost structures. In these instances, it might be possible to predict the prices of other competing organisations. Another advantage is that cost plus pricing is simple to compute. A major criticism of cost plus pricing on the other hand, is that it does not consider demand. It assumes that the price for the good or service should depend on the cost.

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<sup>9</sup> For more information on absorption cost and variable cost pricing formulas see Langfield-Smith, Thorne and Hilton (2003) pp. 939.

Although it is clear that in most instances, demand does influence pricing, this criticism might not be so significant as the final price of the good or service is rarely adopted directly from the formula without any upward or downward adjustments taking factors such as this into consideration. Another criticism of this approach is that the claim that using cost plus pricing can be used to set a price base to ensure that the organisation makes a profit. In certain circumstances this may not be true. A potential problem with this is when organisations unitize fixed costs, and then this unitized cost is fixed for a certain activity level. If the demand for the good or service falls significantly below that activity level, then the revenue received from the good or service might not be sufficient to cover the unit cost. Therefore this cost plus pricing approach needs to be taken with caution.

### *Time and Material Pricing*

Under time and material pricing, the organisation sets two pricing rates, one for the labour that is used for each product produced (good or service) and another for the materials that are consumed for each product. Service industries widely use time and material pricing, for example public accounting firms, such as KPMG, maintain records of all costs that are generated when performing a job for a client, almost every minute of labour time is recorded and resources such as photocopying and faxing are recorded and charged to clients based on the quantity of resources consumed.

Labour costs include the cost of the direct labour such as hourly rate and other employee costs, and can incorporate a charge to cover other costs such as overhead, selling and administrative costs. It can include charges that are required to make a profit or return on investment per hour of employee time.

The calculation of time charges can be expressed in the following equation:

Time charge = hourly labour costs + (annual overhead excluding material handling and storage / annual labour hours) + hourly charge to cover profit margin.

### *Numerical Example: Sally's Restaurant Function Service*

Sally's restaurant and function services provide catering services for special occasions at the premises of the client or public parks and gardens. Sally has budgeted 6,000 hours of service time for 2004 (time to prepare food and wait on customers), and desires a profit margin of \$10 per hour of labour and a profit margin of 35% on the invoiced cost of food.

#### Budgeted Data for 2004

Labour rate (including on-costs)	\$14 per hour
Annual overhead costs:	
Food handling and storage	\$ 32,000
Other overhead costs (i.e. public liability insurance)	\$ 120,000
Annual costs of materials (food)	\$ 870,000

The time charge can be calculated as follows:

$$= \$14 + (120,000/6,000) + \$10$$

$$= \$44 \text{ per direct labour hour}$$

The charge for materials typically includes the cost of the materials that are incurred plus a charge that covers the cost of the purchasing, receiving, handling and storage of materials. This can also include a charge for the desired profit margin on the materials that are used.

The calculation of material charges can be expressed in the following equation:

$$\text{Material charge} = \text{Cost of material incurred on the job} + (\text{material cost incurred on the job} \times (\text{annual material handling and storage costs}/\text{annual cost of materials})) + \text{desired profit margin on materials used}$$

Numerical Example:

Refer to Sally's restaurant and function services above.

The material charge can be calculated as follows:

$$= \$Y \text{ cost} + (\$Y \text{ cost} \times (32,000/870,000)) + 35 \%$$

\$ Y cost represents the material cost incurred for the individual job.

Therefore, by using time and material pricing, the final price for the job will be a combination of the time charge for the job plus the material charge for the job.

### *Target Costing*

Unlike cost plus pricing, where the cost of the good or service is firstly determined followed by determining the mark-up and finally the price of the good or service, target costing acts in much the opposite direction. Target costing is a proactive approach to cost management where the initial step in target costing involves looking outside the organisation toward the price in which consumers are willing to pay for the good or service in the marketplace. Once the target selling price is established, then target volume and target profit are determined. Once these factors have been determined, then the target cost for the good or service is established and finally, in the case of production, a product design is determined in accordance to the target cost. These steps are taken to ensure that the good or service that the organisation is intending on providing will be at a cost that is not exceeding the target cost.

Target costing is considered price-lead costing in that target costs are established by determining the competitive market cost and subtracting from this the target profit or required profit margin. It is also considered customer driven and design centred in that much attention is paid to the features and timeliness that customers are expecting from a good or service, at a given market price. In addition to this, organisations attempt to match the competitive dimensions of their competitors. The design of the product and also the processes are also central to the cost reduction efforts under target costing.

As mentioned above, target costing is a method of cost management and of vital importance to target costing is target pricing. The target price is based on the estimated price that consumers are willing to pay for a good or service and is determined by developing an understanding of customer demands and perceived value and also from examining competition. Important considerations from competition might include competitor's technology, products and services offered and production costs.

*Example: Target pricing and target costing*

Playland Toys are considering developing a new innovative toy that can talk and interact with children. There are some products that are already on the market that have the 'talk' feature, however Playland Toys research and development division believe that they have the capacity to produce a toy that can also respond to the child thereby providing some interaction with the child. In developing the target price, Playland Toys considered the price of the 'talk' only product that is currently on the market at a price of \$65. In addition to this, customer survey research has indicated that parents would value the 'interactive' option of their toy as they would consider this educational for their child. Research indicated that customers placed a perceived value of this function alone at a price of \$20. Drawing from this, Playland Toys believes that the target price of the new product should be set at \$85.

The required profit margin rate for Playland Toys for new products is has been determined by management at 23%. This has been determined by looking at the target profit plan over the medium to long-term. Playland Toys expects a high rate of sales of the product early within the product life and then a decreased but steady demand for the product once customers start to match Playland Toys competitive dimensions. What is the expected target cost for the product?

The target cost for the product would be calculated as:

$$\begin{aligned} \text{Target cost} &= \text{expected selling price} - \text{target profit} \\ &= 85 - (85 \times 23\%) \\ &= \$ 65.45 \end{aligned}$$

Therefore, the product needs to be designed so that the cost of the product is at or below the target cost for the product at \$65.45. This will ensure that the required target profit of 23% will be achieved whilst selling the product at the target price.

*Full (absorption) Costing and Marginal (variable) costing*

As briefly mentioned under cost plus pricing, it is very important that an appropriate definition of cost is determined for each organisation. Also, as mentioned, there is no single best definition of cost and in this section two possible methods of costing will be further elaborated on being full (absorption) costing and marginal (variable costing).

*Full (absorption) costing*

Full costing, also called absorption costing, is a costing methodology that incorporates all manufacturing costs. This includes both variable and fixed manufacturing overhead, direct materials and direct labour. There are also some exclusions from this cost base, being both variable and fixed selling and administrative costs. This is because these costs, in addition to the required profit margin, are taken into consideration when determining the mark-up on the good or service.

Full costing can be used to establish pricing formulas, such as through cost-plus pricing. The objective of full costing is to establish the total cost of production and also the cost of other product-related cost, such as the cost of upstream product-related costs and downstream product-related cost. Cost-plus pricing uses these full costs that have been determined and add a profit margin to this to establish the price for the good or service. In Australia, full (absorption) costing is required under the Australian Accounting Standards and therefore it is efficient and cost effective for organisations to use the full cost in consideration for their pricing decisions. From a global perspective, the information for full costing is also already available in the organisation's ledger accounts, again proving a cost effective approach to costing. In addition to this, conceptually, using full costing is a sensible approach to costing because from a long-run perspective, organisations need to establish a price that covers all costs, whilst at the same time provide an acceptable profit. In addition, because full cost pricing includes all product-related costs, it provides a defensible approach to justifying prices set by management.

Total costs, however, may be difficult to establish and specifically traced to individual products. Costing systems such as activity-based costing can be used to overcome some of these difficulties. In addition, it is possible that because product costs in relation to fixed production-related costs would change in related to volume of production, the cost behaviour pattern of the organisation can be obscured as a result of this relationship.

*Marginal (variable) costing*

Marginal costing, also called variable costing, incorporates only variable costs that are associated with the good or service. Unlike full costing (above), marginal costing also includes variable selling and administrative costs. Fixed costs are the obvious exclusion from this approach and therefore need to be taken into consideration when determining the mark-up (in addition to the required profit margin).

Due to marginal costing excluding fixed cost, the organisation is not faced with the limitation of full costing in relation to the changing cost per unit as volume changes. Therefore, marginal costing is more in line with cost-volume-profit analysis. Information from marginal costing is also important for managers when they are faced with short-term pricing decisions, such as providing managers with information that is needed for pricing of special orders, or for

deciding whether to accept or reject a special order. This is because the marginal approach provides information that allows managers to assess the incremental cost of accepting an order. Marginal costing also avoids any arbitrary allocation of fixed costs to individual goods or services. For example, many facility-level costs, such as the cost of the Chief Executive Officer's salary, can be arbitrarily allocated to goods or services under full costing. Under marginal costing, these costs are considered in addition to the variable costs, when determining the mark-up.

A difficulty with marginal costing is ensuring that for the good or service to be profitable in the long-term then the price needs to cover all of the costs, both fixed and variable, over the long-term plus a mark-up that covers the required profit margin. This is a challenge that management is faced with and managers also need to be wary of the different types of information that they will need for long-term versus short-term pricing decisions.

### Relevant costs to pricing

There are several types of costs that need to be considered, that fall outside the categorization of fixed and variable costs that can be relevant for pricing decisions. Some of these costs are discussed below.

#### *Sunk costs*

A sunk cost is a cost that has occurred in the past and therefore cannot be changed. Because of this, sunk costs become irrelevant for decision making, as they will be the same for all alternative courses of action in the future or present. Sunk costs can also be called historical costs and they are irrelevant for any type of cost-benefit analysis.

Sunk costs reflect the cost of something at the time of acquisition and can be closely related to the opportunity cost at that time. Where the sunk cost never changes, the opportunity costs do change as time goes by. Sunk costs should not be considered when making pricing or planning decisions. They are irrelevant as they represent past costs that cannot be changed and should not impact on any pricing or planning decisions for the future. For information to be relevant for decision making then that information needs to be different under competing courses of action. So for information to be relevant then it must be related to some aspect of the future. Managers need to be aware of the nature of the sunk costs within their organisation and to consider them appropriately when making pricing decisions.

#### *Opportunity costs*

An opportunity cost is a cost of the foregone opportunity of using a resource. Resources, whether they are cash, time or labour for example, are costs that once they are used for one purpose, then they cannot be used for another purpose. For example, if one employee spends two hours on project B then they have foregone the opportunity to work on project A within those two hours. The opportunity to have worked on project A represents the opportunity cost. So

here, cost is determined in the sense of the use of resources, such as the labour in this case.

Managers are faced with the challenge of considering the opportunity costs involved with the many decisions that they make daily. When opportunity costs can be considered in monetary terms, then managers need to determine the opportunity costs for the different alternatives and choose the course of action that is in the best interest of the organisation. This gets more difficult when determining the opportunity cost for non-cash resources, and managers need to be creative here in determining the next best use of the resource in order to attempt to equate it back into monetary terms. For pricing decisions, managers need to consider the opportunity costs when setting prices for their regular goods or services and also for any short-term decisions such as for special orders. For example, for a special order there may be both monetary and non-monetary costs that are relevant for decision making when deciding what to bid for a special order. For example, there might be the choice of accepting special order A or special order B. Special order A might cost \$10 and be priced at \$13 per unit and special order B might also cost \$10 and be priced at \$12.50 per unit, however special order B might provide exceptional public exposure to the product that would not be possible under special order A. The value of this exposure would need to be considered by management when deciding on the opportunity cost of each order.

#### *Other costs*

There might also be other costs that are relevant for pricing decisions. When considering other costs, then it is important to consider what information is relevant for decision making. It is important to consider only relevant information, as the cost of generating information can be expensive. In addition to this, managers only have limited time to digest this information and cannot afford to waste time processing information that ends up being irrelevant to the decision making.

### Analysis of Special Decisions

Managers may be faced with the need to analyse special decisions for the organisation such as whether to make or buy a product, whether to continue or eliminate a product or whether to accept or reject a special order. The implications of each of these special decisions are described below.

#### *Make or buy*

Should organisations actually produce a product or service themselves, or purchase it from outside the organisation, this is typically called outsourcing. There can be many factors that are taken into consideration with make or buy decisions. These can include levels of quality, costs and dependability of suppliers. Both qualitative and quantitative factors are taken into consideration. Managers need to determine whether they have the resources and expertise required to make the product and also establish the opportunity cost of making that product. They also need to determine whether outside organisations are

going to supply the product on a timely basis and at their required levels of quality. As discussed above, only relevant information should be considered when making these make or buy decisions. The incremental cost for making the product, which is the cost incurred if the product is made, would be a relevant cost for decision making. Also the difference between the costs of the two options would also need to be considered along with relevant qualitative factors.

### Numerical Example:

AM Printers are a company that specialises in making computer printers. AM Printers is facing the decisions whether to make or outsource the production of printing cartridges, a necessary part of their product. The print cartridges are currently made by AM Printers, however management has concerns regarding the extensive use of resources required to produce these printing cartridges and also the high level of defects that they are producing. Management have decided to consider whether outsourcing this function would be a desirable option.

There are both qualitative and quantitative factors that need to be considered. Qualitative factors include the quality problem that AM Printers are currently having with their production of printing cartridges. There appears to be a very high level of defects. HP Printers specialise in printing cartridges and are therefore likely to provide high quality printing cartridges. Management has established the relevant financial information for their decision:

Nature of cost (per 1,000 cartridges)	AM Printers	HP Printers
Direct materials	14,700	
Direct labour	8,250	
Variable manufacturing OH	11,625	
Outside purchase of cartridges		32,000
Total relevant costs	\$34,575	\$32,000

Based on the above information, from a financial perspective, it appears that AM Printers would be saving \$2,575 per 1,000 print cartridges if they outsource this function to HP Printers. Along with this, it appears that AM Printers would gain from HP Printers expertise and consequently gain higher quality print cartridges. In this case, management is likely to decide to outsource this product and focus more on their core competencies, which is the production of their printers.

### *Drop or continue*

The decision whether to drop or continue a product, service, or department for example, would also require special attention from management. If for instance, the decision was being made whether to continue producing a certain product, management would need to consider factors such as the revenues received from that product and costs incurred in producing the product, effects on customers if that product was no longer available, effects on competition and reputation



consequences. Similar factors would need to be considered if deciding whether to add a new product. Both qualitative and quantitative factors would need to be considered.

From a qualitative perspective, the organisation would need to examine the benefits and also consequences that might eventuate from eliminating the product. Such as the opportunity to focus on their core competencies and also any backlash from consumers for no longer being able to purchase that product, for example, consumers might perceive the organisation as being unreliable. From a quantitative perspective the organisation would need to consider the revenues and costs of the alternatives for dropping or continuing the product. The greater the profit (or the lower loss) of each alternative would help in determining whether to continue or drop the product. For example, if the additional profit was \$1,700 for continuing the product and \$1,950 for dropping the product, then qualitative considerations aside, the product would be dropped.

Also, the opportunity costs that would be involved in producing the product would also need to be incorporated into this decision making. The decision whether to drop or continue the product can have long-run implications for the organisation and is therefore one which great care and consideration needs to be taken.

### *Special order*

The opportunity for organisations to decide whether to accept or reject a special order has already been briefly described above (under opportunity costs). Special orders generally have no long-term implications, so it is deemed as a short-term orientated decision. A major influence on deciding whether the organisation should accept or reject a special order would be whether the organisation has any excess capacity within their production facilities. If they do not have excess capacity then there will be an opportunity cost involved. That is, the organisation will have to choose whether to produce their normal type of product or accept the special order. Where there is excess capacity, this type of opportunity cost does not exist. In this instance, the organisation would need to consider the incremental cost and revenues of producing the special order. Fixed costs would not be a consideration here, as they would occur whether the organisation accepted the order or not. Other factors may also be considered, for example customer satisfaction, that is, if the order is not accepted then that customer might take their regular business with the organisation elsewhere.

### Non-cost Factors in Pricing Decisions

It is possible that there are non-cost factors that need to be taken into consideration in pricing decisions. An example of a non-cost factor is strategic factors. The organisation might align its pricing decisions with the organisations strategy. An example of when this might occur is when the organisation is introducing a new product into the market. In this case, it might be difficult to determine what the market is willing to pay for the new product. The

organisation might decide to align the pricing of the product with the strategy of the organisation, such as a low-price strategy.

There can also be other factors that influence the pricing of a good or service, other than costs, such as price discrimination. This is when different types of customers are charged different prices for the same good or service. Another factor can be peak-load pricing, which is when a higher price is charged in periods that are considered 'peak', that is the demand for the good or service is approaching capacity. Hence the demands of customers that are willing paying extra for the convenience of the good or service will be met (within limits). For example, it costs more to fly from Sydney to Melbourne in peak times, for example 8am Monday morning, compared to off-peak times such as 11.30am Monday morning.

### Summary and Conclusion

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This chapter examined the important issues underlying pricing decisions in organisations. Pricing is very important within organisations and pricing decisions are complex as there is much information that needs to be considered. This chapter described the different types of information that influences pricing decisions in organisations and the different approaches to pricing and also costing, which is an important factor that indeed influences pricing decisions.

There are also various types of special decisions that need to be made in organisations that this chapter discusses, that also have direct implications on pricing decisions. Finally, this chapter discussed some non-cost factors that might also influence pricing decisions. In conclusion, the aim of this chapter was to provide a detailed outline of the importance of pricing decisions in organisations and also the complexity of the information that needs to be analysed and interpreted by management. While cost information is an important factor in pricing decisions, this chapter illustrates that there are many other factors that also need to be carefully considered when determining the price of a good or service.

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## Chapter 12

### Transfer Pricing: Concepts and Application

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#### LEARNING OBJECTIVES

After reading this chapter you should be able to:

1. Define transfer price, and understand its importance for the organisation
2. Explain the importance of having an efficient transfer pricing system, and describe its characteristics
3. Discuss the methods of setting transfer prices and understand the advantages and disadvantages for each method
4. Discuss multinational transfer pricing and realize its tax implications

**Introduction**

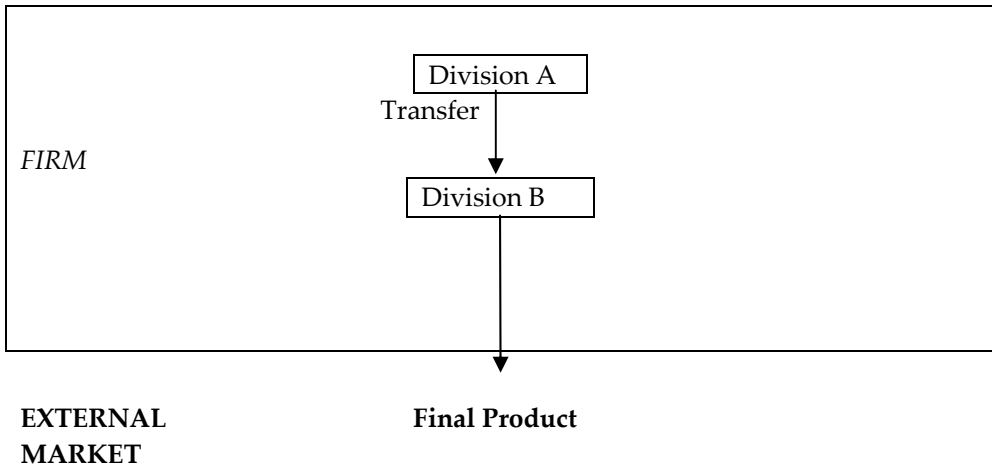
Transfer prices of products between divisions can have implications for divisional performance evaluation. The greatest challenge to management is to measure and separate the performance of each division forming part of the production chain. One of the keys to a satisfactory resolution to this problem lies in the setting of the price at which the product is transferred.

This chapter provides a good understanding of the issue of transfer pricing. First, it defines transfer price and its role for the organisation, and then it discusses the importance of the transfer pricing system and provides the characteristics of an efficient system. The chapter provides a substantial outline of the different methods used in transfer pricing showing the advantages and disadvantages for each method. Finally, the chapter discusses transfer pricing in the multinational companies and analyses its tax implications.

**What is a Transfer Price?**

Transfer price is the price of goods and services charged by one division (the transferring division) to another division (the receiving division) within the same organisation. The transfer price usually affects the revenues of the transferring division and the costs of the receiving division. Subsequently, the financial and managerial performance of both divisions would be affected. Exhibit 1 demonstrates a typical transfer pricing situation.

**Exhibit 12.1: A transfer pricing situation**



Transfer pricing remains to be considered by many managers as unresolved problem despite the substantial interest in this issue among academics. As divisions, acting independently, may set transfer prices that maximize divisional profits but adversely affect the organisation’s profits. For example, suppose that Division A (Exhibit 1) sets transfer price of \$40 for a part that costs \$30 to produce. If Division B can get the part from an outside supplier for \$34, it will

not buy the part from Division A. Division A will be saving \$6 per part (\$40 the internal transfer price it incurs - \$34 the external price). The issue here depends also on whether Division A can replace internal sales with external sales. Suppose that Division A can not sell in the external market, the company as whole will be worse off by \$4 per part (\$34 cost through external supplier - \$30 internal cost). Thus, how transfer prices are set can be critical for profits of the business as a whole.

### Transfer Pricing System

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A transfer pricing system facilitates cost determination and control and performance accountability between divisions.

Companies must have a transfer pricing system that facilitates the communication between divisions in this regard. Such a system is essential to determine:

- when divisions are free to sell/buy from other divisions
- what degree of freedom they have to buy from external sources when goods are available internally
- what policy they must use to determine the transfer price
- which method they can use (market, cost or negotiated)
- how they can resolve any dispute that might occur.

### Effective Transfer Pricing System

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An effective transfer pricing system should accomplish the following objectives:

1. It should motivate the divisional manager to make *sound decisions*, and it should communicate information that provides a reliable basis for such decisions. This will happen when actions taken to improve the divisional profit would also improve the profit of the company as a whole.
2. It should result in a report of divisional profits that is a reasonable measure of the *managerial performance* of the division.
3. It should ensure that divisional *autonomy* is not undermined. Autonomy means that central management should not interfere with the decision-making freedom of divisional managers.

Black and Edwards (1979) have provided a number of characteristics that an effective transfer pricing system should have:

- Be as simple as reasonably possible
- Offer flexibility where and when it may be needed
- Facilitate speed and minimize delays: offer a fast response to changing business conditions country by country around the world
- Minimize duplication paperwork
- Reflect the True profit contributions of all concerned (including, for example, reducing the denominator in an ROI formula of a product division if the profit is credited to a marketing unit)
- Act as an incentive to keep cost down – worldwide
- Maximize profits and sensible minimize taxes

- Put profits in locations where they can best be used (e.g., to build up new business)
- Effectively motivate managers worldwide to maximize total company profits
- Involve- really involve- all relevant units in the corporation that are affected by pricing decisions
- Facilitate assessment or calculation of what is going on- where, and on which products, the company is really making its profits.

In general, we can evaluate the degree to which a transfer price satisfies the objectives of a transfer pricing system by considering the opportunity cost of the goods transferred. The *opportunity cost approach* identifies the minimum price that a selling division would be willing to accept and the maximum price that the buying division would be willing to pay. These minimum and maximum prices are defined as follows:

- The minimum transfer price is the transfer price that would leave the selling division no worse off if the goods were sold to an internal division
- The maximum transfer price is the transfer price what would leave the buying division no worse off if an input is purchased from an internal division.

The opportunity cost approach, ensures that the divisional manager of either division is no worse off by transferring internally. This means that the total divisional profits are not decreased by internal transfer.

### Transfer Pricing Methods

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The literature identifies several approaches to transfer pricing. They are discussed next.

#### *Market-based Transfer prices*

A market-based price is established by the open market. It is the price that a selling division can get for its product in the external market or the price at which a buying division can purchase the product in the market place. Note that with some intermediate products there is an external market while with some others there is not.

So, if there is an outside market for the intermediate product and the market is perfectly competitive, then the correct transfer price is the market price. In this case, no division can benefit at the expense of another division.

The opportunity cost approach supports the market price in this setting. Since the selling division can sell all it produces at the market price, selling internally at any lower price would make that division worse off. Similarly, the buying division would be unwilling to pay more than the market price as that division can always buy at the market price from an outside supplier. So as we can see the only possible transfer price is the market price.

#### **Advantages:**

The basic advantage of using market prices is that they allow each division to be evaluated on a standalone basis. Measures of income have more validity when

market prices are used. Managers are encouraged to treat their divisions as independent companies and to buy from whatever source seems the best under current market conditions.

**Disadvantages:**

In many cases, the establishment of a market price is difficult. First, a market may not exist for an intermediate product; as is the case in automobile manufacturing companies where the transmission division may not be able to sell the transmissions that the assembly division wants. In this case, prices are established arbitrarily, for example, they may approximate market price based on similar products manufactured in the market or by marking up costs of production in the same manner that they would for an outside sale.

Second, if a division is a captive of another division that means there is no source of supply except that division or there is no source of sales except the other division, then there is a real question about using income-based measures to evaluate the division. A captive selling division that provides 100 percent of its output to another division may well be evaluated as a cost center. A captive buying division that needs all its products from other divisions of the company may be evaluated as a revenue center. In these cases there is dependence between the divisions, and it would be best if they were evaluated together as a single unit.

Finally, there are some market-based transfer prices that can lead to sub-optimal decisions as has been discussed.

**Example 1:**

Alpha Division of XYZ Corporation currently purchases one component used in its production from an outside supplier for \$50 each. Beta, another division in the same company started producing the same component at a cost of \$40 and selling it in the market at \$50. Assuming that Beta is operating at full capacity and the market is perfectly competitive, what is the possible transfer price that should take place if the component was to be purchased internally?

The market price (\$50) is the transfer price, as this is the price that would not leave any division worse off as a result of the transfer.

Of course, the case would be different if the market was not perfectly competitive, that means that Beta Division will not sell every thing it produces in the market. Also, if Beta Division was operating under capacity, then the transfer price could have been lower (maybe negotiated price) than the market price as we will see in the subsequent examples.

*Negotiated Transfer Prices*

As perfectly competitive markets rarely exist, market price may no longer be suitable. In this case, negotiated transfer prices may be a practical alternative and opportunity cost approach can be used to define the boundaries of this



negotiation. A negotiated price should be agreed to only if the opportunity cost of the selling division is less than the opportunity cost of the buying division.

A negotiated price system requires the divisions to deal with each other in the same manner as they deal with external suppliers and purchasers.

**Advantages:**

Negotiated transfer prices have been identified as an important integrating mechanism by which goal congruence can be achieved.

It has the advantage of requiring managers to be sensitive to market requirements and responsive to competitive alternatives.

Finally, it will work best when there are outside markets for the intermediate product.

**Disadvantages:**

First, it may lead to conflict between divisions as it may accentuate personality conflict between managers, and when there is ego involvement, gaining the upper hand may become more important than company profitability.

Second, it can become time consuming and cause wide variations in reported divisional profitability.

Third, it may make the divisional measurement sensitive to the negotiating skills of managers.

Fourth, it requires the time of top management to oversee the negotiating process and to mediate disputes.

Finally, it may lead to a sub-optimal (too low) level of output if the negotiated price is above the opportunity cost of supplying the intermediate goods (Kaplan and Atkinson, 1989).

**Example 2:**

Refer to example 1 in this chapter. Assume now that Beta Division is operating at 75 % of its capacity, and the variable cost of the part produced is \$35. What is the possible transfer price that could take place between the two divisions?

As Beta Division is operating under capacity, then the fixed overhead cost will be irrelevant to the transfer price, therefore the minimum price that Beta Division will accept is \$35. And the Maximum price that Alpha Division will be willing to pay is the market price (\$50). Therefore the transfer price will be negotiated and between \$35 and \$50. Any price in this range will leave either division better off.

*Cost-based Transfer Prices*

If a market price does not exist, then it would be possible to use cost-based transfer prices. The simple rules for constructing such a price must be prescribed by top management to avoid conflict between the buying and selling divisions.

Cost-based transfer prices may be in different forms: full cost, standard cost, marginal cost, or opportunity cost.

**Full-Cost Transfer Prices:**

They include all production costs as well as costs from other business functions, such as R&D, design, marketing, distribution and customer service. So they are based on the actual costs incurred by the selling division.

**Advantages:** its only real virtue is simplicity.

**Disadvantages:** it is the least desirable type of transfer pricing methods as it can provide perverse incentives and distort performance measures. Also, the buying division would be required to absorb the inefficiencies of the selling division. Finally, it will prevent managers from considering long-term profitability that increases cost.

$\text{Full Cost} = \text{Total Variable Cost per Unit} + \text{Fixed Cost per Unit}$
---

*Full Cost plus Mark-up*

Sometimes, in order to provide the selling division with a return that exceeds its full costs, a mark-up can be added over full cost.

Full cost plus mark-up suffers from virtually the same problems as full cost. It is somewhat less perverse, however, if the mark-up can be negotiated.

*Variable Cost Plus Fixed Fee*

Like full cost plus mark-up, variable cost plus fixed fee can be a useful transfer pricing approach provided that the fixed fee is negotiable. This method has an advantage over the full cost plus mark-up method: if the selling division is operating below capacity, in this case variable cost is its opportunity cost.

**Example 3**

Acer Company has two divisions A and B. A is the producing division which manufactures chair legs that are used by the division B (the finishing division) to produce chairs. The market price for each leg is \$50 per leg. Each chair completed by the Finishing Division requires four legs. The production costs to produce 10,000 legs for year 2005 are as follows:

Direct materials	\$45,000
Direct labour	\$30,000
Factory overhead:	
Variable overhead	\$7,500
Fixed overhead	\$22,500
Operating expenses:	
Variable	\$10,000
Fixed	\$40,000

Required:

Calculate the transfer price for a chair leg using the following methods:

- Full-cost transfer price.
- Full cost plus 20 % mark-up.
- Variable cost plus a fixed fee of 20%

Full cost transfer price =  $(45,000 + 30,000 + 30,000 + 50,000)/10,000 = \$15.5$

Transfer price =  $15.5 * (120/100) = \$18.6$

Transfer price =  $(45,000 + 30,000 + 7,500 + 10,000)/10,000 * (120/100) = \$11.10$

*Standard cost Transfer Prices:*

The transfer price is the predetermined cost of the product, this means what the cost is ought to be under certain circumstances.

**Advantages:** it avoids passing on inefficiencies from one division to another. Also, it set prices, which are independent of production levels.

**Disadvantages:** it may cause problems and dispute between divisions when special orders are requested for which there is no standard cost. As sometimes the buying divisions may request some alterations in the intermediate products.

*Marginal (Variable) Cost Transfer Prices:*

Intermediate products are transferred at the incremental cost of producing additional volume. In such a case the selling division has excess capacity and would be better off to sell at the variable cost as its fixed costs not going to increase (this does not mean that transfer prices will be set equal to the variable costs, but variable costs would be the floor for all transfer prices) . Similarly, the buying division would only purchase additional products if the marginal cost is less than the marginal revenue that can be received from the sale of these products.

The limitation of this method is that it requires calculation of costs at different levels of operations.

*Opportunity Cost Transfer Prices*

When the selling division is at capacity, an opportunity cost arises when any benefits from sales outside the firm are foregone by selling internally. In the same way, variable cost plus incremental fixed cost and / or some share of capacity is the opportunity cost when there is excess capacity or even when capacity has been established exclusively for internal transfers of goods. However, a conflict exists since managers of decentralized segments may not share these assessments and may make decisions in the best interest of the division that turn out to be sub-optimal for the company.

*Opportunity Cost for the selling division = Market Price – Variable Costs*

= Lost contribution margin by not selling outside

**Figure 12.1 Opportunity Costs for a Selling Division**

	<b>Yes External Market</b>	<b>No External Market</b>
<b>Full Capacity</b>	Opportunity cost = Lost contribution	No opportunity cost
<b>Excess Capacity</b>	No opportunity cost as internal orders might be met without affecting external sales	No opportunity cost

Summary of transfer price methods

So as we have explained earlier, determination of the transfer pricing method depends on having an external market of the intermediate product and on the capacity usage of the selling division. That means if we do not have an external market or the market is not perfectly competitive, then the selling division does not have much influence over setting the transfer price that is most profitable. And therefore, cost based transfer prices are the most suitable prices in this case.

But if we have an external market and is perfectly competitive, then the transfer price used depends on whether the selling division is operating at capacity or under capacity. If at capacity, then the selling division can sell all it produces in the market even if not selling internally, therefore the market price is the most suitable. But if was operating under capacity, then the profit from using this excess capacity by selling internally also will be shared between the two divisions and that is when negotiated prices are the most suitable.

External Market	Full Capacity	Method		
		Cost-based	Market Prices	Negotiated Prices
(Perfectly competitive)				
YES	YES	YES		
YES	NO	YES		
NO	YES	YES		
NO	NO	YES		

Multinational transfer pricing and its tax effects

In multinational companies, transfer prices have strong effects on tax liabilities and other payments because of different tax laws and regulations between the countries. Unlike domestic companies where transfer prices are used for goal congruence and motivation, multinational companies use transfer prices more to minimize income taxes, import duties, and tariffs. For example, suppose a division in a country of high tax rate produces a part for another division in a country of low tax rate. Then to minimize the overall taxes paid, the company needs to minimize the profits and that is done by setting a low transfer price, as in this case most of the profit will be recognized in the low tax rate country.

Also, multinational companies set low transfer prices to take advantage of low import duties as they are based on the price paid for a product, whether it bought from an outside company or transferred from another division. Of course, tax authorities recognize the advantage of setting transfer prices that minimize taxes and import duties. Therefore most countries have restrictions on allowable transfer prices.

**Example 4:**

Axis Company has two divisions A and B. Division A produces a part that is transferred to Division B. Division A is operating in a country with a 25 % income tax rate. Division B is operating in a country with a 50 % income tax rate. In addition, the import duty is 20% of the price of the item.

The full cost of the item is \$500, and the variable cost is \$300.

Assume that either variable or full cost transfer prices can be used, which should be chosen?

Income of A is \$200 higher, therefore

A pays 25% * \$200 more income taxes =	(\$50)
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Income of B is \$200 lower, therefore

B pays 50% * \$200 less income taxes =	\$100
--	-------

Additional import duty paid by B is 20% * (500-300) =	(\$40)
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Net Saving from transferring at \$500 instead of \$300 =	\$10
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Also, multinational companies use transfer prices to avoid financial restrictions imposed by some governments. For example, a country might restrict the amount of dividends paid to foreign shareholders. Through transfer pricing, it would be easier for the company to transfer cash from a foreign division as payment for items transferred than as cash dividends.

Evidence from company practice

Although full cost based transfer prices can lead to goal-congruence problems, survey evidence (see below) indicates that it is the most common method between firms using cost-based transfer prices.

The reasons firms are using full-cost transfer price, despite its limitations, is, as the surveys indicate, to take advantage of differences in tax rates and customs duties and to transfer income and dividends from foreign countries.

Method	United States	Australia	Canada	Japan	India	United Kingdom	New Zealand
1. Market-price based	37%	13%	34%	34%	47%	26%	18%
2. Cost-based:							
Variable costs	4	-	6	2	6	10	10
Full costs	41	-	37	44	47	38	61
Other	1	-	3	0	0	1	0
Total	46%	65%	46%	46%	53%	49%	71%
3. Negotiated	16%	11%	18%	19%	0%	24%	11%
4. Other	1%	11%	2%	1%	0%	1%	0%
Total	100%	100%	100%	100%	100%	100%	100%

Source: from Horngren et al. (1999) except for New Zealand from Alam & Hoque (1995).

The surveys identify the different factors that affect the firms' choice of transfer pricing method. Those are (in order of importance): Performance evaluation, management motivation, pricing and product emphasis, and external market recognition.

### Summary

Transfer pricing remains considered as unresolved problem as divisions tend to act independently and for their own interest. The transfer pricing involves finding a mutually satisfactory transfer price that is compatible with the company's goals of accurate performance evaluation, divisional autonomy, and goal congruence.

The opportunity cost approach is recommended as a guide in setting transfer prices. If a perfectly competitive market exists for the intermediate product, the optimal transfer price is the market price. But if not, a negotiated transfer price is best recommended and the opportunity costs is used to establish the upper and the lower limits.

The transfer pricing process is more complex in multinational companies than in domestic companies, as multinational companies have more objectives to be achieved through transfer pricing, and some of these objectives can conflict with one another.

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# Chapter 13

## Capital Budgeting Decisions

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Fadi Alkaraan and Trevor Hopper

### LEARNING OBJECTIVES

After studying this chapter, you should be able to:

1. Appreciate the significance of capital budgeting
2. Recognise the nature and importance of capital investment decisions
3. Identify the four stages of capital budgeting
4. Understand the opportunity cost of an investment, the time value of money, and the difference between compounding and discounting
5. Evaluate capital investment proposals using net present value (NPV), internal rate of return (IRR), payback (PB), and accounting rate of return (ARR) methods, and understand their strengths and weaknesses
6. Use profitability indices to allocate limited funds between projects
7. Identify the impact of tax and inflation on investment cash flows
8. Understand risk and uncertainty and how to deal with risk in investment appraisal
9. Appreciate the importance of non-financial and qualitative factors, and new approaches such as real options



## Introduction

Capital budgeting decisions involve costly long-term investments with profound impacts upon organisations and their long-term performance. Success or failure can hinge on one such decision. Given this, managers must understand investment appraisal techniques. This chapter introduces the capital budgeting process of organisations.

### What is capital budgeting?

Capital budgeting is the decision process relating to long-term capital investment programmes.

Capital investments can commit companies to major courses of action. They can be risky as outlays tend to be large, benefits uncertain and slow to materialise, and they are difficult to reverse. Typical investment decisions include introducing electronic commerce, new product lines, and computerised production processes; acquiring or merging with another company; substantially increasing production capacity; and major research and development plans. These decisions have common characteristics: they lay the basis for future success, commit a substantial proportion of resources to possibly irreversible actions, involve substantial costs and benefits, are permeated with uncertainty, and profoundly impact long-term performance.

Management accountants should direct managerial attention to significant information (Weetman, 1999), and provide analysis and advice but investment decisions also require expertise ranging from, *inter alia*, production and marketing managers, engineers, and the board of directors (Northcott, 1998).

Capital investment decisions commit resources in the hope of receiving benefits in future time periods. Examples are:

- ⇒ British Telecom's investment in the broadband Internet service Open World.
- ⇒ Rio Tinto's investment in exploration projects.
- ⇒ Tomkin's investment in new product lines (air systems components).
- ⇒ AstraZeneca's investment in research and development (R&D) on new drugs.
- ⇒ British Vita's investment to expand in Germany and France.
- ⇒ BMW, General Motors and Toyotas' investments in computer integrated manufacturing.

### Stages of capital budgeting decisions

Figure 1 presents a simplified framework of capital investment decision-making. It assumes decision makers will be economically rational, i.e. they will systematically collect information and carefully evaluate all possible alternatives. However, what executives **actually** do can be different. They may use other

criteria and compare alternatives using heuristics and analytical models separately or together.

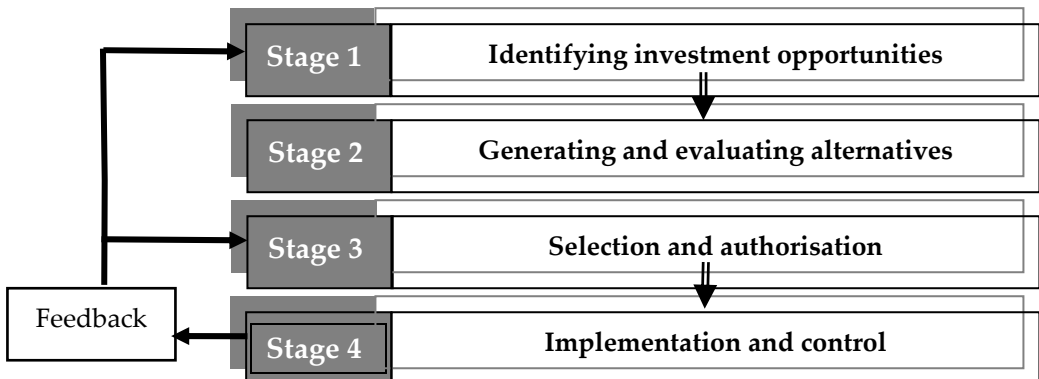
Managers have cognitive limitations – they can only cope with a limited amount of information and are subject to biasing. And they must assess qualitative considerations, interpret data, verify assumptions, and assess knock-on effects of ‘solutions’ - including micro-political ramifications, before making an assessment. They cannot rely exclusively on numerical estimates and expected values of outcomes: a decision problem may represent a unique and poorly understood situation.

Thus investment decision-making does not depend merely on accounting information. Managers with different expertise and information must debate amongst themselves to clarify complex problems and the feasibility of possible solutions. Thus it is unsurprising that empirical research reveals decision makers sometimes use simplified search and evaluation methods (bounded rationality), intuition (garbage can theories), and employ micro-political and power considerations. This is not necessarily irrational. For example, decision-makers who emphasise real-time information may be developing intuition or crosschecking reports based on historical data. However, executives tend to choose projects whose predicted outcomes (benefits) exceed predicted costs by the greatest amount.

#### *Stage 1- Identifying organisational objectives*

Establishing organisational objectives identifies the type of capital expenditure projects a company will pursue. Many businesses seek to maximise profits or, more accurately, their wealth. Traditional economic theory assumes this is their primary goal. However, as such a goal lacks operational detail many organisations prepare mission statements, corporate objectives, strategies, detailed plans, and budgets. Examples of a mission statement are provided in Exhibit 1. Corporate objectives may specify levels of acceptable risk, desired profit levels; obligations to stakeholders (shareholders, employees, customers, local communities etc.), growth targets, and the markets it will operate in.

**Figure 1 Stages of capital budgeting decisions**



Strategic planning formulates how to achieve the objectives. Possible strategies are various; for example, an organisation could increase profits by targeting new products, customers or markets, or by reducing costs through improved productivity and efficiency. Executives from functions such as marketing, customer service, production, and finance usually jointly formulate a strategy subject to board guidelines and their subsequent approval. Management accounting has developed techniques for quantifying business strategies but these are outside the remit of this chapter.

*Exhibit 1*

- At 31 December 2002, Rio Tinto had operating assets of US\$13 billion located in Australasia, North and South America, Indonesia, Africa, and Europe. Their fundamental objective is to maximise long-term returns to shareholders.
- Britax International is an innovative and successful manufacturing and marketing company. Expansion of new distribution channels is an important part of its strategy.
- Tomkins is a global engineering group with market and technical leadership across three businesses: industrial and automotive, air system components, and engineering and construction products. It tries to enhance shareholder value by increasing the economic value of its businesses. This is executed by concentrating on products, regions and sectors with prospects for profitable growth and where the firm has a sustainable competitive advantage.
- Astra Zeneca's strategy is based on R&D and buying intellectual property (they spent \$3.1 billion on R&D in 2002).

*Stage 2- Generating and evaluating alternatives*

Creative searches of strategic options generate capital investment projects consistent with the organisation's objectives. This involves collecting considerable information, which can be time-consuming, particularly when considering entry into new markets or investing in new technology. An environmental analysis may ascertain matters such as market size, competition within the industry, bargaining power of suppliers and customers, and threats of new entrants to the market and substitute products (Louderback et al, 2000). The preliminary analysis of alternative capital investments will estimate their costs and benefits, and their quantitative and qualitative consequences. Management accountants are often responsible for the former.

*Stage 3- Selection and authorisation*

Theoretically, a company wishing to maximise its wealth should accept all investments that exceed its cost of capital. However, this is unlikely because firms have capital constraints, insufficient capacity to evaluate (or know) all alternatives and some options may clash with their objectives. In practice firms

tend to examine a limited range of alternatives, which after preliminary screening are reduced to a smaller set for further, more rigorous evaluation. Managers may have neither the cognitive capacity, nor the time and resources to do more. Formal analysis emphasises financial quantification of predicted outcomes. However, managers can over-rule conclusions of financial analyses due to non-financial and qualitative considerations. Thus, executives combine qualitative intuitive judgement with systematic financial analysis.

For a project to proceed, a capital authorisation request has to be prepared and approved. The hierarchical level that authorises such requests varies according to company size and the nature and cost of the project (see Exhibit 2). Capital expenditure limits using accrual accounting measures are frequently used to grant managers limited discretion over investment decisions. The larger the amount normally the higher the hierarchical level where approval occurs.

In summary, in the early stages of investment decision-making managers are subject to considerable control such as authorisation levels, formal procedures of appraisal, minimum hurdle rates, and designation of strategic growth areas.

*Exhibit 2*

- At Rio Tinto each business unit's managing director can approve capital projects up to \$20 million. Anything above this must go to the Business Evaluation Department for evaluation and approval.
- In Tomkins top managers in each business can approve capital investments up to £3 million without head office approval if they are in the agreed strategic plan of the business. There is a lower limit for unplanned expenditure. Nevertheless, ultimate authority for investment projects rests with top management (the board of directors).
- In Young & Co.'s Brewery any investment over £100,000 needs approval from the board.
- At Huntleigh Technology any significant capital expenditure is subject to a formal capital expenditure authorisation process. Capital investments up to £100,000 within the business plan are delegated to the chief executive and do not require approval by the board of directors.
- In British Vita all investment proposals over £75,000 go to the head office. All acquisitions must be approved by the main board.

*Stage 4- Implementation and control*

Companies should evaluate whether capital investments are meeting plans once implemented. Following approval, expenditure on investment projects is built into capital and operating budgets to monitor actual expenditure against that planned. Post-decision monitoring and control may include a post-investment audit that compares actual results with predictions made when the project was selected. However, empirical research reveals that this is not universal practice, possibly because managers believe revisiting irreversible decisions serves little

function. On the other hand it checks managers' predictive accuracy, discourages biasing, may improve subsequent evaluations by learning more about the scale and location of deviations, and can reinforce accountability.

### Capital investment appraisal techniques

The main methods to financially evaluate investments are net present value (NPV), the internal rate of return (IRR), the payback rule (PB), and accounting rates of return (ARR). To simplify their introduction, it is assumed that cash flows are known with certainty, sufficient funds are available to undertake all profitable investments, and there are no taxes or inflation.

#### *Activity*

At a meeting of the board of directors of X plc Trevor said: *'We must make sure that the cash flows of any project we invest in recoup the investment quickly and give us a profit so we can invest in the next project'*. A second executive Helen replied, *'It's fine to talk about cash flows but the outside world judges our success by our profits. We should select the project that maximises the return on assets invested'*. A third executive Stuart countered, *'I agree with Trevor about the cash flows but I want to be sure that we cover interest charges to HSBC bank on the money we borrowed to finance the project. The cash flows should exceed the total cost of borrowing so we have funds for further investments or to increase dividends to shareholders'*. The managing director Bob joined in saying *'We shouldn't take on projects that don't fit with our competitive strategy regardless of whether they show a financial return'*.

All the executives seek cash flows from the project but Trevor is emphasising their speed whereas Helen wants to convert them into accounting accrual profits shown in the financial accounts. Stuart is concerned about total cash flows and whether they provide a surplus, whilst Bob is more concerned about corporate strategy.

Which of these executives do you think has the most desirable approach and why?\*

\* Question adapted from Weetman, 1999, p.719.

### Net present value

NPV requires an appropriate interest rate to discount future cash flows to their equivalent present value. This rate is known as the opportunity cost of an investment. Finance theory demonstrates that required returns on investments are a positive function of their risk - the higher the risk, the higher the rate.

**Opportunity cost of an investment:** Investors wishing to avoid risk can invest in government securities with a fixed return and virtual certainty of being fully repaid upon maturity. On the other hand, they may prefer to invest in risky securities such as company ordinary shares quoted on the stock exchange. If so, they will discover that returns can vary annually and share prices fluctuate

according to the performance of the company and future expectations. Investors normally prefer to avoid risk and choose risky securities only if they yield returns that compensate for increased risk. For example, if government securities yield 10% then investors might invest in ordinary shares only if say returns are 15%. The greater the risk, the greater the expected returns.

Rates of return from investments in securities in financial markets represent the **opportunity cost of an investment**: i.e., cash invested in a capital project that cannot be invested elsewhere – the returns foregone are a cost of that investment. Thus companies should choose projects with returns above the opportunity cost of the investment, which is also known as the **minimum required rate of return, discount rate, and hurdle rate**.

Returns on a capital investment should be compared with investments in securities traded on financial markets of equal risk. This is done by **discounted cash flow (DCF)**. Discounting is the opposite of **compounding interest**.

**Compounding and Discounting:** Suppose you invest \$1,000 in a risk-free security yielding 10% payable at each year-end. If the interest is reinvested, your investment will accumulate to \$1,331 by the end of year 3. Thus \$1,210 received at the end of year 2 is worth \$1,100 received at the end of year 1, for it can be invested at 10% to return \$110. Similarly, \$1,331 received at the end of year 3 is equivalent to \$1,210 received at the end of year 2, since \$1,210 can be invested at the end of year 2 to accumulate to \$1,331.

$$FV_n = V_0(1 + K)^n \quad (1)$$

These calculations are represented in the above formula.  $FV_n$  denotes the future value of an investment in  $n$  years,  $V_0$  denotes the amount invested at the beginning of the period,  $K$  denotes the investment's rate of return, and  $n$  denotes how many years the money is invested for. Thus the future value of the investment above in 3 years time is  $\$1,331 = \$1,000(1 + 0.10)^3$ . This calculation is illustrated below.

**The value of \$ 1000 000 invested at 10 % compounded annually for three years.**

End of year	Interest earned (\$)	Total investment (\$)
0		1,000
	0.10 x 1,000	<u>100</u>
1		1,100
	0.10 x 1,100 000	<u>110</u>
2		1,210
	0.10 x 1210 000	<u>121</u>
3		1,331

Converting cash received in the future to today’s value using an interest rate is termed **discounting** and the result the **discounted present value**.

Compounding estimates the value of an investment in future years, whereas discounting reduces the value of future cash flows to the present. Equation (1) for compounding can be rearranged to give the present value formula below.

$$\text{(Present value)} \quad V_0 = \frac{FV_n}{(1 + K)^n}$$

Using this equation, the calculation for \$1,210 received at the end of year 2 can be expressed as  $V_0 = \frac{\$1,210}{(1 + 0.10)^2} = \$1,000$ .

You should now realise that \$1 received today is not equal to \$1 received a year later, for one year on an investor can have the original \$1 plus one year’s interest. For example, if the interest rate is 10%, each \$1 invested now will yield \$1.10 a year from now, i.e. \$1 received today is equal to \$1.10 one year from today given 10% interest. Conversely, \$1 one year from today is equal to \$ 0.9091 now because its present value of \$0.9091 plus 10 % interest for one year amounts to \$1. The concept of that \$1 received in the future not being equal to \$1 received today is known as the **time value of money**.

**Definition**

The present value ( $V_0$ ) of \$1 receivable at the end of ( $n$ ) years when the rate of return is ( $K$ ) per cent per annum equals:

$$V_0 = \frac{FV_n}{(1 + K)^n}$$

The process of calculating present value is called discounting and the interest used is the discount rate.

Determining whether a project yields a return in excess of the alternative equal risk investment in traded securities is done by NPV. This calculates the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present time using the required rate of return. The required return represents what the organisation could receive for an investment of comparable risk. The NPV rule can be expressed as:

$$NPV = \frac{FV_1}{(1 + K)} + \frac{FV_2}{(1 + K)^2} + \frac{FV_3}{(1 + K)^3} + \dots + \frac{FV_n}{(1 + K)^n} - I_0$$

Here  $I_0$  represents the investment outlay and  $FV$  represents the future values received in years 1 to  $n$ . The rate of return  $K$  is the return available on a security in financial markets of equivalent risk. Only projects with a positive NPV are acceptable, as their returns exceed the cost of capital (the return from investing elsewhere). All other things being equal, decision-makers prefer projects with higher NPVs.

**Example (1)** Executives in X Plc are evaluating two projects with an expected life of three years and an investment outlay of \$500,000. The estimated net cash inflows are:

	Project A (\$)	Project B (\$)
Year 1	150,000	300,000
Year 2	500,000	300,000
Year 3	200,000	300,000

The opportunity cost of capital for both projects is 10%. A calculation of the NPV of each project is required.

The NPV calculation for Project A is:

$$NPV = \frac{\$150,000}{(1.10)} + \frac{\$500,000}{(1.10)^2} + \frac{\$200,000}{(1.10)^3} - \$500,000 = +\$199,850$$

Alternatively, the NPV can be calculated by using published tables of present values (an example is in Appendix A). The relevant discount factors are found by referring to the year the cash flows occur and the appropriate interest rate. For example, if you refer to year 1 in Appendix A, and the 10% column, this shows a discount factor of 0.9091. For years 2 and 3 the discount factors are 0.8264 and 0.7513. The present value of cash flows is obtained by multiplying the cash flows by the relevant discount factor. The calculation is as follows:

<b>Year</b>	<b>Amount (\$)</b>	<b>x</b>	<b>Discount factor</b>	<b>=</b>	<b>Present value (\$)</b>
1	150,000	x	0.9091	=	136,365
2	500,000	x	0.8264	=	413,200
3	200,000	x	0.7513	=	<u>150,260</u>
					699,825
			Less initial outlay		<u>500,000</u>
			Net present value		<u>199,825</u>

Now the NPV for project B will be calculated. When annual cash flows are constant, the calculation of present value is simplified. The relevant discount factors in Appendix B reveal that the discount factor for 10 % for three years is 2.487. The total present value for the project is calculated by multiplying the annual cash inflow by the discount factor (see below). It is important to note that Appendix B can only be used when annual cash flows are identical.

<b>Annual cash inflow</b>	<b>x</b>	<b>Discount factor</b>	<b>=</b>	<b>Present value (\$)</b>
↓		↓		↓
\$ 300,000	x	2.487	=	<u>746,100</u>
			Less initial outlay	<u>500,000</u>
			Net present value	<u>246,100</u>



An organisation seeking to maximise its owners' wealth should accept any project with a positive NPV. If finance markets are working efficiently, funds will always be available for projects that meet or exceed their cost of capital. Project B has the highest NPV but both projects (A and B) are acceptable as both have a positive NPV.

### Definition

The NPV of a project equals the present value of cash inflows minus the investment outlay. The NPV decision rule is:

- ⇒ When the NPV is positive - accept.
- ⇒ When the NPV is zero, the project meets the cost of capital but yields no surplus to owners - indifference.
- ⇒ When the NPV is negative - reject.
- ⇒ The major problem is selecting an appropriate discount rate. This is crucial to the outcome of NPV analysis as it determines the relative values of cash flows in different time periods. A common criticism is that firms unrealistically assume a fixed/uniform discount rate over time.

### *Internal rate of return (IRR)*

The internal rate of return (IRR) (sometimes called the **time-adjusted rate of return**) incorporates the time value of money but expresses the answer as a percentage return. The IRR is the discount rate that equates the present value of cash inflows from a project to the present value of its cash outflows, i.e. IRR is the discount rate that produces a NPV of zero. Nowadays most practitioners have a calculator or computer programmed to give the IRR, otherwise the answer has to be calculated by trial-and-error.

### Definition

IRR is the discount rate that equals the present value of cash flows inflows to the present value of the capital invested (cash outflows), i.e. NPV is zero. IRR decision rules are:

- ⇒ When the IRR exceeds the cost of capital - accept.
- ⇒ When the IRR equals the cost of capital, the project meets the cost of capital but yields no surplus - indifference.
- ⇒ When the IRR is less than the cost of capital - reject.
- ⇒ As with NPV, sources of cash flows and the accounting treatment of income and expenditure flows are irrelevant to IRR calculations. IRR has a high sensitivity to errors in forecasted cash flows.

NPV and IRR are the two main **discounted cash flow (DCF)** methods. Both measure cash inflows and outflows of projects and compare them as if occurring at a single point in time. DCF methods are theoretically superior to other techniques because they recognise the time value of money and that investments

have an opportunity cost foregone. DCF focuses on cash flows rather than on operating profits and asset valuation of accrual accounting.

### *Payback*

Payback is the simplest and most frequently used investment appraisal method. It measures the time taken to recoup the net initial investment. It is calculated by dividing the total initial cash outlay by the expected annual cash proceeds.

**Example (2):** Executives of X Plc are evaluating three projects. The cash flow calculations for each are below. Their payback period is calculated thus:

	Project A		Project B		Project C	
Initial cost (\$)		100,000		100,000		100,000
Net cash inflows (\$)						
Year 1	20,000		20,000		20,000	
Year 2	40,000		20,000		40,000	
Year 3	40,000		20,000		40,000	
Year 4	40,000		40,000		7,000	
Year 5	20,000		60,000		7,000	
Year 6	-		60,000		7,000	
Year 7	-		60,000		7,000	
NPV at 10 % cost of capital		21,031		78,973		(-2,036)

Here, project A repays its initial investment in three years whereas project B takes four. Using payback speed as the criterion, project A is preferable. There are obvious deficiencies in these calculations: payback ignores cash flows after the payback date and the timing of proceeds earned prior to payback, and it can result in projects with a negative NPV being accepted. Consider project C with a payback of three years. If this met the time criteria of management it would be accepted despite its negative NPV. Note also that payback ranks project C over project B despite B yielding a positive NPV.

### **Definition**

The payback method measures the time to recoup, in the form of net cash inflows, the net initial investment in a project. Its major deficiencies are:

- ⇒ It ignores cash flows after the payback period.
- ⇒ It ignores the time value of money.

Like NPV and IRR, PB does not distinguish between sources of cash inflows. For example, they could be from operations, disposal of equipment, or recovery of working capital.

*Accounting rate of return*

The accounting rate of return (ARR) is also known as **return on investment** and **return on capital employed**. ARR is an accounting accrual measure of income divided by an accounting accrual measure of investment. Projects with an ARR in excess of that required are considered desirable. Executives using ARR prefer projects with higher rather than lower ARR other things being equal. It differs from other methods as profits not cash flows are used to measure investment returns. However, accounting profits include adjustments that are not cash flows and thus have no direct impact on investors' wealth, such as depreciation and gains and losses on fixed asset sales. Financial accounting profit does not equal cash flows because it is based on the accruals concept.

If depreciation is the only non-cash expense, then profit is equivalent to cash flows less depreciation. For example, the three projects in Example (2) required an initial outlay of \$100,000. The average investment figure used in ARR calculations varies according to depreciation methods employed. If straight-line depreciation is used (which assumes the investment will decline by an equal (linear) amount each year of the estimated life of the asset) then the average investment, assuming no scrap value, is one-half of the initial investment, i.e. \$50,000. The average profit is calculated as total profits (cash flow plus depreciation) divided by the years the project lasts. This is \$60,000 divided by five years for A, i.e. \$12,000; \$180,000 divided by seven years for B, i.e. \$25,750; and \$28,000 divided by seven years for C, i.e. \$4,000. The calculation of the ARR for each project is:

$$\text{Project A} = \frac{12,000}{50,000} = 24\% \quad \text{Project B} = \frac{25,750}{50,000} = 51\% \quad \text{Project C} = \frac{4,000}{50,000} = 8\%$$

ARR is superior to payback as it recognises different useful lives of assets under comparison. For example, the above calculations capture the high earnings of project B over all of its life, thus it is ranked over A and C. Also, projects A and C have the same payback but ARR indicates that A, the profitable project, is preferable.

**Definition**

The ARR is an accounting measure of income divided by an accounting measure of investment. It differs from other methods as profits rather than cash flows are used to measure returns. It is also known as **return on investment** and **return on capital employed**. Projects with an ARR exceeding the required accounting return are deemed desirable.

ARR ignores the time value of money. When it compares two projects with identical average cash inflows but which occur at different times, it will show the same ARR.

### Which methods are used in practice?

Research conclusions on the extent each capital budgeting technique is used in practice are not unanimous. Often they depend on when the research was conducted, the questions asked, research scales used, the size of the companies, the sample, and the location of the research. Table 1 illustrates the frequency particular capital-budgeting methods are used in Australia, Canada, USA, UK and Belgium according to surveys.

#### International comparison of capital budgeting techniques

	Australia†	Canada††	USA*	UK ^	Belgium **
<b>NPV</b>	45%	41%	74.93%	99%	60%
<b>IRR</b>	37%	62%	75.61%	89%	77%
<b>PB</b>	61%	50%	56.74%	96%	50%
<b>ARR</b>	24%	17%	20.29%	60%	65%

† cited in Horngren et al (2002)

† † Jog and Srivastava (1994), cited in Horngren *et al* (2000)

\*Graham and Harvey (2001), the companies in their sample range from very small to very large.

^ Alkaraan (2004), large UK companies.

\*\* Dardenne (1998), cited in Drury (2002)

The reported percentages exceed 100% because many companies use more than one technique. For example, 98% of large UK companies used more than one method and 88% used three or more. Because NPV calculations are beset with uncertainty associated with predictions, astute executives typically use multiple criteria and methods to check the reliability of data.

Sophisticated DCF methods (NPV, IRR) are used more than the unsophisticated method of ARR. However, despite its theoretical limitations payback is widely used, especially when a firm has liquidity problems and needs quick repayment of investments, and for risky investments in uncertain markets - say subject to rapid design and product changes - or when future cash flows are unpredictable. Risk is time related: the longer the time period, the greater the chance of failure. Hence payback is used as a rough proxy of risk. Managers may also choose projects that payback quickly because of self-interest. If performance is evaluated by short-term criteria, such as net profits, managers may select projects with quick paybacks to boost short-run net profits.

Payback is often used in conjunction with NPV or IRR for payback is easily understood and provides an important summary measure - how quickly the project will recover its initial outlay. Ideally, payback should be used in conjunction with NPV and be calculated using cash flows discounted before payback.

ARR is also widely used possibly because the annual ARR is often used to evaluate (and reward) managers of business units. Hence managers are concerned with the impact of new investments on ARR (Drury, 2003).

### Mutually exclusive projects

**Capital rationing and NPV:** Executives frequently work within limited capital budgets. Exhibit 2 outlines a problem of using NPV when there is a capital constraint. The executives of X Plc can choose one of two mutually exclusive projects - A or B. The profitability index is helpful here because it identifies the project that generates most money from the limited capital available. The index is calculated by dividing the total present value of future net cash inflows by the total present value of the project's initial cost. Using this index, project B is preferable because its profitability index of 1.4% is higher than that of project A. However, if the initial costs of projects differ then the absolute NPV must also be considered. Profitability index analysis assumes other factors like risk and alternative use of funds, are equal, i.e. choosing project A or B has no effect on other projects planned. This is often not so, hence the profitability index may not indicate the optimal investment.

#### Exhibit 2: Capital rationing and NPV

	Project A	Project B
Initial cost	\$150,000	\$50,000
Present value @ 10 % cost of capital	\$195,000	\$70,000
NPV	\$45,000	\$20,000
Profitability index	1.3%	1.4%

**Choosing between NPV and IRR criteria:** NPV and IRR applied to a single project will give identical solutions as both discount the same cash flows. However, executives may have to choose between mutually exclusive projects, e.g. there may be insufficient production capacity to do all. In Exhibit 3 the executives of X Plc must decide between project C or D.

#### Exhibit 3: NPV and IRR for two mutually exclusive projects

	Project C		Project D	
Initial cost		120,000		120,000
Net cash inflows				
Year 1	12,000		96,000	
Year 2	60,000		48,000	
Year 3	108,000		12,000	
NPV at 12 % cost of		15,419		12,521

capital				
NPV ranking		1		2
IRR		17.6%		20.2%
IRR ranking		2		1

When mutually exclusive projects have unequal lives or unequal investments, IRR can rank projects differently from NPV. In Exhibit 3 the NPV ranking favours project C, whereas the IRR ranking favours D. Both projects are acceptable because they have a positive NPV. The ideal would be to undertake both projects but this is impossible. NPV and IRR can give different results because NPV assumes that proceeds are reinvested at the company's required rate of return, whereas IRR assumes they are reinvested at the rate of return of the project with the shortest life. Readers should refer to a corporate finance textbook for guidance on ranking projects with unequal investments or unequal lives.

### Taxation and investment decisions

Income taxes can change the relative desirability of projects. Companies rarely pay taxes based on published profits, as expenses in published accounts may not be deductible for taxation purposes, for example depreciation calculations are not allowable. Instead taxation legislation provides capital (writing-down) allowances on plant and machinery purchases, and other fixed assets. Capital allowances vary across countries and type of asset. In the example below, X plc can claim annual capital allowances of 25% on the written-down value of plant and equipment costing \$20,000 based on the reducing balance method of depreciation (as in the UK). The assets generate net revenues (before depreciation) of \$15,000 per year and the corporate tax rate is 40%. In year 1 the taxable profit is \$10,000 [ $\$15,000 - (\$20,000 \times 25\%)$ ] rather than \$15,000, i.e. the tax is \$4,000 ( $\$10,000 \times 40\%$ ) instead of \$6,000 ( $\$15,000 \times 40\%$ ). If the company applies a 10% straight-line depreciation method (an equal amount of depreciation in each of the 10 years assumed life of the assets) then profits in the accounts at the end of year 1 will be \$13,000 ( $\$15,000 - \$2,000$ ). Similar calculations apply in subsequent years. The timing of tax payments is relevant for it affects cash flows, e.g. in the UK tax payments normally occur one year after the end of a company's accounting year.

Year	Written-down value (opening)	25% allowance	Written-down value (closing)
0-1	\$20,000	\$5,000	\$15,000
2	\$15,000	\$3,750	\$11,250
3	\$11,250	\$2,812.5	\$8,437.5

### Inflation and investment decisions

Inflation is the decline in the value of the monetary unit (the dollar in Australia, the franc in France, or the pound in the UK). Annual inflation rates vary over time and across countries. Capital budgeting must recognise differences between the **real** rate of return (that required to cover the rate of return and investment risk) and the **nominal** rate of return (that required to cover the rate of return, investment risk and anticipated decline in money value due to inflation). This is illustrated below.

The real rate of return for an investment project at X plc is 15% and the expected inflation rate is 5%. Thus:

$$\text{The nominal rate} = (1 + \text{real rate}) (1 + \text{inflation rate}) - 1 = (1 + 0.15) (1 + 0.05) - 1 = 0.21$$

The real rate of return can be expressed in terms of the nominal rate as follows:

$$\text{Real rate} = [(1 + \text{nominal rate}) / (1 + \text{inflation rate})] - 1 = [(1.21) / (1.05)] - 1 = 0.15$$

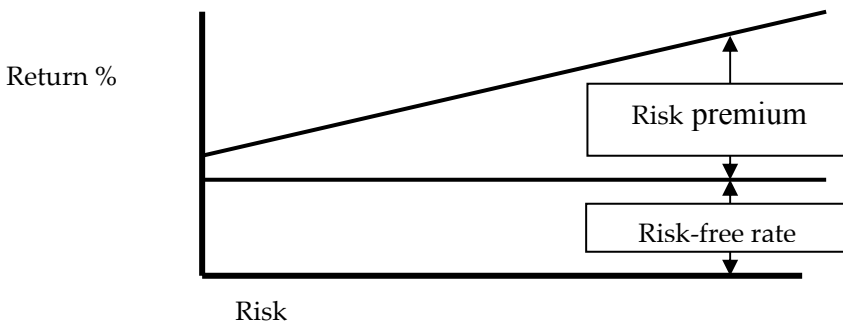
Note that the nominal rate is higher than the real rate.

Capital budgeting deals with inflation by discounting cash flows expressed in current monetary values at the nominal rate or, if inflation is expected to vary over time, by discounting cash flows adjusted for differential inflation rates by the real rate of return.

### Dealing with risk in investment appraisal

Risk is an important for investment decisions given their long time scales and their size. Risk here refers to the degree of uncertainty the decision-maker attaches to predicted cash flows from an investment. Uncertainty is inherent in organisational life. Decision-makers virtually never have access to all relevant information, nor can they generate all possible alternatives and accurately anticipate all consequences. This has brought risk analysis and management science techniques that supplement present value based decision models to the fore.

The logical reaction to a risky project is to demand a higher rate of return, which is supported theoretically and empirically. Relationships between risk and return are illustrated below



**Figure 2 Relationship between risk and return**

Risk handling methods fall into two categories, simple risk-adjustment methods (deterministic assessments and intuitive adjustments, i.e. raised discount rates or shortened required payback periods) or risk analysis derived from management science. The latter calculates uncertainties of significant variables by allocating probabilities to possible outcomes using methods such as sensitivity analysis, probability analysis, simulation, and capital asset pricing models. Executives often use at least one of the following methods to deal with risk:

**Vary the required payback period:** The higher the risk, the shorter the required payback time.

**Adjust the required rate of return:** Demand a higher rate of return when risk is higher, i.e. demand a risk premium. The risk premium is added to a risk-free rate of return (normally based on the rate of return from government securities) to derive the total return required.

**Adjust estimated future cash inflows:** (Also called the certainty equivalent approach). Reduce the predicted cash inflows of risky projects, e.g. very high-risk projects by say 25%, high-risk projects by 20% and average risk projects by 10%.

**Sensitivity analysis:** This widely used technique assesses risk by examining what happens if key assumptions of investment projects are changed. In practice, key factors affecting the sensitivity of NPV calculations vary but they frequently involve factors such as sales price, annual sales volume, project life, financing cost, operating costs, and initial outlay. The disadvantage of sensitivity analysis is that it gives no clear decision rules for accepting or rejecting a project - executives must use their judgement. Also, often only one input is considered at a time, while the rest are held constant, but in practice more than one input value may differ from the best estimates. Simultaneous changes to several inputs can be examined using spreadsheet models.

**Estimating the probability distribution of future cash flows for each project.** Assigning probabilities to different possible cash flow outcomes can help assess risks of a project and enable decision makers appreciate the uncertainties they face.

### ***Beyond capital budgeting***

Capital budgeting focuses on quantitative financial analysis. Academicians and practitioners agree that models analysing cash flows are a sound approach to investment decisions. However, these approaches have been criticized, especially for their narrow perspective, exclusion of non-financial benefits, and overemphasis on the short-term. Some researchers argue that the emphasis on the DCF techniques of NPV and IRR hampers important organisational innovations, especially within manufacturing. They argue that high discount rates and short payback targets penalise Advanced Manufacturing Technology (AMT) investments. This is not a problem if calculations are sound, and the rule that companies should invest whenever the rate of return is higher than the cost of capital is maintained. However, there is evidence that firms do not invest until the rate rises substantially higher than the cost of capital. Raising discount rates randomly may penalise investments such as R&D with long-term benefits.



Moreover, not all investment projects can be fully represented in monetary terms. Non-financial factors may be important. Financial decision models may ignore intangible benefits and thus may be inadequate for evaluating investments like AMT. Conventional investment appraisal techniques identify a specific outlay and cash flows attributable to it but this may be difficult for a firm deciding to invest in Computer Integrated Manufacturing (CIM) technology (Exhibit 3). In CIM plants, computers automatically set up and run equipment, monitor the product, and directly control processes to ensure high-quality output. It is difficult to predict costs and revenues associated with the benefits of CIM. Faster response times, higher product quality, and greater manufacturing flexibility to meet changing customer preferences aim to increase revenue and contribution margins, and gain competitive and revenue advantages that are often difficult to quantify financially. Also, the *status quo* may not be an option if competitors are making similar innovations. Difficulties in predicting benefits and costs arise in other investments with long-time horizons, e.g. R&D projects and oil exploration (Horngren et al, 2002).

Thus capital budgeting techniques can have less influence on investment decisions than strategic considerations. Investment decisions are not always determined by financial evaluations. Sometimes the latter are used merely to provide *post hoc* quantitative support for a particular decision, i.e. post-decision confirmation or rationalisation. Non-financial criteria such as product quality, fit with business strategy, and the competitive position of the firm can be more influential upon investment decision-making. Whilst financial analysis is important, qualitative intuitive judgement is also crucial (Butler et al, 1993). Ignoring either can render decision-making less effective.

### **Exhibit 3: Examples of financial / non-financial outcomes of CIM investment**

➤ **Examples of financial outcomes:**

- ⇒ Lower direct labour costs
- ⇒ Less scrap and rework
- ⇒ Lower stock costs
- ⇒ Increase in software and related costs

**Examples of non-financial and qualitative outcomes:**

- ⇒ Reduction in manufacturing cycle time
- ⇒ Increase in manufacturing flexibility
- ⇒ Reduction in product development time
- ⇒ Faster response to market changes
- ⇒ Improved competitive position in the industry

The real options approach is an interesting innovation that addresses uncertainty. This discounts cash flows after considering options like waiting before investing or abandoning the investment temporarily depending on certain

outcomes, or even integrating future investment possibilities that are contingent on different current investment options (see Dixit and Pindyck, 1994). A real options approach focuses on value enhancement and integrates strategic considerations systematically into capital budgeting. Its basic principle is to conceive future investment opportunities as a 'growth option', analogous to a call option on securities. It may transform strategic investment decision-making because it enables decisions under uncertainty to be made flexibly and it focuses on total risk of investments. In contrast, conventional investment appraisal techniques only work well when there are no options or there are options but little uncertainty. MacDougall and Pike (2003, p.2) define strategic options as "opportunities latent in an investment, which, if exercised, enhance competitive advantage". They offer as examples "the option to take advantage of changes in consumer demand, respond to or curtail competitors' actions or to make subsequent, contingent investments which add potential and value to the initial investment". There is growing academic interest in using real options to guide capital budgeting and strategic decisions in dynamic environments. It should be seen not merely as a new investment appraisal technique but as a management process (Trigeorgis, 1999).

However, its use for analysing strategic investment decisions is relatively new and, despite a growing body of knowledge associated with real options, much of this work remains confined to academia. Questionnaire surveys (e.g. Busby and Pitts, 1998; Alkaraan, 2004) show executives in large UK companies were often unaware of the term 'real options' or associated academic research, and they claimed it must be more accessible to managers to be used. Pinches (1998) and Dempsey (2000) acknowledge dramatic advances in real options approaches but many challenges remain in its practical application to capital investment decisions. Nevertheless, whilst the application of real options remains in its infancy it has the potential to bridge conventional quantitative capital budgeting and qualitative approaches to strategic investment decisions.

## Summary

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This chapter has noted that:

Capital budgeting involves long-term planning of proposed capital projects. It is a four-stage process involving: identification, generation and evaluation of alternatives, selection and authorisation, and implementation and control.

Capital investment decisions are vitally important because they involve commitments of large sums of money that can affect the entire future of the business. Evaluating such decisions entails determining investment outlays and the resulting cash flows.

\$1 received today can be invested to earn a return (e.g. interest), so it is worth more than \$1 received tomorrow. The time value of money (the opportunity cost or return foregone) takes this into account.

The assumed objective of capital investment appraisal is to maximize shareholder wealth. This is achieved by accepting all projects that yield positive net present values.

Discounted cash flow (DCF) methods include project cash flows and the time value of money in capital budgeting decisions. The two major DCF methods are net present value (NPV) and internal rate of return (IRR). NPV calculates the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present using the required rate of return. All projects with a positive NPV are acceptable. IRR calculates the rate of return (discount rate) that equalises the present value of expected cash inflows from a project with the present value of its initial expected cash outflows. A project is acceptable if its IRR exceeds the required rate of return.

Payback (PB) and accounting rate of return (ARR) methods are frequently used in practice. PB is the period, usually expressed in years, for a proposal's net cash inflows to equal its initial cost. PB neglects profitability. The ARR is operating profit divided by an accrual accounting measure of investment. IRR considers profitability but like PB it ignores the time value of money. Thus both are theoretically unsound.

Mutually exclusive projects create a special problem. The profitability index is useful when allocating limited funds. It is the total present value of future net cash inflows of a project divided by the total present value of the net initial investment. The company's available funds and alternative investment opportunities should be considered rather than relying on a single capital budgeting technique.

The higher the risk, the higher the rate of return required. Approaches to recognising risk in capital-budgeting decisions include: reducing the required payback time, increasing the required rate of return, adjusting estimated cash inflows, performing sensitivity analysis, and estimating probability distributions of future cash flows.

The use of non-financial indicators within management information systems has increased in recent years. Finance-based models such as NPV and IRR may ignore important intangible benefits and may be inadequate for evaluating investments involving non-financial, qualitative and strategic factors.

The real options approach focuses on value enhancement and integrates strategic considerations systematically in capital budgeting.

Decision outcomes are rarely based exclusively on signals computed by financial analyses. Intuition and judgement based on experience play a major role in decision-making. Executives adopt 'holistic' approaches incorporating financial and strategic considerations. They are not just technocrats anchored to financial calculations.

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**Appendix A: Present value factors**

The table gives the present value of a single payment received  $n$  years in the future discounted at  $(X)\%$  per year. For example:

With a discount rate of 10% a single payment of \$1 in one year time has a present value of \$0.9091. For years 2 and 3 the discount factors are \$0.8264 and \$0.7513

With a discount rate of 8% a single payment of \$1 in five year time has a present value of \$0.6806

Years	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923
26	0.7720	0.5976	0.4637	0.3607	0.2812	0.2198	0.1722	0.1352	0.1064	0.0839
27	0.7644	0.5859	0.4502	0.3468	0.2678	0.2074	0.1609	0.1252	0.0976	0.0763
28	0.7568	0.5744	0.4371	0.3335	0.2551	0.1956	0.1504	0.1159	0.0895	0.0693
29	0.7493	0.5631	0.4243	0.3207	0.2429	0.1846	0.1406	0.1073	0.0822	0.0630
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0094	0.0754	0.0573
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221
45	0.6391	0.4102	0.2644	0.1712	0.1113	0.0727	0.0476	0.0313	0.0207	0.0137
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085

## Appendix B: Present value factors

The table gives the present value of  $n$  annual payments of \$1 received for the next  $n$  years with a constant discount of (X) % per year. For example:

- With a discount rate of 10 % and with three annual payments of \$1, the present value is \$2.487
- With a discount rate of 8 % and with seven annual payments of \$1, the present value is \$5.206

Years 0 to:	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201
19	17.226	15.678	14.324	13.134	12.085	11.185	10.336	9.604	8.950	8.365
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.292	8.649
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.442	8.772
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.580	8.883
24	21.243	18.914	16.939	15.247	13.799	12.550	11.469	10.529	9.707	8.985
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077
26	22.795	20.121	17.877	15.983	13.375	13.003	11.826	10.810	9.929	9.161
27	23.560	20.707	18.327	16.330	14.643	13.211	11.987	10.935	10.027	9.237
28	24.316	21.281	18.764	16.663	13.898	13.406	12.137	11.051	10.116	9.307
29	25.066	21.844	19.188	16.984	15.141	13.591	12.278	11.158	10.198	9.370
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.644
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.779
45	36.095	29.490	24.519	20.720	17.774	15.456	13.606	12.108	10.881	9.863
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.915



## **PART 6**

### Corporate Financial Management and Ethical Finance

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- Chapter 14 The evolution of corporate investment decisions: A multidisciplinary perspective  
By Michael J Dempsey
- Chapter 15 Corporate financial management: time to change the cost of capital paradigm  
By Michael J Dempsey
- Chapter 16 Ethical finance: an agenda for consolidation or radical change?  
By Ratnam Alagiah, Michael J Dempsey and Zahirul Hoque





## Chapter 14

### The Evolution of Corporate Investment Decision Making: A Multidisciplinary Perspective

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Michael J. Dempsey

#### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

1. Understand how our understanding of corporate investment decision-making has evolved over the last fifty years from prescriptive insights based on experience, to the various modes of enquiry encapsulated here as “strategic management”, “management accounting” and “financial” perspectives
2. Understand that “strategic management”, “management accounting” and “financial” perspectives of the firm’s investment policies together encompass a wide range of concerns – from a concern for the key strategic investment decisions that are likely to be consistent with the firm’s niche in the market place (strategic management), to a concern for how the firm’s financial resources are allocated in practice via the mechanism of capital budgeting systems - both formal and informal (management accounting), to a concern for the implications of the firm’s investment decisions in the financial markets (financial)
3. Understand that “strategic”, “management” and “financial” perspectives of the firm’s investment policies are likely to reflect different and contrasting “modes of enquiry” – from a qualitative-strategic approach (strategic management) to case study observations (management accounting), to quantitative cost of capital analyses (financial)

## Introduction

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This chapter offers a multidisciplinary perspective on the evolution of corporate investment decision-making theory and practice since the middle of the 20th century. To this end, perspectives from across the Strategic Management, Management Accounting and Finance, disciplines are developed. The particular contribution of insights to corporate investment decision-making from each discipline is thereby highlighted. The chapter emphasizes recent development in the area of corporate investment decision-making and concludes that the distinctive perspectives and modes of enquiry as encapsulated in the above disciplines are necessary to the continued advancement of our understanding.

A firm defines its productive identity by its investment choices. In the early 1900s, the study of such investment choices was dependent on writers who were content to articulate their experiences of institutional arrangements and industrial investment. From the 1950s, however, the emerging belief in Management Science stimulated a perceived need for a more theoretically rigorous approach. In such context, corporate investment decision-making began to be addressed more cogently across distinctive Finance, Management Accounting and Strategic Management literatures.

Distinctive approaches to the issue of understanding and improving investment decision-making processes have consequently been advanced across these disciplines. Thus, we can characterize contributions that have emphasized an economic theoretical perspective (finance), case study observations in an attempt to describe resource allocation behaviour (management accounting), and empirical field-based observations of the characteristics of success in an attempt to develop a qualitative-strategic approach to investment decision-making (strategic management). We might say that finance research specializes in the attempt to understand investment decision-making in terms of the workings of a micro-economic cost of capital (the “god in the machine”), management accounting research often specializes in documenting how capital appears to get allocated throughout the firm in practice via the mechanism of the firm’s capital budgeting systems (both formal and informal), while strategic management research focuses on identification of the key strategic investment decisions that are consistent with the firm’s niche in the market place.

More recently, the positive economic foundations of financial investment – for example, the capital asset pricing model – have been challenged. Furthermore, a number of chapters have been forthcoming under the heading of “behavioural finance”, wherein market forces are the ultimate outcome of individual and distinctly “human” psychology, behaviour and attitudes. Such a foundation hypothesis would mark a departure from the Modigliani and Miller framework of “rational economic man” to a framework which accommodates “irrational man”. It might therefore be reckoned that we are at an opportune time to reflect on the various contributions to our understanding of corporate investment activity as they have been advanced from the mid 1900s.

In order to synthesize these different perspectives on investment decision-making, the remainder of the chapter is arranged as follows. In the next section, I consider the prevailing approach to corporate investment decision-making as it existed prior to the advent of the economic equilibrium conditions of Modigliani and Miller in the late 1950s. The subsequent section assesses the trend of contributions as they derived from the Modigliani and Miller foundation in the domain of Finance. The two subsequent sections assess the parallel contributions to corporate investment decision-making as revealed in both the Management Accounting and Strategic Management literatures. The penultimate section considers more recent developments across the disciplines, as well as the potential for integration across our understandings from these disciplines, before the final section concludes the chapter.

### Corporate Investment Decision Making prior to the 1950s

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Since the early 1800s, accounting systems have been used to monitor the consequences of investment decisions and to report results of operations to interested parties. From the 1950s, however, they began to be used more extensively to control investment decision-making actively (Johnson, 1994). Prior to this time, managers were more likely to believe that their *experience* must recognize the well-run *processes* combined with satisfied customers which would make their companies competitive and profitable. Although these managers would not generally have used discounting appraisal methods in their investment decision-making, the concept of, and the mathematical apparatus for Net Present Value calculations were nevertheless familiar to textbook writers by this time. For example, Fisher's (1930) standard economic text considers the choice between alternative investments on the basis of discounted earning streams, with examples of choosing between the allocation of land between farming, forestry and mining (p. 133). It is even pointed out that the undesirable time shape of the highest discounted earning stream can be remedied by lending out some of the proceeds in earlier years and consequently being paid back with interest in later years. Nevertheless, Fisher is at pains to emphasize that the choice is being analyzed under *unrealistic* assumptions of certainty. With regard to the appropriate discount rate under conditions of general *uncertainty*, he considers:

To attempt to formulate mathematically in any useful, complete manner the laws determining the rate of interest (return) under the sway of chance would be like attempting to express completely the laws which determine the path of a projectile when affected by random gusts of wind. Such formulas would need to be either too general or too empirical to be of much value. . . We must, therefore, give up as a bad job any attempt to formulate completely the influences which really determine the rate of interest. (p 316)

In the absence of a formal model of risk, Fisher recognizes that risk and return are closely correlated, and states:

But evidence that in general risk tends to raise the commercial rate of interest is abundant. The proposition is a matter of such common observation that no special collection of facts is necessary. Every lender or borrower knows that the rate of interest varies directly with risk. A bird in the hand is worth two in the bush. The principle applies not only to the explicit interest rate in loan contracts, but also to the implicit interest which goes with the possession of all capital. Where there is uncertainty whether income saved for the future will ever be of service, but the certainty that it can be of service if used immediately, the possessor needs the possibility of a very high future return in order to induce him to save. (p. 382)

Application of probability theory to an assessment of risky outcomes was also quite familiar at this time. Nevertheless, mathematicians distinguished naturally between the problem of predicting outcomes under *risk* - when the probabilities might be difficult to estimate - and the problem of predicting outcomes under *uncertainty* - when the possibilities themselves are difficult to estimate. Among theoreticians, typical problems with the reduction of uncertainty to probability distributions were in fact well recognized, to the extent that enthusiasm for the potential applications of probability to economic issues had been more or less extinguished as economists acknowledged the insurmountable problems (as discussed by McGoun, 1995). Put simply, the modelling of uncertain future cash flows in terms of probability density functions did not at this time answer a need among managers in their bid to face uncertainty.

For such reasons, a sound basis for investment decision-making was identified not with mathematical proofs, but with the application of proven principles based on experience. Textbook writers' recommendations and prescriptions at this time were inevitably substantiated by the evidence of experience. We might say that theory at this time *was* the distillation of experience as interpreted by the writer. The major corporate finance textbook prior to the late 1950s was published by Dewing (1919 and 1953) who advanced "principles of judgment" on the basis of his observations and experience. Dewing established the tone of his study of corporate investment decision-making with the opening passage to his text:

Four main motives have led men to expand business enterprises. On the whole they are not economic, but rather psychological; they are the motives incident to the struggle for conquest and achievement - the precious legacy of man's "predatory barbarism." Primarily a man measures the success of a business by increased size, and secondarily by increased profits. . . . The race-old instinct of conquest becomes translated in our twentieth century economic world into the prosaic terms of corporate growth. Business expansion is the spirit of a modern Tamerlane seeking new markets to conquer. It is a pawn for human ambition. The second motive, less significant, one is led to believe, is the creative impulse. . . . It is a commonplace of psychology, current since the brilliant introspective studies of the elder Mill and Reid, that somewhere in the mental structure

of all of us lies the impulse to build, to see our ideas take form in material results. . . The third motive is the economic. My own observation is that the vast majority of businessmen who plan enlargements, consolidations, and extensions of their business are not actuated primarily by the impulse to make more money, although they unquestionably place this motive uppermost when they need to present plans for enlargement to directors and stockholders. Since increased profits have so obvious and direct an appeal, and since no other motive can sufficiently justify the investment of other people's money, it is natural to place the motive of increased profits foremost. And it appears foremost in every business manager's mind when he attempts to justify a business policy which may have been in the first instance subconsciously prompted by less obvious and more basal motives. The fourth motive is the satisfaction in taking speculative chances. . . All men enjoy the game they think they can play. (Vol. 4, p. 4)

Dewing's argument was that the problem of investment decision-making was essentially that of determining whether or not economic circumstances called for an *expansion* or a *contraction* of the firm. Reflecting the more labour-intensive conditions of his day, Dewing considered that the production of a manufacturing establishment was a direct result of a relatively constant factor in the form of fixed capital investment and a variable factor in the form of human labour, the whole administered by an intangible economic value called entrepreneurial ability. The firm was judged to be in equilibrium when its investment strategy was at the point of decreasing returns with expansion (Dewing's law of "balanced return").

Dewing's text progresses to discuss the financial problems incident to obtaining money for extensions, with special reference to the sources of new capital. Nevertheless, Dewing's understanding of entrepreneurial activity is not divorced from an understanding of what he terms the "humanity of business". His text emphasizes repeatedly that motives other than the economic are at play, and that the reasons for men's actions can but seldom be reduced to simple prerogatives. "The impelling springs of human action are difficult to fathom." In Dewing's world, business managers remain as human beings, and their solutions of the difficult problems of business expansion cannot be dissolved easily into economic elements nor forecasted readily in accordance with any canons of economic expediency.

### The Financial (Cost of Capital) Approach to Investment Decision Making

In the late 1940s and 1950s, the high prestige of the natural sciences began to encourage the belief that the modelling of investment decision-making and resource allocation problems could be identified with the elaboration of optimization models and the general extension of techniques from applied mathematics. In a scientific world, the logical structure of decision-making implied that practicing managers were likely to make more optimal decisions when supplied with a richer set of *positive* theories that provided a better understanding of the consequences of their choices (Whitley, 1986). Thus the

environment of the late 1950s was set for fundamental changes in financial theory. The outcome was the "economic science" of Modigliani and Miller (MM) (MM 1958, 1959, 1963; Miller and Modigliani, 1961; Miller, 1977) and their followers from the late 1950s which offered a rigorously mathematical arbitrage and cost of capital foundation.

Against such a background, the intuitive normative approach contributions of early writers could be largely ignored. Brennan (1995) singled out Dewing's contribution as, "detailed institutional fussiness" (p. 11); and Smith (1990) in his *The Theory of Corporate Finance: a Historical Overview*, also singled out Dewing for dismissal while requiring only a single paragraph to account for corporate finance theory prior to the late 1950s:

The finance literature through the early 1950s consisted in large part of ad hoc theories and institutional detail, but little systematic analysis. For example, Dewing (*Financial Policy of Corporations*, 1919; 1953), the major corporate finance textbook for generations, describes the birth of a corporation and follows it through various policy decisions to its death (bankruptcy). Corporate financial theory prior to the 1950s was riddled with logical inconsistencies and was almost totally prescriptive, that is, normatively orientated. The major concerns of the field were optimal investment, financing, and dividend policies, but little consideration was given to the effects of individual incentives, or to the nature of equilibrium in financial markets. (p. 3)

A second phenomenon at this time which contributed to the need for a more detached scientific assessment of investment, was the rapid spread of the multidivisional form of business organisation. The outcome was often a situation where decision-making responsibilities were being increasingly delegated to divisional managers. Although corporate management might ultimately hold formal authorization for expenditure, its technical knowledge of divisional functions and needs were generally less than those of the divisional managers themselves, so that they were often ill-equipped to argue against their demands. In consequence, divisional managers often held substantial influence over the capital invested in their divisions (Scapens, 1982). By imposing *financial* criteria, however, management was able to establish a common language when it came to justifying expenditures, and could bring the framework of discussion into its own area of scientific expertise. It began to be believed that such financial criteria could be used to establish practices which would ensure that individual operating performances were being integrated effectively with regard to the overall use of the firm's capital resources. Before expenditure could be authorized, divisional managers were required to present assessments of operating performance in terms of capital employed and to demonstrate that consequent returns on investment overcame "hurdle" financial rates of return (Johnson, 1994). The decisive change was that accounting systems were being used actively to control processes, rather than used simply to report the results of processes.

Against such background, teaching in graduate business schools after the 1950s actively began to feature and promote the concept of “scientific financial management” with the use of accounting-based management information tools (Johnson and Kaplan, 1987). Economic models of business and psychological models of individual behaviour also came into vogue. The study of real business problems faced by real business people now often represented only a small contribution. Real case-studies could seem ambiguous, open-ended, and altogether too indeterminate as subjects for analytical inquiry (the Harvard Business School MBA actually distinguished itself by holding to a case study orientation to education in business administration). In contrast, financial criteria offered M.B.A. students the appearance of a ready “management-science tool kit” for investment analysis that was generally applicable (cf. Whitley, 1986).

In a scientific world, it was necessary that the stock markets should also be scientific. Prior to the 1950s, the equity stock markets had been regarded with more than a fair degree of suspicion: they were capricious, capable of abrupt bouts of optimism and depressions - bull and bear moods - their vicissitudes being capable of bestowing sudden wealth as well as ruin. Nevertheless, the foundations of MM neo-classical finance theory embraced a view of “efficient capital markets”. The efficient market hypothesis (EMH) asserted that in financial systems in equilibrium, financial capital circulated to achieve those rates of return that are most attractive to investors, and that in accordance with this principle, prices of securities observed at any time “fully reflected all information available at that time”, so that it was impossible to make consistent economic profits by trading on such available information (for example, Fama, 1976; Weston, 1989). Put another way, the paradigm stated that the firm's value reflected the present value of the firm's expected future net cash flows capitalized appropriately, including expected cash flows from future investment opportunities. “Correct and meaningful” markets implied that “the market knew best” and, that the underlying economy was likely to be served better by financial deregulation and a general hands-off attitude to financial market activity. In such context, activities surrounding leveraged buy-outs, junk bonds, merger and take-over activity were deregulated.

The variant of the model that came to dominate financial economics to the extent of being labelled the “paradigm” was the Capital Asset Pricing Model (CAPM) (cf. Ross, 1978; Ryan, 1982). As summarized by Jensen (1972), the CAPM relies on several major assumptions (all asset holders are single period expected utility of wealth maximisers who choose their asset portfolios on the basis of the mean and variance of expected returns; they can borrow or lend an unlimited amount of money at an exogenously given risk-free rate of interest; they have identical subjective estimates of the means, variances and covariances of returns on all assets; they are price takers, so that asset markets are perfectly competitive; the quantity of assets is fixed so that there are no new issues and they are perfectly divisible and liquid with no transaction costs; and, finally, there are no taxes). Given these assumptions, the price of an asset in equilibrium is determined as a



function of the risk-free interest rate, the mean expected return on the market of all risky assets, and the covariance of the particular asset's return with such market portfolio return (Sharpe, 1964; Lintner, 1965). In defense of the model approach in Finance, Fama (1976) stated:

Looking at the model in these terms, the student who is newly exposed to scientific research is often tempted to conclude that the model has no value. To draw such a conclusion is to forget what modeling is all about. The first purpose of a model is to improve understanding of some real world phenomenon. If the phenomenon is a complicated one, like the adjustment of stock prices to new information, then to abstract from unimportant and potentially confusing details and to focus on the important aspects of the problem, we must impose some simple structure on the world. Since the structure is simplified and is thus not a completely realistic view of the world, we call it a model. (p. 168)

At the same time as the basic conceptual models of efficient capital markets were being tested against data banks of historical capital market price movements, the theoretical implications of the models for business financial decision-making were also being clarified. It followed that the firm's key financial decisions must be understood on the basis of providing the firm's investors with a rate of financial return that at least matched their opportunities elsewhere. In other words, investors' required expectation of financial return represented the firm's *cost of financial capital*. On such a basis in a world of perfect markets, the market value of a firm was pronounced independent of both the firm's capital structure and its dividend policy and the financial objective of management was reduced to that of identifying those investment opportunities where the expected cash flows, discounted by the market opportunity cost of investment capital employed, produce a positive Net Present Value (NPV) (MM, 1958). When corporate and personal taxes were introduced, it was suggested that firms should never pay dividends and strive to have 100% debt in their capital structures (MM, 1963; Farrar and Selwyn, 1967; Brennan, 1970). Such stylized pronouncements did not always appear relevant to actual practitioners. Distinctly "behavioural" characteristics of the market - financial "distress", shareholders' "preference" for dividends, the "signaling" property of dividends, the "agency" problem - began to be invoked so that the theory could be aligned more satisfactorily with observed practice.

In effect, the agenda in Finance became that of recognizing and understanding corporate activity in terms of its *divergence* from the Modigliani and Miller propositions - "look(ing) at finance through the eyes of MM" (Ross, 1988, p. 133). In his review chapter, Brennan (1995) stated:

The shift is away from attempts to *prescribe* normative rules for decision-makers that would assist decisions that are optimal from the point of view of shareholders and towards attempts to *describe* more realistically the way that decisions are actually made. ( p. 17)

Hence the new theory emphasizes the decisive role of individually motivated agents, both those within the corporation and those with whom the corporation must deal. Such agents are non-robotic individuals, who hold aspirations and motivations in the context of institutions which provide incomplete contracts. Newly recognized features of the opportunity set include the informational endowments of agents, their discretionary powers, and the nature of the implicit and explicit contracts that link their actions to their rewards. Newly recognized aspects of reward include perquisite consumption, control benefits and other non-pecuniary benefits, reputation, and effort aversion. In these lights, Finance continues to model directly the belief that investors' concerns and corporate financial decisions are different sides of the same investment coin, which come to be reconciled every day in the pricing of securities in the markets.

Miller (1977) defended the rational financial framework that he had helped to establish, stating:

Why then do economists keep trying to develop models that assume rational behaviour by firms? They are not, I insist merely hoping to con their business school deans into thinking they are working on problems of business management. Rather they have found from experience that - not only in finance, but across the board - that the rational behaviour models generally lead to better predictions and descriptions at the level of the industry, the market and the whole economy than any alternatives to them. Their experience, at those levels, moreover, need involve no inconsistency with the heuristic, rule-of thumb, intuitive kinds of decision-making that they actually observe in firms. It suggests rather that evolutionary mechanisms are at work to give survival to those heuristics that are compatible with rational equilibrium, however far from rational they may appear to be when examined close up and in isolation. (p. 272)

Notwithstanding the reluctance of practitioners to accord with a literal interpretation of the NPV investment criterion, researchers across Management Accounting, Finance, and Scientific Management disciplines by the mid 1970s generally had been won over by a belief in its efficacy. From a management accounting perspective, King (1975) observed that researchers who voiced their doubts that "effort extended in attempting to follow the ideal of the scientific models will be worthwhile" appeared to be in a minority. A great deal of activity grew up around surveying and documenting the extent to which capital budgeting decision-makers used, or did not use, the various techniques for analyzing potential investments. The implication was always that the use of NPV revealed "sophistication", whereas the use of methods such as payback and accounting rates of return revealed either ignorance of better methods, or irrationality in refusing to adopt better methods. Northcott (1991) comments on the "visible relief" when this gap between the new methods (NPV analysis and other "sophisticated" support tools) and observed practice was observed to be closing (as reported by Pike, 1983; Klammer and Walker, 1984; Scott and Petty, 1984; Pike, 1988). The researchers at this point appear to have seen a vindication

of their own role as academics - that due to themselves, practitioners were now making more rational decisions based on the sophisticated methods taught at their classes. For example, Pike and Wolfe (1988) noted "with encouragement" both that capital budgeting procedures were becoming more formalized and that companies had shown notable improvements in their financial and risk analysis methods. So much so, that they were able to voice hope for "their eventual whole-hearted adoption" (p. 81).

### The Management Accounting (Organisational Context): Contribution to Corporate Investment Decision Making

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From the 1970s, management accountants such as Hopwood (1974, 1983) and Scapens (1990) began to debate that a theory could be meaningfully *prescriptive* for an individual only in so far as the context of its assumptions was *descriptive for the individual* of the actual organisation context within which such decisions were assumed to take place. These authors accordingly called for research to be constituted with direct regard to the organisational context of actual decision-making. Case-study management accounting research in the area of capital budgeting from the 1970s has tended subsequently to see investment decision-making as a *process* of investigation which occurs at many points in the organisation, and which is spread out over time, from "triggering" and "recognition" of a problem through to a fuller "definition" of an investment proposal, as it is eased through the system to formal appraisal and ultimate acceptance by higher management (Bower, 1970; Hopwood, 1974; King, 1975; Petty, Scott and Bird, 1975; Ross, 1986; Mukherjee and Henderson, 1987; Butler, Davies, Pike and Sharp, 1993). The process typically is seen to involve readily available information, precedent, general strategic considerations, and environment factors, together with qualitative judgements of technical, production and marketing staffs, against which a manager's belief about future profitability might depend rather simply on optimism and confidence in the economy. For these reasons, a number of writers considered that although financial criteria such as NPV, payback, IRR and ARR, might constitute a framework on which to formalize investment decisions, the techniques were unlikely to determine the decision outcomes in any material manner (Bower, 1970, p. 45; Hopwood, 1974, p. 135), although the numbers nevertheless ensured that decision-makers were able to "account" for their decisions. In this perspective, financial figures are called for when the project has the required backing of a sponsor with "reputation", and when they are called for, the numbers are likely to be sufficiently exposed to manipulation that they merely reflect the aspirations and commitments of the project sponsors (Mukherjee and Henderson, 1987).

On the basis of insights afforded by management organisation specialists (e.g., Starbuck and Hedburg, 1977; Miller and Friesen, 1984; Pettigrew, 1985), Dent (1990) considered that the capabilities of the firm were defined by sunk costs, irreversible investments, as well as the characteristics of its personnel built up in the past, so that the strategies of the organisation were determined by where it

had been in the past and by what it had done. Further, once the firm's strategic decisions were committed (which in practice tended to be non-regenerative, making no automatic claim on management) the firm's "big" investment decisions were then effectively committed (Ansoff, 1987). From this point, organisations experienced "difficulty" in responding to change. In this view, the firm held only restricted volition over its choices. Investment decisions directed at re-aligning the firm's competitive posture in terms of new competitive strengths and distinctive competencies, were noted to be the exception (Mintzberg, 1978, 1987). It could even appear that organisations had been selected more or less *deterministically* to their distinct niches in the first place, on the basis that their particular capabilities were valued.

In this context, a number of management authors recognized analogies between Kuhn's paradigm shifts in science and a "new way of seeing the world" in firms, which duly entered the accounting literature (Hedberg and Jonsson, 1978; Dent, 1990; Dempsey, 1996). Such was the difficulty of achieving "paradigm shifts" in the firm that they were frequently contingent upon the arrival of new leaders who brought with them new interpretations. It required a new leader to rupture an organisation's belief in the efficacy of its past (Starbuck and Hedberg, 1977). It was observed, for example, that corporate turn-around strategies appeared generally with a change in top management even when the need for the turn-around was brought about by factors beyond the control of management (Slatter, 1984). Once the new "vision" was accepted, however, *operating* activities would again be aimed at maximizing the profitability of current operations within the newly-accepted strategic framework. Such decisions aimed to enhance the efficient and effective scheduling of operations, supervision of performance, application of control actions, along with budgeting decisions at the margin of already committed investment activity (Davis, Dempster and Wildavsky, 1971).

For these reasons, researchers were exhorted not to be "blinkered" by the need to be overly "rational" within the terms of economic modeling (Northcott, 1991). Johnson (1994) made the distinction between continuous total-quality management "processes" and "management by accounting numbers", advocating the former as the basis of competitive success. These views were supported by the observation that attempts to correlate positively the reported use of discounted cash flow techniques and superior firm performance had generally failed (the correlation even tending to be in the opposite direction: for example, Haka, Gordon and Pinches, 1985; Cooper and Petry, 1994). Based on their study of investment decisions from various perspectives in a wide range of UK and international companies, Butler, Davies, Pike, and Sharp (1993) also concluded that there was little hard evidence to support the view that increased attention to the computational aspects of investment decision-making led to improved performance, although managers seemed to believe that they led to softer measures of effectiveness such as improved evaluation and control of capital projects. It appeared that the numerous capital budgeting surveys (for example, Scapens and Sale, 1981; Pike 1983 and 1988) had only partially enriched

the understanding of the role of financial measures such as DCF and risk analysis techniques in reaching investment decisions.

Even at this stage, it appeared that more was known about the firm's prescribed investment techniques to be performed prior to approval, than about how such decisions are actually made. In effect, the traditional emphasis in the literature on financial appraisal was being given undue prominence and was often far removed from the emphasis in the actual decision-making process within organisations.

### The Strategic Management Context of Corporate Investment Decision Making

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A general thesis of dissatisfaction with the emergent "cost of financial capital" paradigm methodology can be traced back to Steinbruner and the Harvard Business School. Steinbruner (1974) in a general observation of decision-making stated:

If quantitative precision is demanded, it is gained, in the current state of things, only by so reducing the scope of what is analyzed that most of the important problems remain external to the analysis. (p. 328)

Such a line of thought was extended by Hayes and Abernathy (1980) and Hayes and Garvin (1982), followed by Hill (1985). A key concern of these contributions was that the logical consequence of the net present value (NPV) methodology was a bias to analyze the analyzable, so that a company would allow itself to sink slowly, but nonetheless inevitably, because at each stage, the only proposals that allowed for a convincing NPV-type analysis were the incremental ones (reduce staff, make certain savings, reduce perceived inefficiencies. . . ) that went some way to shoring up the situation. The radical long-term view that was more difficult to quantify and which did not fit so neatly into a discounted cash flow analysis was ignored. Hayes and Abernathy (1980) stated:

We believe that during the past two decades American managers have increasingly relied on principles which prize analytical detachment and methodological elegance over insight. . . based on experience. Lacking hands-on experience, the analytical formulas of portfolio theory push managers even further toward an extreme of caution in allocating resources.

Hayes and Garvin (1982) went even further, blaming the growing use of discounted cash flow methods for the relative decline in the performance of Western business. They observed that as such investment evaluation methods had gained wider use in investment decision-making, so the growth of capital investment and research and development spending in the US had slowed; and they believed that this was not a coincidence. They claimed that their own observations suggested that US firms were repeatedly requiring pre-tax hurdle rates of 30% or more before committing to investment proposals. For Hayes and Garvin, the problem of unrealistically high discount rates was compounded by the fact that benefits such as increased worker skills and capabilities, new

products, and a different cost structure were harder to document in advance and so did not fit neatly into a present-value analysis.

Such views were subsequently picked up and extended by non-finance academic specialists such as by Hill (1985) who argued that the key differences in the approach to investment decision-making by Japan and West Germany were, first, they avoided the delusion that in an imprecise environment, numbers are precise and thereby reliable, and that by using numbers, the risk is thereby reduced; and, two, they accepted that to run a successful enterprise, it was necessary to take risks. Hill concluded his text in the following manner:

Investment decisions such as Nippon Electric Company's twenty year 'incubation period' of its computer and semiconductor business, Honda's persistence in using its motorbike profits to bring its clean-engine vehicle to market, or Japanese car manufacturers' entry into the four-wheel vehicle market in the environment of the early 1980's, could and would not be justified on any quantitatively financial analysis. (p. 207)

Porter (1980, 1985) recognized that the firm's value derives fundamentally from what customers are willing to pay, which must be achieved either by offering lower prices than competitors for equivalent benefits or by providing unique benefits. Thus the firm is called on to determine the selection of product mix that it will produce and the markets to which it will sell. The destiny of the firm is to discover its equilibrium position in the context of competitors and an advancing economic and technological environment. Conceptual frameworks such as the "Boston Consulting Group Matrix" and the "SWOT" analysis assisted such strategic outlooks.

Grounded field research by Carr, Tomkins and Bayliss (1994) - of companies in the motor-components industry and which contrasts UK and German approaches - substantiated the above strategic emphasis, suggesting that quantitative accounting control systems may fail entirely to connect with the kind of successful investment decision-making that is required to bring real success. These authors observe that the more impressively successful managers - as encountered more typically in the German companies investigated - talk about having a *thorough knowledge* of the business, and the perceived direction of markets, technologies and competition, and have little doubt that much of this cannot be encapsulated in NPV calculations. For the more successful firms, the strategic investment debate is recognized as involving so many uncertainties and complexities, that it is almost bound to be qualitative, and not necessarily quantitative. The company might have "foresight" of the gains to be made but often has difficulty in judging any kind of payback period, let alone a meaningful NPV. One Chief Executive, who had a strong financial background yet insisted on placing little emphasis on the role of finance in the strategic decision-making process, is quoted:

Finance is not enough; it must be paired with intuition and intimacy with products, markets and customers. US and UK managers sit too much in

their offices over their figures. . . . When I talked of intuition it was not just out of the blue. Intuition is the very last thing when you know everything. You have to have every kind of information about your competitors, but the rest is intuition. (p. 107)

Fairly crude depictions of potentially large benefits against potentially large loss scenarios are often the only message of an investment's cash-flow analysis, which management would be only too readily aware of. Reminiscent of the Harvard NPV criticisms, Carr et al summarized the successful companies:

Their argument was that, so long as progressive companies do not actually waste resources as a result of poor controls, more laggard suppliers would simply be forced to incur the same outlays at a later date, whilst missing the window of opportunity and securing ultimately fewer benefits from the same investments. The only other option for such laggard suppliers, surrendering market share, was merely a short-term "harvesting" strategy. Ultimately customers would not accept less than world standards and such laggard suppliers would be forced out of the vehicle component business altogether. A number of German Chief Executives perceived UK and also US suppliers in this light, blaming them for what they saw as a crude form of financial orientation. (p. 345)

Based on their continued follow-up learning processes with eight managers in four companies, Grundy and Johnson (1993) emphasized the sheer difficulty that managers have in "seeing" their decisions from the perspectives of academic definitions and of bridging their understandings of strategic, financial and organisational aspects of their investment decisions. The authors concluded that the variety and complexity of investment issues were such that broad, prescriptive approaches to linkages were unlikely to be useful to managers. It appeared that once formal mathematical models reached a certain sophistication, they were all but unintelligible as conceptual frameworks to most practicing managers.

The "popular" Management literature has generally enjoyed repeating the Harvard School argument against the "hard numbers" approach to investment decision-making. For example, management consultants Peters and Waterman (1982) in "In Search of Excellence" objected to the dominance accorded to the quantitative analysis of high theory, and exhorted:

Analysis has no way of valuing the extra "oomph", the "overkill", added by an IBM or Frito-Lay (PepsiCo) sales force. Every time the analysts get their hands on Frito's "unreasonable" level of service their eyes begin to gleam and they proceed to show how much could be saved if only Frito would reduce its commitment to service. The analysts are "right"; Frito would immediately save money. But the analysts cannot possibly demonstrate the impact of a tiny degree of service unreliability on the heroic 10,000-person sales force - to say nothing of Frito's retailers - and, therefore, on eventual market share loss or margin decline. Viewed

analytically, the over commitment to reliability by Caterpillar (“Forty-eight-hour parts service anywhere in the world - or Cat pays”) or Maytag (“Ten years' trouble-free operation”) makes no sense. Analytically, purposeful duplication of effort by IBM and 3M on product development makes no sense in quantitative terms. (p. 45)

Such sentiments continued to be replicated in the popular management literature. As one further example, Mito (1991) quoted the president of Honda Research and Development:

A project may *not* be profitable but if the idea is one that responds to people's needs, researchers should pursue it to its conclusion. Environmental pollution, toxic exhaust fumes, energy conservation - at first, problems such as these may seem insurmountable but no problem should be seen, in principle, as impossible to solve. How close researchers come to solutions depends on their organisation's commitment to doing what is right - perhaps transcending short-term profits - and on the individual conviction that problems can be solved. Knowing that what they are doing contributes to a better world - that they are not just working in a vacuum - lifts the morale of researchers and gives point to their work. Research carries a moral content. . . The driving force in the growth of enterprise is ideas. At the R & D centers, priority should be given to ideas. (p. 63)

### More Recent Trends

In Finance, the need to understand and evaluate the points at which discounted cash flow analysis fails as a positive theory of investment decision-making has stimulated various research agendas. In the model-building tradition of Finance, one agenda continues to be that of developing quantitative models of investment decision-making that are more sophisticated and, hence, it is hoped, more realistic. Here, a principle focus has been with the need to comprehend the “option” value inherent in investment decision-making. There is the “option” value of deferral when a project is not immediately undertaken, as well as the “option” value of further investments contingent on the project when it is undertaken.

With regard to the option value of deferral, it is recognized that project approval is often not a “now-or-never” decision. In other words, if a project is turned down, it may be that it can be undertaken at a later date. It may be that a distinct “option” advantage actually accrues to deferment, such that “deferment” equates to “holding an option on the project.” Dixit and Pindyck's (1994) text illustrates numerical applications of the technique with the option value of delaying the closing down of a steel works and delaying the developments of mining/petroleum reserves on the basis that the price of steel/copper/oil may increase in the future. The opportunity cost of exercising the strategic option by deciding not to invest is subtracted from the conventional “invest if the NPV is



positive" rule. Nevertheless, in order to make progress, realistic complications, such as the impact of corporate inactivity while the firm waits for information some years down the line, are ignored. As these authors concede, the illustrations of the options approach as advanced have tended to be "simple and stylized" (p. 394).

When there are programs that are contingent on the current project, the current project may effectively offer "options" on such investment opportunities, which value must be attributed to that of the current project. The NPV appraisal model has accordingly been extended with the exploitation of "real option" pricing theory aimed at capturing the *strategic* options inherent in investment undertakings (to the extent of being regarded as the new paradigm of investment decision-making, Brennan, 1995, p. 9). Nevertheless, it may again be remarked that illustrations of the techniques as a practical prescription are not as yet general. As acknowledged by Pinches (1998): "Advances in real options have been dramatic, but many challenges remain – especially in applying real option concepts and ideas to the capital investment decisions-making process employed by firms." Pinches points out that implicit in the application of the real options approach to capital investment decision-making is the understanding that the concepts and approaches for valuing options on financial assets can be applied to valuing the strategic and timing options held by firms. Nevertheless, additional complexities exist with real options as are generally not present with options on financial assets. To give two examples: (1) real options held by firms are generally *far more complex* than financial options – this occurs especially in the areas of across-time strategic interdependencies and the compoundness of multiple options within the same capital project; and (2) ownership of real options is generally *nonexclusive* – which is to say, more than one firm may own or be able to develop the real option, which creates the obvious problem that the value of a real option may depend on the action of other firms in relation to the actions of the firm making the current investment decision. Recognizing these issues in valuing real options, Lander and Pinches (1998) conclude that it may be necessary to resort to other approaches, such as decision trees or influence diagrams, to model real options effectively. Cortazar and Casassus (1998) recognize the usefulness of software in incorporating the insights of real options. Nevertheless, it is fair to say that the application of real options to decision making in firms remains in its infancy. Such issues are further elaborated in commentaries provided by Ross (1995), Trigeorgis (1996), Brennan and Trigeorgis (2000).

The link of "real option" theory in Finance with strategic options offers an interface between Finance and Strategic Management. Almost for the first time, it appears that the distinctly strategic concerns of Strategic Management with regard to investment decision-making (as well as of the Management Accounting case-study literature in this area) are being consciously built into the quantitative models of Finance. Nevertheless, it cannot be denied that a tension remains between the traditional quantitative focus of Finance and the more qualitative insights associated with the other disciplines.

Ultimately, the contention that, in some operational sense, NPV (as derived from discounted cash flow analysis) represents a prescription for decision-making because this is what the market capitalizes as equity, relies on the proposition that corporate and investment finance are two sides of the same investment coin that come together in the market place. That is to say, the firm's actions are immediately recognized and capitalized as market value by the firm's investment community. Yet, it is clear that an operational positive theory that brings corporate and investment finance together has yet to be devised.

A realistic appraisal of the interaction of corporate and investment finance must recognize the technical difficulties that investors have in monitoring what managers are doing. Without such connection, the NPV of a firm's project cannot translate into an equivalent market value for the firm's shareholders as owners. The issue of information asymmetry implies that personal (as opposed to shareholder) success, perquisites, short (as opposed to long) term success, thereby come to influence a manager's decision-making. Such issues of information asymmetry have been recognized in numerous contributions; for example, Harris, Kriebel and Raviv (1982), Sherfin and Statman (1984), Antle and Eppen (1985), Statman and Caldwell (1987), Dye (1988), Trueman and Titman (1988), Emmanuel, Otley and Merchant (1990), Chaney and Lewis (1995), Welker (1995), and Arya, Fellingham and Glover (1998).

The outcome that managers consequently choose amongst potential investment opportunities within a *psychological* framework, represents a more recently acquired agenda in Finance - founded on the "prospect theory" contributions of Kahneman and Tversky (1972, 1979, 1982, and 1982 (with Slovic)) and Tversky and Kahneman (1981, 1986, 1992) and "regret theory" of perhaps notably Bell (1982) and Loomes and Sugden (1982). Notwithstanding that the "institutional-behavioural" reality of investment decision-making has long been central to Management Accounting case study research, "Behavioural Finance" represents a recent agenda. The goal of Behavioural Finance is, in effect, to provide an understanding of the behaviour of investors and managers and their interaction in companies and securities markets (cf Statman, 1995, 1997). Such a qualitative assessment of investment behaviour clearly represents a radical departure for modern finance theory. Nevertheless, the award of the 2002 Nobel Peace Prize in Economics to Daniel Kahneman (for integrating insights from psychological research concerning human judgment and decision-making under uncertainty) and Vernon Smith (for having establishing laboratory experiments as a tool in empirical economic analysis) has served to signal behavioural finance as coming of age in Finance.

Following from the above work, prospect and regret theory are now foundational to the study in Finance of the role of varying attitudes to risk: the "framing" of the problem, cognitive errors, self-control and regrets in financial decision making; and has extended to questions such as, Why do investors and decision-makers hate to realize losses? Why do managers hate to terminate projects? Why do investors prefer stocks of good companies? Why do investors

like cash dividends? What determines expected returns? What kind of securities do investors like? It appears that the predictions of prospect theory and regret theory can help to explain manager and investment behaviour (reviewed in Shiller, 1999). Such focus in Finance on a more realistic appraisal of “behavioural” decision-making – with its emphasis on the distinctly human attributes of investment decision-making - offers an interface between Finance and case-study Management Accounting.

In Strategic Management itself, the work of Kay (1993) served to emphasize the firm’s investment decision-making in the context of the firm’s “reputation “and “strategic linkages based on trust”. It follows that the firm’s investments should not be assessed independently of how they contribute to these two dimensions of firm success. “Reputation” and “Trust” have been variously recognized as constituting not only key outcomes of the investment decision of the firm, but as constituting key elements of the investment decision-making process itself. So, for example, Mukherji and Nagarajan (1996) extend the concept of trust to investment decision-making, Chami and Fullenkamp (2003) relate trust to efficiency within the firm, while McAulay (1996) explores how reputation extends the potential for negotiation and action in investment decision-making (cf. also, Tinsley, O’Connor and Sullivan, 2002). Dempsey (1996) has gone so far as to suggest that an almost identical framework of “reputations based on past performances” and “commitment and trust relationships” might be applied as a framework for recognizing and understanding corporate investment activity in preference to a framework of traditional cost of capital equations. So, again, we observe that the Strategic, Management and Finance literatures are embracing complementary research agendas.

In Management Accounting, research continues to explore the integrity and application of the NPV methodology. Thus case study research continues to emphasize the difficulties inherent in practical application of formal, quantitative systems of investment analysis to the firm’s strategic goals (for example, Slagmulder, 1997; Carr and Tomkins, 1998; Seal, 2001). In connection with this, the literature continues to highlight the gaps between NPV theory and practice (for example, Arnold and Hatzopoulos, 2000). The Management Accounting literature also continues to monitor and critique research into adaptations of NPV as management performance indicators - for example, the EVA (Economic Value Added) measure of value proposed and commercialized by Stern, Stewart & Co - which serves to highlight the attributes and essential nature of the NPV methodology (as, for example, Biddle, Bowen and Wallace, 1997; Chen and Dodd, 1997).

## Conclusion

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The insights of the Finance, Management Accounting and Management disciplines with regard to corporate investment are clearly capable of informing one another. What one discipline is capable of ignoring in regards to investment decision-making, the other disciplines may illuminate. Moreover, more recent developments across the research agendas of these disciplines in the area of

investment decision-making indicate increasingly strong inter-relationships between their agendas.

Nevertheless, it is possible that an integrated model of investment behaviour across the disciplines must remain unattainable. To see this, consider that the distinctive skills of mathematics, case-study and empirical field-based observations are capable of functioning more or less independently – so that, in consequence, the disciplines differ in their philosophical outlooks. Thus, for example, while financial and strategic models prefer to abstract or generalize their findings, Management Accounting's case-study focus recognizes that everyday corporate investment decision-making is rarely an example of such neat theory, being more likely the outcome of an on-going refinement of operations for that particular firm by its particular inter-locking participants. Or, again, we might observe that while Finance seeks mathematical rigour, and thereafter seeks practicality, Strategic Management seeks first to generalize practice from past experiences, and thereafter seeks to justify with supporting theory. As just one outcome, we have observed that while real options theory has been invoked in Finance to align the NPV decision-making models with a more strategic agenda, the NPV method so designed with its mathematical sophistication and precision remains almost certainly impractical for practicing management.

Thus I conclude that while our understanding of corporate investment decision-making must continue to be nourished by the interplay of the various disciplines that it invokes, it appears that such disciplines will continue to preserve their particular concerns, methodologies and other distinctive dimensions.

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# Chapter 15

## Corporate Financial Management: Time to Change the Cost of Capital Framework?

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### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

1. Understand how the notion of the firm's cost of financial capital was first imposed to "prescribe" and later "describe" corporate financial management
2. Understand how the firm's corporate financial management may be understood in terms of (i) its investment decisions (where the firm should be positioning itself in the market place), (ii) its financing of its investments (by debt or equity), and (iii) its servicing of its financing commitments (interest and dividend payments)
3. Understand that the firm's financial decision-making takes place in the context of traditional and socially constructed institutions and markets, and that the much-acclaimed cost of capital framework of itself is likely to offer too mechanical an instrument with which to successfully manage the firm's financial position across interrelated investment, financing and dividend policies
4. Understand how a socially constructed framework of (i) "reputations based on past performance", and (ii) "commitment and trust relationships" may provide a more meaningful basis for recognising and understanding the firm's financial policies

## Introduction\*

Modern corporate finance theory is founded on the proposition that financial capital is supplied to firms by investors who have an "expectation of return", and that, reciprocally, such expectation represents the firm's "cost of financial capital". With such assumption, it had been possible to construct a *positive* theory of corporate finance - aimed at prescribing *normative* rules for decision-makers, which would assist managers to take decisions that were optimal from the point of view of shareholders. In this view, institutional arrangements and individual human behaviour were rendered essentially "uninteresting" on the assumption that they must ultimately comply with the economic *deus ex machina*. The models, however, were largely to disappoint in the purpose of directing actual corporate financial management activity. Thus we can observe that corporate finance theory begins with "irrelevancy" pronouncements about a firm's value being independent of its financing and dividend policies; which are then adjusted (by allowing taxation) to the statement that firms should tend to 100% debt and pay no dividends. In response to these unrealistic outcomes, theoretical development has subsequently come to be directed at providing models that are *descriptive* of the way corporate financial decisions are actually made (Brennan, 1995, for example). To this end, institutional arrangements and behavioural considerations have increasingly been recognised as first order influences. So, for example, individually motivated 'agents' are now allocated a decisive role, both those within the corporation and those with whom the corporation must deal. Thus we might observe that very much without debate, corporate financial theory has actually moved from its original Modigliani and Miller (1958) 'positive' role where theory might assume to direct practice, to one where practice is assumed to dictate theory.

The present chapter therefore sees fit to address the question: What is the purpose or *reason-to-be* of corporate financial theory? Here I take signposts from Kuhn. However, I argue ultimately against the position that a theory is legitimately preserved provided it adjusts to conform to its own predictions. Rather, I shall develop the position of Putnam that "practice is primary", leading us to the proposition that a theory *is* a "useful" conceptual framework. From this position, I contend that it is beholden to theory-makers to strive for such "useful" conceptual frameworks. These arguments provide us with the authority with which I presume to adjust the paradigm foundations of corporate finance theory. Our enquiry will lead us to suggest that essential corporate financial management may be better recognised and understood as taking place within the "domains of fundamental uncertainty" allowed by the limitations in operational accuracy of the established quantitative models. Within these bounds of uncertainty, I shall argue that corporate financial management is manifested more readily on the basis of an institutional/behavioural paradigm,

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\* This chapter has been adapted from the author's previous chapter published in *Critical Perspectives on Accounting* (Vol. 7, 1996, pp. 617-639).

which is in fact reminiscent more of the *accounting* origins of the subject matter, rather than of the rational investor of economics.

The remainder of the chapter is arranged as follows. In the following section (2), I assess the cost of capital/perfect market paradigm at the heart of finance theory. Here, I attain at the outset a clear representation of what I presume to consider changing. In section 3, I assess the Kuhnian development of the perfect market/cost of capital position; while in section 4, I assess what is at issue in the re-directing of a corpus of knowledge, which is to say, a 'paradigm shift'. Section 5 considers the stylized facts of corporate financial decision-making; before section 6 offers a paradigm shift in the form of an institutional/behavioural paradigm for the formulation of insight and enquiry into actual corporate financial decision-making. Section 7 concludes the chapter.

### Corporate Financial Theory: the Paradigm

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By the late 1950s, the writings of Karl Popper had done much to exalt the philosophical basis of Science as *the* rational process: progressing towards objective truth on the basis of the falsification method of theory selection. At this time, too, the high prestige of the natural sciences encouraged the belief that the modelling of decision-making and resource allocation problems could be identified with the elaboration of optimization models and the general extension of techniques from applied mathematics. In a scientific world, the logical structure of decision-making implied that practising managers were likely to make more optimal decisions when supplied with a richer set of positive theories that provided a better understanding of the consequences of their choices. It was natural therefore that finance theory (along with other social science disciplines) should seek to identify with the scientific method.

Into this environment in the late '50s Modigliani and Miller (MM) ushered in their agenda for the modern theory of corporate finance. Thus the discipline was transformed from an institutional normative literature - motivated by and concerned with topics of direct practitioner relevance, such as, technical procedures and practices for the raising of long term finance, the operation of financial institutions and systems - into a micro economic positive science to be centred around the formation and analysis of corporate policy decisions and addressing questions such as: What are the effects of alternative investment, financing and dividend policies on the value of the firm? In this way, corporate financial decision-making came to be derived primarily as an application of economic asset valuation models with reference to perfect capital markets, where perfection, amongst other things, meant no taxes, no transaction or bankruptcy costs, all information available to all market participants without cost, complete alignment among participants as to the probabilities attached to all possible outcomes consequent on such information, and perfect alignment of the incentives of managers and shareholders.

A capital market where prices provide meaningful signals for capital allocation is an important component of a capitalist system. In such a system, when firms

issue securities to finance their activities, they can expect to get fair prices, and equally when investors choose among the securities that represent ownership of firms' activities, they can do so under the assumption that they are paying fair prices given what is known about the firm (for example, Fama, 1976, ch. 5). The foundations of MM neoclassical finance theory embrace such a view of capital markets. The underlying paradigm asserts that in financial systems in equilibrium, financial capital circulates to achieve those rates of return that are most attractive to its investors, and that in accordance with this principle, prices of securities observed at any time "fully reflect all information available at that time" so that it is impossible to make consistent economic profits by trading on such available information (for example, MM, 1958; Fama, 1976; Weston, 1989). Put another way, the paradigm states that the firm's value reflects the present value of the firm's expected future net cash flows capitalised appropriately, including expected cash flows from future investment opportunities.

The "efficient market hypothesis": the notion that market prices react rapidly to relevant new information (weak, semi strong or strong form), is claimed to be the most extensively tested hypothesis in all the social sciences (for example, Smith, p. 5, 1990). Consistent with the efficient market hypothesis, detailed empirical studies of stock prices indicate that it is difficult to earn above-normal profits by trading on publicly available data because it is already incorporated in security prices. Fama (1976) reviews much of this evidence; although the evidence is not completely one-sided (for example, Jensen, 1978). Yet even allowing that empirical research has succeeded in broadly establishing that successive share price movement are systematically uncorrelated, thus establishing that we are unable to reject the efficient market hypothesis, this does not particularly inform about *how* markets respond to information and *how* information is impounded to determine share prices. That is to say, the much-vaunted "efficient market hypothesis" does not of itself enable us to conclude that capital markets *allocate financial resources* efficiently. If we wish to claim allocative efficiency for capital markets, we must go beyond markets that *rapidly* impound new information and arrive at markets that both *rapidly* and *meaningfully* impound new information.

The variant of the above model that encapsulates a basis for such efficient allocation is the Capital Asset Pricing Model (CAPM). The CAPM has dominated financial economics to the extent of being labelled "the paradigm" (cf, Ross, 1978; Ryan, 1982). It states that investors should assess their expectation of return on a firm's shares with regard to the opportunity cost of safe returns available elsewhere (government bonds) and seek some premium in the form of enhanced expectations on the firm's shares as compensation for their inevitable risk. As summarised by Jensen (1972), the CAPM relies on the following seven assumptions:

- All asset holders are single period expected utility of wealth maximisers, who
- choose their asset portfolios on the basis of the mean and variance of expected returns.

- They can borrow or lend an unlimited amount of money at an exogenously given risk-free rate of interest.
- They have identical subjective estimates of the means, variances and covariances of returns on all assets.
- They are price takers, so that asset markets are perfectly competitive.
- The quantities of assets are fixed so that there are no new issues and they are perfectly divisible and liquid with no transaction costs.
- Finally, there are no taxes.

Given these assumptions, the price of an asset in equilibrium is a function of the risk-free interest rate, the mean expected returns generated by holding that asset and the covariance of those expected returns on all assets in the market portfolio (cf Sharpe, 1964; Lintner, 1965). The Capital Asset Pricing Model (CAPM) thus provides financial theory with the paradigm with which to give testable content to the notion that capital markets rapidly impound information 'correctly'. It may, nonetheless, be stated that tests of the model (or of its generalised form, the Arbitrage Pricing Theory) remain inconclusive (cf. Friend, 1977; with more recent acclaimed work by Fama and French (1992) even undermining applicability of the CAPM). The difficulties in interpreting the results of data analyses in financial economics are in fact fairly widely acknowledged and their implications for dominant analytical models remain unclear. Not least because the models are constructed in terms of 'expectations' rather than actual realized returns. The correspondence rules that link the models to available data are highly debatable.

At the same time as the basic conceptual models of efficient capital markets were being tested against data banks of historical capital market price movements, the theoretical implications of the models for business financial decision-making were being clarified. It followed that if a firm's expectation of financial return were to drop below investors' required expectations, investors would react by trading in that firm's shares at such a reduced price as to reinstate their expectations. The corollary is that the firm may be recognised as a series of cash flows from an *investor's* perspective. Failure of a firm to adhere to investors' expectations must imply dissatisfaction among shareholders and the firm's exposure to take-over at a suppressed share price. It follows, then, that the firm's key financial decision-making nodes - (i) where should the firm be making financial investments (the 'investment decision'), (ii) how should the firm be financing those investments given available sources of investment finance (the 'capital structure decision'), and (iii) at what point should the firm be returning the fruits of those investments to investors (the 'dividend decision') - must be understood on the basis of providing the firm's investors with a rate of financial return that at least matches their comparable opportunities elsewhere. In other words, investors' required expectation of financial return represents *the firm's cost of financial capital*, on the basis of which all financial decisions are assessed; the paradigm is: the theory is a cost of financial capital theory. By becoming the other side of the coin to investment analysis assuming a well-diversified portfolio, corporate finance theory is underpinned by the self-same quantitative/statistical analysis of risk-return maximisation.



Leading from the paradigm of the cost of financial capital, the market value of a firm was pronounced independent of both the firm's capital structure and its dividend policy, and the financial objective of management was reduced to that of identifying those investment opportunities whose expected cash flows, discounted by the market opportunity cost of investment capital employed, produce a positive net present value (MM, 1958). When corporate and personal taxes were introduced, it was suggested that firms should never pay dividends and strive to have 100% debt in their capital structures (MM, 1963; Farrar and Selwyn, 1967; Brennan, 1970). Individual agents within the corporation are ignored at this stage, either by assuming that they act as well-trained robots (as in the investment decision) or by paralyzing them with the *ceteris paribus* assumptions that underlie the classical capital structure propositions (Brennan, 1995). Similarly, the individuals with whom the corporation must deal - investors, banker, underwriters, bidders, customers, employees, and others - are rendered essentially uninteresting, by treating them as price takers.

In response to the unrealistic corner point solutions generated from such assumptions, the early leading candidates for the study of departures from the MM conditions were bankruptcy costs, financial 'distress', transaction costs and 'signalling' theory. Subsequently, the fundamental shift has been from a position where both institutional arrangements and behavioural considerations are taken as "mere detail" to one where individually motivated 'agents' are now allocated a decisive role, both those within the corporation and those with whom the corporation must deal. An explosion of models based on agency theory - with information asymmetry, the nature of implicit and explicit contracts, as well as non-pecuniary considerations, such as reputation and effort aversion - has been motivated by the need to attain reconciliation between the directives of theory and observed practice. The nature of each adjustment hypothesis is subject to alternative formulations, which in turn are likely to impact on the role of others.

The paradigm now is: departures from the original MM propositions are driven by imperfections to perfect and complete markets. Thus contributions which acknowledge the institutional/behavioural dimension are yet expected to confront the paradigm of perfect markets and present argument in the language of its terms of reference. As Ross recognises in his 1988 review of the MM propositions, "economists now do look at finance through the eyes of MM" (p. 133), thereby supporting Miller's (1988) contention (in his own review chapter of the MM propositions) that "showing what *doesn't* matter can also show, by implication, what *does*" (p. 100). Or, again, as Stiglitz (1988) puts it, "some of the most productive responses to the MM results have come from those who did not feel able to accept the conclusion that financial policy is irrelevant. The MM results force those skeptics to identify which of the assumptions underlying the MM theorem should be modified or rejected" (p. 122).

Thus we observe that reconciliation of observed practice with theoretical models continues to be pursued within an MM/cost of capital framework, where mathematical coherence and integrity are a condition for contribution. It may be

deemed that a stream of literature has thereby been successfully generated, as a result of which the understanding of corporate financial behaviour has been hugely stimulated and, in consequence, has been greatly sharpened from both theoretical and empirical perspectives. A glance at such as the *Journal of Finance* or the *Journal of Financial and Quantitative Analysis* reveals the striking departure that has taken place from everyday language as a medium in which to develop concepts and ideas to that of the mathematically skilled and the academically rigorous and abstract.

### Corporate Financial Theory as Kuhnian 'Normal' Science

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Allowing that the initial stylized pronouncements of corporate finance theory (firms have 100% debt and pay no dividends) bear no relation with observed reality and the theory's obligation thereby to accommodate countervailing hypotheses (bankruptcy costs, financial difficulties costs, dividend signalling, etc.), some commentators have observed that corporate financial theory accords with a Kuhnian type wherein the central paradigm defends its special status against contradictions and attacks on its empirical work by continuing to accrete hypotheses as necessary (cf. Findlay and Williams, 1980, 1985; Whitley, 1986; and Kuhn, 1962). For critics of corporate finance theory, the Kuhnian process can be frustrating. For Gordon (1989), the position is: "the assumptions do not matter as long as the model cannot be shown not to work" leading to a kind of intellectual stalemate between protagonists and a veritable outpouring of contributions that essentially restate the theory. Whitley (1986) has dared even to suggest that the process of resistance may be recognised as the self-perpetuating self-interest of those whose status is committed to the corpus of theoretical development as it essentially stands.

Such criticisms align with Popper's "conventionalist stratagem" critique that *ad hoc* changes in the auxiliary hypotheses must not be allowed to save a theory from contrary observations. Countervailing this objection, however, the antifalsification view presented by Kuhn stresses that theories are by their nature highly immune to falsification. The so-called Duhem-Quine thesis holds that it is difficult, if not impossible, to refute theories completely since any empirical test always involves the target hypothesis in conjunction with a whole set of auxiliary hypotheses - which are often of the form of simplifying assumptions that are *known* to be *untrue*. It follows that any refutation is a refutation of only a particular conjunction of hypotheses, not of the target hypothesis. The existence of auxiliary hypotheses means that there are always potential immunizing stratagems at hand to counter any negative empirical results. Looked at in this way, the theory is not a hypothesis in need of confirmation, but a "view of the world" on the basis of which we 'set out' to explore and explain. In this perspective, corporate finance theory has now entered the process of what Kuhn calls "normal science", the process of "puzzle solving" - adjusting the theory to accord with the observations.

For Kuhn, what finally terminates the interval of "normal science" is the introduction of a new paradigm which manages to supersede the old, such an

event requiring the assertion of a fundamentally new basis for theory along with a "successful and striking" application; so that supplanting one paradigm with another requires a Gestalt switch, a case of looking at the world through the spectacles of the new paradigm. The arrival on the scene of Modigliani and Miller (MM) economic finance theory itself is suggestive of such a shift. Thus corporate finance theory prior to MM was orientated to meeting the combined needs of the firm's managers and stakeholders, who, it was assumed, assessed their company's performance *not* so much on the basis of the prevailing stock market's determination of the firm's share price (a Casino which was allowed to be capricious at best), but rather on the conventionally respected basis of the firm's audited financial accounts of its own performance. In this context, Gordon (1959) had argued that firms might effectively reduce the level of uncertainty to their shareholders by maintaining "generous" dividends - the "bird in the hand" argument that payments in the foreseeable future are appreciated more by shareholders than the promise of payments at some vaguely specified time in the future. Modigliani and Miller, however, by allowing only that the markets should possess such a level of rationality as to recognise that the firm could not add economic value by simultaneously raising \$1 and issuing \$1 as dividends, demonstrated a clear arbitrage argument to the effect that provided the firm's investment decisions remained unaffected, the firm's dividend policy was irrelevant. It was suggested that financial managers concentrate instead on identifying investment projects which would add value. In sweeping away the "bird in the hand" argument as a fallacy, they pointed to the markets rather than company accounts as the arbiter of value. The study of firm valuation was thereby effectively captured from the domain of Accounting by the emerging discipline of financial economics. A paradigm shift had occurred. Finance was set to become a discipline in its own right.

### Corporate Finance Theory as 'Useful' Patterns: The Case for Pluralist Systems

The science philosopher Hilary Putnam argues against the idea that the essential *raison-to-be* of a theory is to continue to make predictions, a notion on which both the Popperian deductivists and the Kuhnian inductivists, in their different ways, rely. Thereby Putnam (1979) refuses in fact to accept the separation of science and behavioral science. He argues that what previous scientific philosophers - Popper in particular - fail to recognise is that "practice is primary", meaning that ideas are not just an end in themselves; rather, they exist primarily to "guide practice", to structure whole forms of life:

We judge the correctness of our ideas by applying them and seeing if they succeed; in general, and in the long run, correct ideas lead to success, and ideas lead to failures where and insofar as they are incorrect. Failure to see the importance of practice leads directly to failure to see the importance of success. Circular justifications need not be totally self-protecting nor need they be totally uninformative. . . . The fact that a justification is circular

only means that that justification has no power to serve as a reason, unless the person to whom it is given as a reason already has some propensity to accept the conclusion. We do have a propensity - an *a priori* propensity, if you like - to reason "inductively", and the past success of "induction" increases that propensity. . . The method of testing ideas in practice and relying on the ones that prove successful (for that is what "induction" is) is not unsuccessful. That is an *empirical* statement. The method does not have a "justification" - if by a justification is meant a proof from eternal and formal principles that justifies reliance on the method. But then, nothing does - not even, in my opinion, pure mathematics and formal logic. Practice is primary. (p. 374-5)

We can say that theory exists in the demonstration, by mathematical or otherwise convincing argument, that from a set of initial assumptions, other hypotheses can be shown to co-exist with the original assumptions. Thus, in the final analysis, *all theory is tautological*. To take an illustration from physics, if asked to explain the force of gravity, we are likely to reply with some confidence, "that which causes objects to fall to the ground"; if asked "to explain" *why* objects fall to the ground, we reply with equal confidence, "the force of gravity". That is to say, we *understand* the phenomenon of things falling to the ground in relation to the theory of gravity, and, reciprocally, we *understand* the theory of gravity in relation to empirical observations of things falling to the ground; but the combined structure of theory and observation has no foundation outside of itself; we can say that it hangs in the air. But the exercise of constructing such relationship patterns on otherwise chaotic observations may nevertheless prove "useful". Allowing that 'intelligence' is "the ability to see patterns" (Mensa IQ definition) a theory that co-ordinates and integrates in this way is "useful" for the simple reason than "it makes us intelligent". The better equipped I am to order and regulate our sense-data, the better equipped I am thereby to be "pro-active" with regard to such sense-data, in short, the better equipped I am to be "successful". The theory is successful in so far as "I" am successful. In a sense, I link here with Foucault's (1977) position that the production of knowledge is never separable from the exercise of power.

It is always likely that having formulated some conceptual frameworks of ideas, that such frameworks will be confronted subsequently by other observations (and possibly ideas). *De facto*, our conceptual framework either remains intact (in continuing to inform and guide our practice and structure our life), is modified, or is abandoned. But in no case am I called on to make pronouncements as to the intrinsic "truth" underlying our process of theory building. Thus to the oft-repeated claim that the "efficient market hypothesis" is the most extensively tested hypothesis in the social sciences, I might reply "What of it?". That is to say, an effective paradigm must go beyond being in some sense "not incorrect" - it must grasp an essential concept or view of the world along with its terms of reference and be able to facilitate further levels of understanding and enquiry.

This view of the essence of a paradigm may be illustrated in terms of a further example from physics. We assume that the force of gravity creates mutual forces of attraction between the sun and the planets so that their relative motions are determined. We assume, naturally, that these forces work independently of the notion of an origin to a frame of reference and measurement as might be imposed by observing physicists, so that a framework of analysis that features the Earth as the centre of observation is quite legitimate and will produce predictions perfectly consistent with a conceptual observation point fixed at, say, the centre of the sun. The point of setting the sun at the centre of the system of measurement for the solar system is that it makes the formal analysis *much simpler*. Yet the choice has profound consequences; for allowing that society can allocate only so much intellectual activity to any given enquiry at any time, a paradigm that simplifies our intellectual framework greatly enhances the furtherance of effective enquiry. The theoretical edifices that plotted the orbits of the planets around the earth surpassed in terms of "intellectually difficulty" the derivation of Newton's elliptical paths. But without the shift to a system with the sun at its centre, intellectual endeavour might yet be absorbed in plotting the painfully difficult trajectory of each new comet and every new satellite. As it is, intellectual capacity has been freed to progress to new worlds of enquiry.

The volume of intellectual endeavour given over to the development of a positive framework of corporate financial analysis with its restricted impact on effective management insight might suggest an intellectually impressive but ultimately a highly restricted development akin to that of explaining planetary motions as it preceded the Copernican view of the solar system. Thus we state that great breakthroughs in understanding are more often not so much those that discover something new, as those which succeed in placing what was previously considered peripheral or anomalous at the centre of a framework of understanding. To take yet another example, the invariance of the speed of light was observed experimentally by Michelson and Morley and the invariance of Maxwell's theoretical electromagnetic behavior under transformations implying the constancy of the speed of light was contributed theoretically by Lorentz. The insight of Einstein was to place the Lorentz framework as the central paradigm for his enquiry into electromagnetic phenomena. In effect, the most satisfactory way to grasp the essence of the phenomenon was to place it at the centre of the corpus of thought. The development of quantum theory provides a similar example, where an established, but relatively new phenomenon, the discreteness of observed energy levels, was made central to conceptual development.

Allowing that a theory *is* that which "explains by integrating" we may recognise it as no more than the logical self-consequence of a theory that it should strive to be of the form of an all-pervasive, closed system, - which is to say, that all phenomena within a particular field of investigation can be explained ultimately with reference to some single set of first principles. Nevertheless, we cannot state *a priori* that such a theory is to exist. Rather, it may be that at least in the short term (in the long term, we are all dead) that classes of phenomena might continue to be understood *more easily* in terms of qualitatively different types of

order. A more pluralist approach involves an acceptance that different notions of order might be legitimate within the same subject field, with each notion more relevant - which is to say more 'useful' - in co-ordinating patterns of understanding in one area than in another. In Economics, itself, for example, we have the micro and macro levels of understanding of economic behavior. In our attempt to structure useful patterns of understanding in the domain of financial activity (in the following sections), we shall find ourselves obliged to allow such a splitting of types of order, distinguishing between corporate finance (the focus of the present chapter) and investment finance.

### Corporate Finance and Financial Markets: Some Stylized Facts and Observations

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In this section, I attempt to summarise essential corporate financial activity (the firm's investment, financing and dividend decisions) as well as the characteristics of the financial markets in the context of which firms must raise and utilize investment capital. Thereafter, in the following section, I shall consider what kind of statements might provide us with the platform *paradigm* on which these observations can be most readily constructed.

#### *Corporate Strategy and Investment Decision Making*

A firm's investments ultimately define the firm. It follows that the firm's major investment decisions are ultimately inseparable from decisions about the firm's sense of purpose and strategy aimed at achieving that purpose. In this subsection, I shall therefore consider a firm's investment decision-making through a consideration of its strategic decision-making.

The notion of strategic *continuity* is a prominent theme in the literature (1990). That is, strategic reorientations within companies occur only rarely (eg, Jonsson and Lundin, 1977; Starbuck and Hedburg, 1977; Hedburg, 1981; Miller and Friesen, 1980, 1984; Mintzberg, 1978, 1987; Pettigrew, 1985). Thus Mintzberg (1978), for example, traces over-arching continuities of periods of 17 and 18 years, respectively, for Volkswagen's product strategy and the U.S. military strategy in Vietnam. And Mintzberg and Water's (1982) analysis of a retail chain history finds only six shifts in strategic behavior in 57 years, roughly once in every ten years, of which only half constituted major strategic reorientations. Pettigrew (1985, chapter 11) reports comparable continuities in his analysis of ICI's history. Authors such as Mintzberg (1978, 1987) and Mintzberg and Waters (1982) see such periods as *desirable*, enabling organisations to develop and perfect those things that they already do well, as if in a quest for continual improvement. Change in these cases is disruptive, whereas continuity permits consolidation.

Organisations certainly experience tremendous *difficulty* in responding to change (Starbuck and Hedberg, 1977; Pettigrew, 1985). Structural and political factors create inertia (Pettigrew, 1985; Miller and Friesen, 1980, 1984; Mintzberg, 1978). Dent (1990) considers that this may be explained by the fact that organisations have been *selected* more or less *deterministically* to their distinct niches in the first place, on the basis that their particular capabilities are valued. In this

perspective, we must even be careful as to what extent we allow that an organisation has "volition" in its choices (Astley and Van de Ven, 1983). Certainly the capabilities of firms are defined by sunk costs, irreversible investments as well as the characteristics of its personnel built up in the past, so that the strategies of the organisation are determined by where they have been in the past and by what they have done. Investment decisions that are directed at re-aligning the firm's competitive posture in terms of new competitive strengths and distinctive competences, are the exception (Pfeffer and Salancik, 1978).

Notwithstanding the simplifying determinism of organisational behavior implied by the above descriptions, many authors emphasise a world in which managers face overwhelming *complexity*. Decision problems are potentially "messy" (Ackoff, 1970), "ill-structured" (Mintzberg et al., 1976; Mitroff and Emshoff, 1979), and "wicked problems of organized complexity" (Duhaime and Thomas, 1983; Mason and Mitroff, 1981. p. 12). The problems exhibit characteristics of interconnectedness, complicatedness, uncertainty, ambiguity, conflict, and societal constraints. Consistent with our philosophical position developed in the previous section, we can say that individuals learn to cope with, and indeed to manipulate, such potential chaos, by *inducing* a system of *pattern recognition*, a conceptual framework, which is the paradigm set of presupposed notions of order which precondition allowable subsequent responses. Otherwise, individuals, and thereby organisations, must typically face much richer and more complex stimuli than they can readily process (cf, Hedberg et al., 1976; Starbuck and Hedburg, 1977; Argyris and Schon, 1981; Hedberg, 1981). If subverting chaos requires that everyone sing from the same company song sheet, the organisation's paradigm of shared meanings and values acts as a central organising concept, reinforcing the firm's normative order, within which individuals are able to order and interpret their own contributions and their relations with each other (Berger and Luckman, 1966; Blumer, 1969; Weick, 1979). In this case, through action and interaction, stylized explanations become entrenched as behavioral routines or *patterns*, which effectively define the relevant stimuli and responses (Duhaime and Thomas, 1983). Which is to say, the patterns of recognition which reduce decision making processes to manageable proportions also make the organisation insensitive to change by bracketing out certain stimuli from consideration. In other words, 'choice' within the firm becomes bounded by consensually validated interpretations of causality and rationales for organisational action (Beyer, 1981; Starbuck, 1983; Starbuck and Hedberg, 1977). Ultimately, organisational participants become trapped in Morgan's (1986) "psychic prisons" (Dent, 1990). The paradigms lock organisations into existing strategies, structures and action patterns even as they become obsolete.

So much so, that a sense of crisis is often a necessary condition for effective change. It is only when a succession of actions demonstrably fails to deliver its intended consequences that faith in the existing paradigm is undermined, creating conditions for the emergence of new paradigms, and associated strategies and structures. Such is the difficulty of achieving paradigm shifts,

however, that they are frequently contingent upon the arrival of new leaders who bring new interpretations. Corporate turn-round strategies are generally associated with a change in top management even when the need for the turn-round is brought about by factors beyond the control of management (Slatter, 1984, p. 78). It is only new leaders who can rupture an organisation's belief in the efficacy of its past. Thus although the impression is often given in the literature that investment decision-making occurs regularly in the organisation (at least one formal budget a year), the exercise is most often an incremental activity: the largest factor in determining the size and content of any single year's budget is usually the previous year's budget (Davis, Dempster, Wildavsky, 1971). Miller and Friesen (1980, 1984) suggest that because adaptation is costly, organisations delay adapting to environmental change until the magnitude of change renders the opportunity costs of continuing with existing strategies greater than the cost of structural and strategic realignment. Firms may be acting out strategies grounded on a firm historical base long after they have outlived their usefulness. 'Continuity' in this case can be interpreted as inertia.

To a greater or lesser extent, a number of authors have drawn analogies with Kuhn's (1962) concept of paradigms in the development of science. The firm's concept of *what it is* and what it should be - its *paradigm* strategy - and the implementation of that paradigm - "normal activity" - do not change easily. Both bureaucratic and psychological inertias resist change. When a shift does occur, we have the disruptive upheaval that Kuhn identifies as a paradigm shift in scientific theory. Consensus has been violated. Following the "sweeping changes", a new consensus faith must be created on the new paradigm, which is the firm's new identity of itself, and through which the organisation's environment is reinterpreted (Jonsson and Lundin, 1977; Hedberg and Jonsson, 1978; Hedberg, 1981; Dent, 1990). Kuhnian "normal" firm activity may then continue under the new over-arching strategy consistent with the new paradigm.

Within the paradigm of over-arching strategy, the firm's "normal" tactical and implementing activity takes place over a range of departments: engineers, marketing and production departments make crucial investment decisions (Mukherjee and Henderson, 1987; Petty et al, 1975; Ross, 1986). Investment proposals are naturally screened for their strategic fit. But both personal and political reasons may also underlie the reasons why a project idea is initially proposed (prestige, personal/departmental ambition, empire building). An individual wishing to carry a new idea through will doubtlessly need to take others with her. Negative reactions are a part of the appraisal process and for this reason, a new project idea may require a sponsor with "reputation" who is prepared to be identified with the project and to give it his backing (Bower, 1970, p. 77; Hopwood, 1974, p. 134; King, 1975). Lobbying and exhortations have a part to play as *commitment and trust relationships* are engendered. "Business is a people orientated thing, it is about personalities" (Carr et al, p. 107, 1994). Ultimately, the bottom-up development of division plans and top-down portfolio management come together in the approval of division plans and budgets. At this stage, ultimate endorsement of an investment proposal is likely viewed as an



endorsement of the proposer(s) (Pike and Wolfe, 1988, pg. 11), or as a reflection on the track record, prestige and/or political influence of the proposer(s)/department (for example, Mukherjee and Henderson, 1987; Ross, 1986). McAulay (1996) emphasises the role that managerial credibility has to play in capital investment appraisal by quoting one Financial Director:

If you get a project and do it well then you go onto the next one. And then you'll be given more opportunity. If you don't, then you're going to be on the wayside. People are pretty careful. It happens on a human level almost more than on a numbers level. The whole process of who gets selected to do what comes out of people having watched what various people are doing. (p. 94)

and concludes that the issue of "credibility" in management in general is an under-researched area. Such "credibility" or *reputation based on past performance* may imply that it is difficult for a firm's personnel to convince either each other or their financial stakeholders that they are competent to act other than to sustain performances, rather than to execute any radical departures. But if it is difficult for individuals to break out of their past performances, the firm (as an aggregate of such individuals) is again constrained to evolve on the basis of its past.

This suggests that we might view managers at tactical and routine levels more as "implementers" than as "investment decision-makers". We might even think of managers as "acting out" the paradigm of the firm. In this case, we can perhaps understand the view of many divisional managers who recognise their contribution as that of day-to-day overcoming logistic problems, "getting the job done", rather than that of "determining what the job should really be". A manager's job is to sense what constitutes a satisfactory level of performance, whose ideas are worth listening to, and what events are significant predictors of future opportunities and calamities. A successful decision-maker depends more on an ability to anticipate problems "ahead of time" along with an ability to recognise a range of alternative courses of action, than on an ability to choose carefully between them. After all, either the choice is clear-cut, or it isn't (the advantages/disadvantages are a close-run thing). But in the latter case, by the same token, the *ex ante* choice cannot be said to be of crucial importance. Hence, perhaps, the response of managers to academic enquiry into their decision-making: "It's a matter of applying judgement and common sense. You guys over-complicate these matters - it's like I know when the house needs painting!" (as reported by Carr et al, p. 81, for example).

### *The Corporate Financing Decision*

Although Scott and Johnson (1982) suggest that executives are often happy to subscribe to the concept of an optimal capital structure, Baskin (1989) concludes that "the Modigliani and Miller theory of static optimal capital structure appears to have little power in explaining corporate behavior", a conclusion that follows from the empirical observation that debt leverage varies positively with past growth and inversely with past profits, along with the observation that borrowing behavior appears serially uncorrelated so that there is little indication

of any adjustment towards static optimal equilibrium. And Pinegar and Wilbricht (1989) reveal on the basis of surveys only little conscious concern by executives for the corporate tax savings consequent on their firm's debts, and negligible regard for the personal tax implications. Rather, firms tend to simple rule-of-thumb target debt-to-equity ratios (Mayer, 1986, UK based; Scott and Johnson, 1982, US based) combined with a straight-forward 'pecking order' preference for raising finance: retained earnings followed by debt with new issues of equity being quite rare (Mayer, 1988, UK based; Baskin, 1989, US based).

For managers, the essential impact of their debt is to create leverage. Provided the firm can beat the interest rate on borrowing, a greater level of debt financing implies a greater profit per unit of equity finance, thereby generating an increase in the share's market value. The higher the firm's level of debt repayment commitment, however, the more crucial that the investment achieves a return that at least equals the interest repayments on the debts taken out to finance that investment. Managers are likely to wish to be associated with high earnings for their shareholders for at least three reasons: one, managerial salaries may depend on market value through a share option incentive scheme; two, in general, the probability of a takeover bid will be lower the higher is the market value; and third, if managers are issuing new debt and equity then the higher the market value the more capital can be raised, and in general the larger the amount of capital raised the more managers can increase their perquisites. Put less formally, there is fame, glory and wealth to be attained by those identified with corporate success.

Thus dependent on the nature of their utility functions alongside their level of confidence and aggressive ambition regarding a proposed investment, there is an incentive by management to take on debt. This is consistent with the general observation that firms assume higher debt-to-equity ratios when they are optimistic about the economy (Pinegar and Wilbricht, 1989). Nevertheless, though higher debt allows for greater success, too much can be dangerous. And even ambitious managers are unlikely to throw caution to the wind and risk everything: the upside benefits contingent on success may imply added acclaim and attendant perquisites for key personnel, yet are likely to be incremental in affecting lifestyles, compared with financial downfall, which may involve severe compromises to individual positions: a stalling of career ambitions, loss of face and even dismissal. Managers do not get too many opportunities to mess up, and accordingly are likely to be wary of the downside of investment projects if they expect that any financial embarrassment would compromise future projects. The inclination of banks to commit financial resources to the firm is conditioned on its reputation *based on past performance*. A firm or individual's poor track record - getting into financial difficulties in the past - will be held against it in future periods. For this reason, firms strive to build *commitment and trust relationships* with their banks.

### *The Corporate Dividend Decision*

A firms' adherence to sustained dividend growth has remained the most firmly established of empirical observations since Lintner's (1956) study. In the survey of G7 countries, Browne (1994) confirms that the proportion of profits paid out as dividends varies counter-cyclically with the generation of profits. Managers therefore seem to have target levels for dividends, and adopt policies, which smooth the time path of dividends to achieve these targets. They appear to wish to avoid making changes in dividend payments, which may subsequently have to be reversed in the event of unfavourable outcomes for profitability.

Regular dividend payments may be understood from a number of perspectives. Firstly, we observe that investors who wish to assess the value of a firm must interpret a complex set of information. As is consistent with our philosophical stand-point developed in the previous section, such investors will naturally seek out *patterns* in the available data. By providing investors with a stream of steady dividends, a firm is providing the most easily interpreted *pattern*. Such dividends consolidate the firm's *reputation based on past performance*. A dividend either above or below the trend contradicts the pattern, and hence will destabilise investor perceptions of the firm's value. Secondly, from a financial perspective, we observe that a firm has "self-sustaining growth" when it has a policy of retaining a more-or-less constant proportion of its earnings for reinvestment (its retention ratio, eg, Copeland and Weston, p. 551) while aiming to assume additional debt obligations to the point that leverage is maintained at more-or-less historical levels through the business cycle (as indicated in the previous sub-section). In this case, the firm's growth derives from its past performance, and the firm's dividends are positioned to grow naturally at some corresponding self-sustaining growth rate. Thirdly, regular and sustained dividend payments maintain a *commitment and trust relationship* between the firm and its shareholders. Such dividends bind firms to their shareholders. They ensure that firm profits are forthcoming to investors and not re-invested more or less freely in management pet projects.

### *The Financial Markets*

Reflecting on the world-wide stock market crashes of October 1987, Brealey and Myers (1991) (the standard champion text of MM theory for a generation of students) concede that a 20% or thereabouts crash in stock market prices might be recognised as having occurred within reasonable error bounds of any cost of capital stock valuation model. They state:

The extreme difficulty of valuing common stocks from scratch has two important consequences. First, investors almost always price a common stock relative to yesterday's price or relative to today's price of comparable securities. In other words, they generally take yesterday's price as correct, and then adjust it upward or downward according to today's information. If information arrives smoothly, then as time passes investors become more and more confident that today's market level is correct. However, when investors lose confidence in the benchmark of yesterday's price, there may

be a period of confused trading and volatile prices before a new benchmark is established. (p. 299)

All the models can say is that to a greater or lesser extent, share prices should firm upward on the advent of good economic news, and slip downward with bad economic news between some levels that appear reasonable on the basis of fundamental value. With share prices free to wander within such a substantial range, investors face an “instability of share price problem”. Constrained within the possible range, there is room for human sentiment and psychology and for the materialising of Bull markets and Bear markets.

We can see this in the context of the individual’s need to look for patterns in the face of uncertainty. Rising stock prices confirm the stock market’s *reputation based on past performance*. *Commitment and trust relationships* are thereby engendered – with the outcome that investors buy further into the market so that prices rise further in additional confirmation of the market’s strength. The processes of (lack of) reputation based on past performance, and (lack of) commitment and trust relationships of course work equally to self-fuel the market’s downward movements.

We might say that share prices can move to the limits of their bounds - justified, for example, by economic prospects, business optimism, low interest rates (at once favouring the cost of debt to business whilst making equity shares more competitive as against holding safe debt securities) - but a bubble of market rises brought about by investors' self-fulfilling belief in continuing rising prices will increasingly be questioned by practitioners as the ratio scales new highs. As tension rises with yet increasing values, it is made increasingly likely that any unfavourable economic news will halt the speculative rise. A reverse position operates for the market in decline. The corollary is that a firm's share price is able to indicate the rate of financial return that a firm is expected to achieve only within some corresponding approximation. Shiller (1981) determines that if share prices are allowed to move within their likely ranges on the basis of psychology, the determination of the cost of financial capital is put truly in the "nebulous regions". For practising management it may be that the cost of capital is actually too nebulous and elusive a parameter to play a key role in financial policy, at least on an everyday or recurring budgeting level (Durand, 1989).

In attempting to characterise the relationship between firms and financial institutional intermediaries, a stylized and often observed distinction between Anglo American financial arrangements and those of Japan and Germany (and to a lesser extent France), is that the former rely more on *reputation based on past performance* (market based), while the latter rely to a greater degree on *commitment and trust relationships* (bank based) (cf Mayer, 1987; Browne, 1994). Of course, it is possible that the two concepts can be fashioned out of each other: reputation may foster commitment, which, in turn, creates the supportive conditions that allow the establishment of reputation. Thus we can imagine that a firm's management might wish to acquire 'commitment and trust relationships' with their providers of investment finance, whilst the providers of such finance

might assess the recipient firm on the basis of 'reputation based on past performance'.

### An Institutional/Behavioural Foundation

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The depiction of the firm's financial-orientated activities in the previous section may appear stylized. Nonetheless, it is broadly consistent with how these activities are represented in at least a broad stream of the Management/Finance literatures. From these perspectives, it appears that not only is the "cost of equity capital" criterion allowed a misplaced focus as a criterion by which to assess the firm's corporate financial management, but that "investment decision-making" itself is misrepresented within the finance literature as an activity within firms. Our observations suggest a world of potentially overwhelming complexity of options about which the firm "simply does not know" and there exists the possibility of genuine surprise. That is to say, the firm is *not* able to assess future cash estimates on the basis of agreed-on-by-all probability density functions for every possible future state. Thus, we have a problem of fundamental uncertainty in attempting to specify the parameters in any quantitative model of market valuation. Having in this way removed the invisible hand of a cost of financial capital as that which works to co-ordinate the provision and utilization of investment finance in well-functioning markets, we are obliged perhaps to postulate (by induction from the evidence) alternative mechanisms of co-ordination. To this I now turn.

In order to implement its strategic intent, the firm must raise and utilize investment capital in the context of financial markets. If we refer back to the previous section, to our stylised summary of financial market and corporate behavior patterns, we may observe the repetition with which we succeeded in accounting for these patterns with reference to:

- (i) reputations based on past performance,
- and
- (ii) commitment and trust relationships.

Corporate financial activity is thereby viewed fundamentally within a framework of institutional arrangements and behavioural considerations. In contrast, the paradigm of modern corporate finance insists that corporate financial activity should be viewed *primarily* as the outcome of investors' ability to maximise the performance of their agent managers. The two sides of the investment coin (corporate finance, investment finance) must in the end meet. But it is clear that one is not the straightforward reflection of the other.

From our philosophical stand point, we can say that a conceptual framework continues to be sustained as "useful" to the recognition and understanding of field/case-study research; or, alternatively, falls short in such regards. Thus we might close this section by assessing briefly the above conceptual framework against two further recent grounded research projects. The first is focussed on corporate investment decision making from a financial perspective, the second is concerned more generally with the characteristics of successful firms.

The grounded field research by Carr, Tomkins and Bayliss (1994) contrasts the approaches to strategic investment decision-making in the motor-components sector of U.K. and German firms. For the U.K. firms, the authors identify a strong "financially-orientated" perspective ("On top of this we have a growth target of 10-15 per cent a year on earnings per share. This is a permanent thing; we always want growth," p. 31, for example); while for the German firms, they identify a much more "market-orientated" perspective ("The financial analysis on that decision was fairly trivial. The big strategic decision to enter the market had been taken eight years before . . . it is a typical case for a new product in a big volume market; when it is a success you get a big explosion, and I believed in that explosion," p. 113, for example). The paradigm outlooks predicate behavior patterns in both cases. A recurring concern for the authors is the extent to which the strong financial control exerted by U.K. firms appears to be unrelated to (i) any correctly specified cost of capital and (ii) any realistic assessment of potentially realizable returns within the industry. Notwithstanding, *reputations based on past performance* and *commitment and trust relationships* are recurring themes in the accounts of decision making in both sets of firms.

Our conceptual framework also accords closely with the framework of interpretation of corporate enterprise employed by Kay (1995) who in addressing the question, "What are the origins of industrial success?" considers that the most important issue is the match between the distinctive "capabilities" of the organisation and the challenges it faces. The three primary "distinctive capabilities" are "architecture", "reputation", and "innovation". By "architecture", Kay refers to the "network of relational contracts within, or around, the firm", which may be legally contractual - or "informal and relational, and enforced primarily by the need the parties have to go on doing business with each other". In short, they are *commitment and trust relationships*. The second primary distinctive capability of the firm is its "reputation", which must be built up on its "recognised performance". For Kay, the third primary distinctive capability of the firm is "innovation", a capability which is considered as being often directly attributable to the firm's architecture of *commitment and trust relationships*.

### Summary and conclusion

The chapter has begun by considering the very nature of "understanding" in terms of paradigm assumptions. I have argued that although a paradigm shift may occur as the refutation of a prevailing paradigm, it is at least as likely to occur as the recognition that patterns of understanding may be structured *more readily* around an alternative set of key-note assumptions, a view that I support with examples of paradigm shifts as they have occurred in the physical sciences. In the context of these considerations, the chapter has assessed the traditional cost of capital paradigm as a basis for recognising and understanding corporate financial decision-making – the firm's investment, financing and dividend decisions. The chapter thereby has developed an alternative paradigm of keynote assumptions about (i) *reputations based on past performance* and (ii)

*commitment and trust relationships*, by which corporate financial practice may more advantageously be recognised and understood.

The present chapter has offered an institutional/behavioural paradigm, on the basis of which an abstraction of a socially constructed market place has been achieved. By placing at the very beginning of the study the concept of "the firm facing complex uncertainty" - essentially *defined* so as to have no satisfactory mathematical apparatus of quantification - the framework of study and analysis is aligned with the behavioral sciences. The institutional/behavioral paradigm asserts that the firm (as an organisation of individuals) must cope with uncertainty and complexity precisely as individuals generally are assumed to cope with uncertainty and complexity: that is, a *framework of patterns* is imposed by which to reduce the interpretation of data to manageable proportions. Our claim is that patterns of 'reputations based on past performances' and 'commitment and trust relationships' scenarios are used by individuals in order to regulate otherwise overwhelming uncertainty and complexity. In which case, we expect that such patterns – rather perhaps than those of risk-return optimisation processes as such – are likely to provide the theorist with the more useful framework of recognition and understanding of corporate financial management decision-making as an on-going activity.

The capability of a theory to explain depends upon the methodological approaches it adopts. Thus, hitherto, with perfect capital markets as the paradigm, those contributions that acknowledge the need to bring in an institutional/behavioral dimension are yet confined to confront the paradigm of perfect markets and present argument in the language of its terms of reference. Informed comment not articulated in terms of the perfect market paradigm - be it from financial observers reported in either the press or dedicated magazines - remains irrelevant, and the research approach of careful observation of what institutions and people actually do has until recently remained unfashionable. All of this, however, might yet be essential grist to the mill of a theory of corporate finance that is squared directly at financial institutions and their operations.

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## Chapter 16

### Institutional Ethics: An Agenda for Consolidation or for Radical Change?

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#### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

1. Understand how the development of ethical frameworks can be interpreted in terms of a process of natural selection with regard to the mutual interdependence of the individual and the community
2. Understand that institutional ethics do not exist “to do good”, but rather to act reflexively to consolidate and sanction internal activity
3. Understand that the employee is called on to be ethical not on the individual’s own terms, but on the profit-motivated terms of the institution

## Introduction\*

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This chapter represents a commentary on ethics and, specifically, ethics in our corporate and financial institutions. As such, it does not set out to offer direction; which is to say, it does not set out to be normative. The chapter considers that conceptual frameworks exist, not to portray truth as an absolute, but rather to provide order and guidance to actions and behaviour. From such perspective, the chapter suggests that ethical frameworks assist in our attempt to balance the instinct that we have to look out for our own individual welfare with the conscience of obligation that we have to care for a wider community. The chapter proceeds to develop the argument that our institutions can no longer be regarded as passive entities to be managed objectively for shareholders and the public interest. They are to be regarded rather as self-possessing and inherently self-interested entities functioning in terms of their own self-sustaining agendas. The chapter thereby recognizes that at the heart of institutional ethics is the priority of preserving and promoting the institution itself. As an example of institutional resistance to an individual who aspires to “change how things are done”, the chapter concludes with a consideration of the inception of the operations of the socially minded Grameen Bank.

The chapter argues that it is in the nature of ethics that they act to restrain excesses while yet acting to sanction norms *as they currently exist*. For this reason, the employee individual is in fact called on to be ethical on the institution’s as opposed to the individual’s own terms. Indeed, a criterion of employment suitability in the first place is likely to be that the individual is not at variance with the implications of the profit motive as they broadly direct market activity. Consistently, the debate that has been captured within the domain of institutionalised ethics has been restricted to a *reflexive* one, concerned with the micro-behaviour of actors who operate in terms of one another *within* the system; the outcome of which is that the debate represents a consolidating agenda, rather than a revolutionary one.

In developing these arguments, the chapter progresses from a consideration of the nature of conceptual frameworks generally to a consideration of ethical frameworks, and, in particular, corporate and financial ethics. We consider that the development of society’s overarching structures and their ethical content can be understood in terms of the development of its institutions; and, aligning with Foucault’s analysis, we consider the outcome that our institutions progress from being the “object” of our knowledge-base as we attempt to understand them, to becoming ultimately “subject” to our understanding of them. In this view, our corporate institutions are no longer driven by individuals as such, but by the knowledge-base in terms of profit and loss that we have created about them, which sets the parameters within which ethical behaviour has adapted. Against a sense of the inevitability of institutionalised ethics, to which we all must

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\* This chapter has been adapted from the author’s previous article published in *Critical Perspectives on Accounting* (Vol. 11, 2000, pp. 531-548).

conform, the chapter outlines the radical features of the Grameen Bank. The example serves to emphasize the constraint on individual ethics in our institutions, while holding out the possibility that individual – as opposed to institutionalised - ethics are yet capable of shaping how our institutions function. The final section concludes the chapter.

### Conceptual Frameworks

Statements relating to fundamental concepts are at the heart of conceptual frameworks. The concepts are made *intelligible* to the reader by means of additional “definitions” of the words that are used to identify the concepts in the statements. But since the words in the definition must technically be defined in their own turn, *ad finitum*, the underlying concepts or *meanings* of the words must ultimately be *grasped* in a gestalt manner by the reader. We align here with Wittgenstein, that the definitions are as a ladder that is discarded when one arrives at the top. In this way, a correspondence of meanings is developed between author and reader, much as a correspondence on the meanings of the names of colours or tastes is developed, without ever knowing for sure how closely our experiences of these concepts actually align. The mathematical philosophers Whitehead and Russell observed that although the definitions are “theoretically superfluous” (Whitehead and Russell, 1910, p. 11), they nevertheless “embody our choice of subjects and our judgement as to what is most important” (Whitehead and Russell, 1910, p. 11). The statements relating to the fundamental concepts are generally reflexive ones of the kind, “The force on an object is equal to its mass multiplied by the acceleration”, where the object mass is actually defined as the force divided by its acceleration; “Only the fittest survive”, in so far as “the fittest” are to be understood as those that survive; or, “A person ought to perform their duty”, in so far as duty is understood as that which we ought to perform. This, of course, is logical. If the initial starting-off statements have no prior foundation, they must be reflexive or *tautological*. In this case, the statements represent an extension to an agreed understanding of the concepts.

It appears to me that the *usefulness* of such formations is to the extent that they allow us to cope with the potential chaotic nature of our perceptions and experiences by the imposition of *patterns* of recognition which we “catalogue” against the definitions and tautologies (“intelligence” is the ability to see patterns, Mensa IQ definition). That is to say, I am able to interpret my sense data in terms of the definitions and tautologies in a manner that is *repeatable*. Without these patterns of recognition, I am left confused by the data. I am unable to cope “intelligently” with the data. The manifestation of patterns creates a conceptual framework. It breaks down (to a greater or lesser degree) when observations fail to fit the pattern. In this way, I move from a tautology to hypotheses that are testable. All animal and life forms must learn to recognise and respond to patterns in their environment (which represents the distinguishing feature of life). When this is done consciously, it may be termed the business of building conceptual frameworks. The process is subjective in the

sense that if all my sense data makes perfect sense to me in terms of one or another tautology, there is not a lot more to be said. Reality *is* my sense of pattern formation imposed on my sense data. Nevertheless, *shared* patterns of understanding are required for intelligent communication between life forms.

On such a basis, the scientific philosopher Hilary Putnam (1979) refuses, in fact, to accept the separation of science and behavioral science, arguing that what previous scientific philosophers - Popper in particular - fail to recognise is that "practice is primary", meaning that our ideas are not just an end in themselves; rather, they exist to "guide practice", to structure whole forms of life:

We judge the correctness of our ideas by applying them and seeing if they succeed; in general, and in the long run, correct ideas lead to success, and ideas lead to failures where and insofar as they are incorrect. Failure to see the importance of practice leads directly to failure to see the importance of success. Circular justifications need not be totally self-protecting nor need they be totally uninformative. . . . The fact that a justification is circular only means that that justification has no power to serve as a reason, unless the person to whom it is given as a reason already has some propensity to accept the conclusion. We do have a propensity - an *a priori* propensity, if you like - to reason "inductively", and the past success of "induction" increases that propensity. . . The method of testing ideas in practice and relying on the ones that prove successful (for that is what "induction" is) is not unsuccessful. That is an *empirical* statement. The method does not have a "justification" - if by a justification is meant a proof from eternal and formal principles that justifies reliance on the method. But then, nothing does - not even, in my opinion, pure mathematics and formal logic. Practice is primary. (p. 374-5)

Thereby, Putnam opposes the positions of both the Popperian deductivists and the Kuhnian inductivists, who in their different ways, assume that the purpose of a theory is to continue to make *new* predictions aimed at a continued refinement of a notion of underlying truth. For Putnam, the purpose of a theory is to be "useful". It is of course always likely that having formulated some conceptual frameworks of ideas, that such frameworks will be confronted subsequently by other observations and ideas. In this case, *de facto*, our conceptual framework either remains intact (in continuing to inform and guide our practice and structure our life), is modified, or is abandoned. But in no case are we called on to make pronouncements as to the intrinsic "truth" underlying our process of conceptual framework building. We align fundamentally here with Arrington and Francis (1989) that knowledge can never be held to be externally grounded, which is to say, legitimated outside its own discourse: "Every claim to knowledge is a discourse, a text, and is both a product of human manufacture and inseparable from the language which gives it expression".

## Ethics as a Conceptual Framework

The fundamental concepts of ethics are represented by the words “good” and “ought”(or “duty”). With “good” a distinction can be made between good as a means and good as an end. Socrates seems to have held that the first and main function of ethics was to define ethical terms, and that we could not really be virtuous unless we knew the definitions of the virtues. But if the words of ethics are not to be defined circularly in terms of each another, they must be defined relative to non-ethical concepts, in which case ethics ultimately becomes a compartment of that science to which the non-ethical concepts in question belong. Thus if “good” is “what is conducive to a stable society” ethics is a branch of sociology; if “good” is “what God wills” it is a part of Theology. Ethics is concerned with the transcendental concept of “goodness” (which comes close to a Theological concept of a Greater Good) and to the concept of “duty” (which comes close to a sociological concept of assigned responsibilities within society). But ethics at the same time is neither of these departments. Ethics has its own particular purpose.

Dobson (1993) considers that a true role for ethics in the corporate community requires that its members aspire to an “internal good” or “ethical ideal”, which may be identified with the good that Bella and King (1989) describe in terms of “common knowledge of the second kind. . . (which) cannot be ‘grasped’ through objective analysis or subjective introspection. Rather it is only revealed through ‘opening’ oneself to such knowledge”. Dobson adds: “It is what classical philosophers describe as ‘virtue’, the internal good toward which all human endeavor should strive”. The outcome is that: “A *truly* ethical individual, pursuing internal goods, would never sacrifice honesty for material gain, but would only too readily sacrifice material gain for honesty”. Dobson quotes the evolutionary economist Robert Frank (1988): “Satisfaction from doing the right thing must not be premised on the fact that material gain may follow; rather it must be *intrinsic* to the act itself”. As for how such aspirations are to take place in society, Bowie (1991) is quoted: “Looking out for oneself is a natural, powerful motive that needs little, if any, social reinforcement. . . Altruistic motives, even if they too are natural, are not as powerful: they need to be socially reinforced and nurtured”.

Fundamentally, we are moved to oppose the above philosophical positions. We have contended that it is in the nature of statements, that they are without foundation other than in their usefulness to those who communicate across them. For such people, the statements assist in interpreting and making sense of the world. For others, however, the statements may simply fail to “connect” with their experiences. Whether or not this is the case must ultimately be an empirical issue. Perhaps, after all, I am *unable* to “open myself. . . to the common knowledge of the second kind. . . which cannot be grasped through objective analysis or subjective introspection”. Perhaps my ethical code is such that I *object* to my altruistic motives being “socially reinforced and nurtured”. To talk as Dobson of an ethical code being unethical is, in the end, simply to communicate



that one finds that the code is incompatible with one's own. Ultimately, there can be no grounding for considering that one's own ethic is absolute, against which a majority ethic is "illogical". I may, of course, find that another person's ethical code is unacceptable or repugnant – and may be prepared to take up arms to confront that ethical code. In this case, the term "unethical" denotes my confrontation with that ethical code. Nevertheless, I cannot be "unethical" any more than I can be "inhuman".

Our own understanding of the purpose or need for ethics – which is the foundation of the present chapter - is as follows. We may assume that while natural selection has favoured individuals who have learned to be "self-seeking" (egotistic), it has also favoured societies whose members have learned to be co-operative (altruistic). The outcome of the natural selection process is that as individuals, we possess an *instinct* to care for ourselves and a *conscience* to care for others. Our conscience has the potential to inflict a sense of *guilt* at self-benefiting actions that are detrimental to the broader society; or, more positively, has the potential to provide a sense of *self-satisfaction* on the self-knowledge that one has sacrificed oneself materially for the greater good. When an individual's co-operation is public or visible within the society, the individual can be rewarded by society so that the conflict between the demands from the self and the society is resolved. As others have recognised, egotism (selfishness) and altruism (selflessness) in this case may be one and the same. However, when altruism is not public, there exists within the individual the potential for conflict between the developed urges to egotism and altruism. The purpose or need for ethics is to make coherent sense of these impulsive urges. That is, ethics represent the attempt to resolve the conflict between selfishness and selflessness; between our material needs and our conscience. It attempts to make sense of our relationships by harmonising our need to live with others as well as with our self. In this way, ethics function to co-ordinate and achieve the co-operation of its members.

We would argue that to the end of resolving the conflict between selfish instinct and conscience, we are, as human beings, capable of accommodating a sense of ambiguity - a kind of intellectual self-deception - that is to our advantage. When we witness this in others, we are likely to call it hypocrisy. That is, rather than maximizing my overall well-being by attaining some conscious compromise between my instincts of ego and altruism, I maximize overall well-being by avoiding a confrontation with the dilemma that could be expected to precipitate any real action. I learn to engage in subterfuges so that "now" is never the appropriate time to act. So, my check-book is unfortunately not too close to hand, and "later" becomes the appropriate time. I learn to see ritual concern (donating a dollar) as material. And so on. Such self-delusions - intellectually putting our heads in the sand, so to speak – appear to be an essential apparatus of the manner in which we negotiate our ethical dilemmas. George Orwell in 1941 described this kind of ambiguity and self-delusion escape from an ethical conflict as he saw it for the ruling classes at that time:

For long past there had been in England an entirely functionless class, living on money that was invested they hardly knew where, the 'idle rich', the people whose photographs you can look at in the *Tattler* and the *Bystander*, always supposing that you want to. The existence of these people was by any standard unjustifiable. They were simply parasites, less useful to society than his fleas are to a dog. . . . But the British ruling class obviously could not admit to themselves that their usefulness was at an end. Had they done that they would have had to abdicate. For it was not possible for them to turn themselves into mere bandits, like the American millionaires, consciously clinging to unjust privileges and beating down opposition by bribery and tear-gas bombs. After all, they belonged to a class with a certain tradition; they had been to public schools where the duty of dying for your country, if necessary, is laid down as the first and greatest of the commandments. They had to *feel* themselves true patriots, even while they plundered their countrymen. Clearly there was only one escape for them – into stupidity. They could keep society in its existing shape only by being *unable* to grasp that any improvement was possible. Difficult though this was, they achieved it, largely by fixing their eyes on the past and refusing to notice the changes that were going on round them (Orwell's emphases). (p. 80)

Nevertheless, as we have viewed above, the ethics of society must work to coordinate and achieve the co-operation of the society. To this end, society's ethics must be recognized and understood and agreed upon by a consensus of that society. Without a consensus of recognition and understanding, intelligent correspondence is not possible; and without agreement, there is conflict rather than cooperation around the ethical dictates. In this way, the society's ethics represent a part of the self-functioning apparatus of the society, serving the dual purpose of harmonizing the activities of its individual members while sanctioning acceptability for its institutions. Thus Orwell observes that not only was it necessary that the British ruling class were able to see the administration of their privileges as a discharge of their "duty" before God and Country and King; it was necessary for the continuing state of affairs that the classes below them should themselves remain in some kind of accord, seeing it as *their* duty to "know their place". Floggings and hangings as "punishments" were sustainable only so long as a consensus accepted the outcome as the necessary order of things. For these reasons, Orwell emphasizes that the ethical framework of his ruling class should not be viewed *merely* as a self-serving delusion. As he observes, although the ethic allowed for the hanging judge and the idle rich, it nonetheless made it impossible that there might be judges that were prepared to be openly bribed or an aristocracy that would allow themselves to indulge in the excesses of gangsters. Thus we expect that a society's ethics by virtue of representing a positive affirmation of the society's functioning, serve also to exert a *containment* on excesses within the society in terms of what is broadly

acceptable. Like the Christian ethic of Joseph Conrad's parsonage in *Lord Jim*, ethics must be fashioned to be "made for the righteousness of people in cottages without disturbing the ease of mind of those whom an unerring Providence enables to live in mansions".

### Corporate and Financial Ethics

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The more the benefits accorded to the business or corporate community and to those of the less privileged have been allowed to diverge, the more the business and corporate community is observed to be self-consciously ethical. In a survey of 500 managers by Digital Equipment Company, "short-term profit" actually came bottom of the list of priorities. Their agenda is the wholesome development of their staff, the community and the environment. Nevertheless, and consistent with Orwell's depiction of the British ruling class, the tough decisions relating to the conflict between capitalism's growth and broader issues for mankind are never presented as a matter of choice: they are unavoidable and hence not an issue of ethics. The pursuit of profit is in fact a response to the pressures of the market place – so that not to pursue maximum profits at every opportunity would not only be an act of irresponsibility to the firm's shareholders but would act to undermine the company's survival, and hence, in the long run, to undermine all the company's stakeholders. Globalization, productivity enhancing technological change, down-sizing and re-engineering are inevitable. "If a company doesn't stay competitive", its executives contend, "it cannot grow, it would provide even fewer jobs, it would earn too little to afford its community programs, and, at worst, it might jeopardize its survival"; while the typical corporate response is: "Our primary responsibility is to our shareholders. Putting jobs into places where it doesn't make economic sense is a dilution of corporate and community wealth" (Strite Ride's chairman quoted by Neimark 1995). The firm of course *has* been socially responsible but nevertheless has to balance the demands of two masters – shareholders and society.

Consistent with our observations that ethical codes function to co-ordinate and achieve the co-operation of members, Neimark (1995) argues that the official discourse of business ethics by business executives and political leaders is invariably aimed at representing a positive affirmation of the processes of the system, rather than any genuine criticism of its activities: "It is a distraction and a means of defeating the cynicism and dissonance created by the growing tension between capitalism's growth and the broader visions we have for society". In this way, the ethics of the system are never challenged. Lovell (1995) here agrees, concluding that while ethical codes are part of the moral atmosphere, in many respects they are a defensive strategy, necessary to assuage public fears. Thus, the official discourse acts to deflect attention from the culpability of capitalism itself and to deflect attention from contradictions and tensions that would otherwise translate into social conflict and change by reducing the matter of business ethics to cases of individual corruption. The moral typically portrayed is that "honesty actually works". In this context, Mitchell, Puxty and Sikka (1994) consider that ethical statements have actually acted to protect the

accounting professions from sustained scrutiny. They conclude that ethical statements and disciplinary apparatus are not what they appear to be. Far from providing a substantial and robust method of *realizing* the ideals of independence and integrity they are little more than a smokescreen for the pursuit and protection of sectional interests; while the mere existence of disciplinary procedures is used to reassure the public, and further elaborations of these procedures offer a low-cost means of demonstrating the profession's responsiveness. Consistently, Neimark (1995) suggests that the periodic identification and punishment of individuals and corporations whose actions have edged past the boundaries of acceptable business conduct, actually allows the official discourse of business ethics to reassure that the system is working and that honesty balances rapaciousness.

We may observe nevertheless, that these authors are also consistent with Orwell's belief that ethical systems must at least function as a *constraint* on behaviour. Neimark observes that the requirement for consensus for a working ideology ensures that while the ideology might serve partisan interests by legitimating and maintaining a prevailing social order, the need to make the ideology appear plausible and universal implies that the ideology must act at least to a degree as a constraint on the excesses of individual sections in the society. The ideology of corporate social responsibility, for example, creates the expectation that corporate behaviour will bear at least some relationship to its claims – by not polluting the environment, by not discriminating in hiring, promotion and other personnel activities, by considering the impact of plant relocations on local communities, by treating employees as “valued” resources, and so on. In agreement, Dobson concedes that although ethics in the financial community are always viewed in the context of objective wealth maximization, they do at least act as a constraint on the behaviour of its participants with regard to insider-trading and the obligation of the professional member to uphold and foster the “reputation” of the corporate community. Ethical behavior has a part to play in maintaining confidence in financial markets. Thus we observe that professional ethical conduct plays a significant role in acting reflexively on our systems to constrain and coordinate their functions.

Discussions of such notions of ethical behaviour are likely to represent the mainstay of the official discourse of business ethics in universities. Nevertheless, if such discussions ignore the broad ethical issues that are at stake in the relationship between our corporate and financial institutions and society generally, they represent no more than statements of “acceptable professional conduct”. In the end, the manner in which we co-operate within the overarching terms of reference of our institutions determines a sort of derivative ethics that may be little more than a distraction from a concern with the ethical functioning of our institutions in their own right. An ethical concern for professional conduct means little in a society that denies any person access to meaningful work, housing, education, health care and not just the right, but the reality of being treated as fully human. The origins and consequences of the functioning of our institutions in their own right, when they appear at all in our

debates, are all too often treated as part of the furniture of life, not as something to be critically appraised, let alone acted on. In the following section, we respond by attempting to understand the nature of our institutionalized systems, their underlying ideologies, and how their interests have come to be what they are today. We advance thereby from a discussion of “micro” ethics – as they work to co-ordinate workers *within* the overall structure of our institutions - to a macro understanding of the implicit ethical functioning of these institutions themselves. In short, we progress to address the question, as employees of corporate institutions, where does the ethical furniture of life come from?

### The Institutionalization of Ethics

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In his first major study, his doctoral thesis, Foucault addressed the question of the historical conditions in the seventeenth century that allowed for the possibility for the emergence and development of the knowledge of psychiatry and psychology, which in turn gave rise to the *institutionalized* asylum. The inception of these institutions could be traced back to when a disparate set of people were set aside in vacated leprosariums with provision to be managed by a doctor. The intervention of the doctor was not in the first instance based on the possession of special medical skill, or upon a corpus of relevant objective knowledge; rather his moral authority derived from his institutionalized status as a doctor (“his medical practice being for a long time no more than a complement to the old rites of Order, Authority, and Punishment”, *Madness and Civilization*, p.272). The first attempt to understand the condition of the inmates was the attempt to classify them: the mad distinguished themselves by “their disruption of the rhythms of collective life and their inability to work”. The phenomenon for Foucault, was that there came a point when the asylum moved from being the “object” of the developing knowledge system - still effectively governed by the doctor in his own right - to becoming “subject” to the power and control that emanated from such knowledge – that is to say, *governed by the knowledge-base rather than by the individuals in their own right*. At this point, knowledge had become inextricably entwined with relations of power and advances in knowledge had become associated with advances and developments in the exercise of power. There could no longer be disinterested knowledge: knowledge and power were mutually and inextricably interdependent. The asylum “institution” had been created.

The original owner capitalists of commercial institutions naturally sought to understand their acquisitions – which they invested in for profit - in terms of their profitability. Their knowledge-base has developed to the sophistication of the balance sheet and profit and loss statements and other corporate statements and our understanding of capital markets in which ownership of these institutions is traded. Thus the institutionalized knowledge-base is underpinned fundamentally by the belief that the firm exists to maximize profits and that a non-profitable company “dies”. The instinct to survive and prosper is transmitted to the commercial company as an entity in its own right in our recognition of its inalienable right to seek profits. In a Foucaultian sense, these

institutions and those that work within them have now moved from being the object of this knowledge to being the subject of this knowledge and its attendant power. We no longer are governed by individuals in their own right, but by the knowledge-base of accounts and capital markets. As individuals, we are abstracted into a kind of element within the organisation, which applies equally whether we are professional or unprofessional, the controller or the controlled. The sense of self-delusion that “there is no other way” as a tactic for avoiding action to change, which we have discussed with reference to Orwell in a previous section (3), may be regarded as conforming to this understanding of how we have come to be where we are. Thus the perspective helps to explain the observation that for all their apparent sincerity, the managers of firms and their investor shareholders actually appear *incapable* of providing jobs in depressed areas at the expense of profits, or of not actually contributing to the increasing degradation and deformation of life and the exploitation of workers abroad. The perspective also helps to explain Denhardt’s (1981) observation: “We originally sought to construct social institutions that would reflect our beliefs and our values; now there is a danger that our values reflect our institutions; that is, organisations structure our lives to the point that we become locked in their grasp. We end up doing certain things not because we choose to do them, but because that’s how things are done in the world of organisations” (p.322).

Within the context of the firm, one’s individuality exists as a legally defined contract and is constrained by ethical codes that serve the company’s profit line. For Lovell (1995), members of the professional accountancy bodies as information gatekeepers quickly come to recognize the injunction not to take an ethical stand that might compromise the company’s profit. He argues the case that employment protection legislation in the UK actually acts as an inhibitor to any moral action that opposes the profit motive, and that no action has been taken by the professional accountancy bodies – whose members are particularly vulnerable in this context – to improve the legal protection available. For Lovell, although the ascription “professional” may carry with it notions of freedom and independence, in a Rousseauian sense, maybe it is merely a different set of chains. Echoing Seedhouse (1988), we are “dwarfed” by our institutions. Some affirmation of allegiance to the financial sector over and above commitment to social issues is generally associated with a professional mien. Those of us that feel that our firms “empower” us – the espoused approach in many organisations – might consider whether our empowerment is an end in itself or merely a means to an end – which is the economic imperative – so that our empowerment is likely to exist for as long as it delivers enhanced economic performance, after which it may be dropped. In the end, as workers, we are paid to obey. The outcome is that the commercial institution with its ethics of profit cannot be regarded as some displacement or almost replica of a civic society whose ethics have developed to ensure *its* survival – that is, the ethics of home, school, families, friendships – that ensure survival through notions of social cohesion that have links with our earliest ancestors. For many of us, as we attempt to resolve the tension between the ethical codes induced by our

“institutional” and “society” existences, the outcome is a sort of schizophrenia between our attitudes at work and away from work.

The “mad” of Foucault’s asylums distinguished themselves by their “disruption of the rhythms of collective life and their inability to work”. Foucault observed that through the Middle Ages and the Renaissance period, the mad had actually enjoyed a freedom of expression, when their condition had been associated with a particular form of knowledge and expression. It was only during the Classical period, that those with an “inability to work” would lose their claim as of right to being a member of the community. Their “madness” was placed on the other side of bars “under the eyes of reason that no longer felt any relation to it and that would not compromise itself by too close a resemblance” (*Madness and Civilization*, p.70); as their confinement in the vacated leprosarium became symbolic with their disease. Our attitudes to those with an “inability to work” are inevitably molded by, if not made subordinate to, the institutionalized knowledge-base of profit and loss, so that those who cannot contribute to the profit and loss statements and the balance sheet must continue to be confined and shamed. We might reasonably conclude that our institutions have become as successful mutations that have learned to protect themselves. As the self-learning robots of science fiction, they have learned to head off threats to their survival – which survival is viewed as threatened by constraints on their functioning to deliver profits to the financial markets. As the Frankenstein creation, it is perhaps fair to say that they are “out of control”. Certainly, they appear to be our masters, before which we appear dwarfed.

Resistance to the influence of our institutions in taking control of not only our working potential, but also our minds, is clearly not a trivial challenge. One wonders to what extent it might be more educational tell our students of ethics not to assume that they can be ethical outside of the firm’s notion of “professional conduct” – which is to say, that the system will ultimately lay claim to them on its own terms. The experience of the Grameen bank in the following section prior to our conclusion, serves to highlight the straight-jacket on ethical issues that most of us must accept as we seek to serve our institutions. Nevertheless, it remains possible that there are exceptions – those who remain within the financial world and yet assume to impose their own ethics of belief – to the extent that the institutionalized system is in fact made to yield. The experience of the Grameen bank serves also to highlight this possibility.

### ***The Grameen Bank***

In the wake of the 1974 floodings in Bangladesh that had led to widespread crop failures and hunger, Professor Muhammad Yunus at Chittagong University in the southern part of the country, was conscious that his abstract economic theories were far removed from the reality of local village populations. Even in more fortunate times, these people had been obliged to remain poor, because the greater part of the value added by their endeavors was exploited by those who financed their activities. For example, the riskshaw pullers who after 20 years hadn’t become the owner of their riskshaw. Money was required to make

money, so that it seemed that the purpose of the poor was to make the wealthy more wealthy. Yunus began with a list compiled by his students containing the names of 42 local people, whose initial capital requirements, in order to purchase materials and work freely, added up to 856 takas, about \$26. The villagers accepted the money as a loan and Yunus arranged for its repayment in small daily installments.

When Yunus attempted to have a bank make a loan to the villagers on the same principle, he was informed, despite the evidence of his own experiment, that the bank could not lend money to the poor because they had no collateral and would therefore not repay. For this reason, governments, not banks, existed to help the poor. The bank would lend to Yunus but not to the people. That was the rule of the bank. For Yunus, the principle was that the bank should be prepared to fund the entrepreneurship of the poor, not his own collateral. In the end, Yunus achieved his first loan of 10,000 takas (\$300) with the compromise of having himself as guarantor, and at the same time actually promising to the bank that if the villagers did not repay, neither would he repay the bank. When the experiment turned out to be a success, Yunus approached the bank to continue the experiment in its own name. He was told that he must submit a proposal for a project with a budget, which the manager could send to his boss, who might decide to send it to his managing director; but was warned: "Even the managing director cannot give his authority just like that. He has to take it to the board and the board has to decide. And there are things that the board cannot change, because they have to do with fundamental principles of the bank. So you have to go to Parliament or whoever made the laws for that. And your suggestion involves that kind of change" (David Bornstein, *Price of a Dream*, p. 51).

In the end, with a loan from the bank, Yunus opened the first branch of his Grameen (the word 'gram' means village) Bank in the village. True to its name, the Grameen Bank works only in villages, which is one of the ways it has reimaged the idea of a bank. Another is that it lends money mainly to women in small amounts for short periods of time. Yet another is its method of screening borrowers. To qualify for a loan, a villager must show that her family's assets fall *below* the bank's threshold. She will not be required to furnish collateral, demonstrate a credit history, or produce a guarantor. Instead, she must join a five-member group and a 40-member centre, and must assume responsibility for the loans of her group's members. Two decades later, the bank has extended an equivalent of \$3 billion US dollars in tiny loans for self-employment purposes to 2 million of some of the poorest people in the world, mainly women. It has lent half that amount in just two years. With loan repayments exceeding 98%, it outperforms all other banks in Bangladesh and most banks around the world. Nevertheless, the Grameen bank is not a charity. Interest rates are commercial, and have been as high 16%. It is a business that scrupulously controls costs and aims at profitability while adhering to a social program whose mandate is to end poverty and hunger, not just in Bangladesh but "from the face of the earth". Yunus maintains that the bank represents a "socially conscious capitalist enterprise". He states:



The myth that credit is the privilege of a few fortunate people needs to be exploded. You look at the smallest village and the tiniest person in that village: a very capable person, a person desperate to work. You have only to create the proper environment to support these people so that they can change their lives through their own efforts.

Yunus has campaigned that the United Nations must amend its 1948 Universal Declaration of Human Rights to incorporate "Credit for self-employment is not only a fundamental human right, it is recognized as a human right that plays a critical role in attaining all other human rights" into article 25 (1), which reads: "Everyone had the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care, and necessary social services, and the right to security in the event of unemployment"; and continues, "There is nothing inherent in the nature of credit that keeps it away from the poor. Nonetheless, the poor have no access to credit institutions. Since the poor cannot provide collateral, the argument goes, there is no basis for lending to them. If collateral alone can provide the basis for the banking business, then society should mark out the banks as harmful engines that create economic, social and political inequality by making the rich richer and the poor poorer" (David Bornstein, *Price of a Dream*, p. 231).

If banks are to be more than glorified pawn-brokers, they must learn to invest in the cash flow potentials of business, rather than in the collateral of business (Dempsey, 1996). This is what the Grameen bank does down to the poorest individual. Credit is not offered on the basis of "having already" but on the basis of "belief" which is the meaning of the Latin word *credere*, from which the word credit derives. The outcome has been that the bank has helped its borrowers make spectacular rises from poverty - thus shattering the belief that there really isn't very much that corporate systems can be expected to do to help the really poor, and that all that can help the poor is charity. Yunus states that poverty is not the complex, insuperable problem it has been made out to be, and that the process of impoverishment is quite predictable, and the way to arrest it also quite predictable.

The Grameen bank crosses the gap between an entrepreneurial institution that has actually made the case for less "charitable" government, and an enlightened social-welfare institution that argues for the value of government involvement that is able to conceptualize in terms of the potential of people to add to their own lives. For Yunus, the problem is that the financial systems through which governments of developing countries attempt to operate do not inherently believe in people, whose poverty alleviation has been largely forgotten, but in wealth generating projects understood in terms of "income" and "GNP". Nonetheless, if increases in the villagers' incomes are to be achieved by movements of the population from the village to the vastly overpopulated city - where *expenses* are also many times increased - it is by no means clear that increases in income - and GNP which measures such increases - are the good thing they are supposed to be. Added to which, GNP does not recognize half

the population's (women's) work, while the concept of income appears to be understood in terms of statements as "Bangladesh has a per-capital annual income roughly equal to \$200," which if it indicates that people in Bangladesh are living for one year on the quantity equivalent to what a New Yorker can receive for \$200, is a nonsense, since they would have all died, and if it doesn't mean that it is unclear what it does mean. To date, the government of Bangladesh has acquired more than \$25 billion in institutional aid for infrastructure projects such as roads, bridges, and power stations as infrastructure. Notwithstanding that Bangladesh needs these kind of things to attract investment, Yunus believes that many of the ideas have been so ill-conceived by the experts from the World Bank that the country has been turned into a graveyard of ideas and projects, with little or no impact on the poorest 50 percent of the country. And the debt obligations remain. For Yunus, the system is *financially* flawed because the constructs of accounting income and GNP – rather than real concerns for people and an appreciation of *their* potential to engage productively as individuals in their own right – are responsible for the accounting systems that produce the figures that in turn determine public policy. In effect, Yunus holds out the possibility that society's *profit-maximizing* objective at the macro level is ultimately compatible with assisting the poorer members of society to help themselves.

### Summary and conclusion

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We have argued that the development of ethical frameworks may be interpreted in terms of a process of natural selection with regard to the mutual interdependence of the individual and the community. The outcome of which is that the ethics of a community work to co-ordinate the activities of its members. In this case, we should not expect that corporate and financial ethics look outwardly "to do good", but rather that they act reflexively to *consolidate* and *sanction* internal activity. In addition, we must expect that the individual employee will be called on to be ethical on the profit-motivated terms of the institution, rather than on the individual's own terms. Following Foucault, we observe that our institutions are subject typically not to individual managers in their own right, but to the knowledge-base that is built up around our institutions and within which managers must operate, so that the development of our institutional ethics must ultimately take place consistent with the development of how collectively we come to define our expectations for the function of our institutions in society.

We have stated that the ethics of a community may function without ever having to look outside of the needs of that community. The ethical attitudes of a community, however, may impact not only on its own members, but on individuals outside of that community. Indeed a community has it in its ethical power to determine who is and who is not to be regarded as an effective member of the community. The Grameen Bank for example remains committed to a clientele that is inherently expensive to serve – a clientele that in the absence of an ethical imperative would have remained outside of the big capital markets.

The example is on the one hand, perhaps daunting, in emphasising the compromised position, which we may feel with regard to the ethical codes of our institutions as we find them. On the other hand, the example is perhaps uplifting, in demonstrating that the single individual who remains committed to their beliefs yet retains a potential to precipitate a significant paradigm shift in the ethical functioning of our institutions, within which most of us seek to leave a mark of our creative energies.

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## PART 7

### Contemporary Management Accounting

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# Chapter 17

## Quality costing: concepts and processes

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Zahirul Hoque

### LEARNING OBJECTIVES

After completing studying of this chapter, you should be able to:

1. Understand the importance of quality in today's competitive business environment
2. Define quality and discuss the four types of quality costs
3. Prepare a quality cost report

## Introduction

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A quality product or service is one that meets or exceeds customer expectations. The highly competitive, globalised environment that exists today has required businesses to focus upon meeting ever-increasing customer demands in order to survive. Quality has now become a competitive weapon. Quality is however not free. That is, there are costs for quality assurance. Management accounting can play a significant role in the assessment of quality initiatives. This chapter focuses on measuring and reporting the cost of quality.

## Quality defined

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In the dictionary definition, quality is the “degree or grade of excellence.” In an operational term, quality adopts a customer focus. Some say quality is “fitness for use,” that is the degree to which a product or service satisfies customer wants or the degree to which a product conforms to design specifications and engineering requirement. In essence, all these features involve the customer and continuous improvement.

## Aspects of the quality process

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There are three different aspects relating to the quality process:

- **Quality control:** Quality control is the use of techniques and activities to achieve, sustain, and improve the quality of a product or service. It involves the following:
  - Specifications of what is needed;
  - Design of the product or service to meet the specifications;
  - Production or installation to meet the full intent of the specification;
  - Inspection to determine conformance to specifications; and
  - Review of usage to provide information for the revision of specifications if needed.

**Statistical quality control:** Statistical quality control is a branch of quality control. It is the collection, analysis, and interpretation of data for use in quality control activities.

**Quality assurance:** Quality assurance is the actions necessary to provide adequate confidence that a product or service will satisfy consumer needs. Quality assurance determines the effectiveness of the quality system, appraises the current quality, determines quality problem areas or potential areas, and assists in the correction or minimisation of these problem areas (Besterfield, 1986).

## Dimensions of quality

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Quality is multidimensional as it covers the following:

1. **Performance:** How consistently and well a product or service functions.

2. **Aesthetics:** Concerns with the appearance of tangible products.
3. **Serviceability:** Measures the ease of maintaining and or repairing the product.
4. **Features:** Refer to characteristics of a product that differentiate functionally similar products.
5. **Reliability:** The probability that the product or service will perform its intended function for a specified length of time.
6. **Durability:** The length of times product functions.
7. **Quality of conformance:** A measure of how a product meets its specifications.
8. **Fitness of use:** The suitability of the product for carrying out its advertised functions.

### Quality costs defined

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What is the cost of quality? There is the view that costs of quality are “the prices of non-conformance”. Morse et al (1987, p. 19) defines “quality costs” as costs incurred because poor quality can exist or because poor quality does exist. Albright and Roth (1992, p. 18) view it differently: “Quality costs are incurred to ensure that quality standards are met or because quality standards are not met.” According to Besterfield (1986), quality costs provide:

- a method of assessing the overall effectiveness of the quality programs;
- a means of establishing programs to meet overall needs;
- a method of determining problem areas and action priorities;
- a technique to determine the optimum amount of effort between the various quality activities; and
- information for pricing products or bidding on jobs.

A cost of quality program collects and reports product-quality-related costs incurred.

### Categories of quality costs

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In the literature, we find the four categories of quality costs often used by organisations. We now outline them.

**Prevention costs** - costs associated with personnel engaged in designing, implementing, and maintaining the quality system. Subcategories include quality engineering, design and development of equipment, quality training, quality planning by others, other prevention expenses such as clerical, telecommunications, travel and supply costs, etc. As prevention costs increase, the costs of failure are expected to decrease.

**Appraisal costs** – costs associated with measuring, evaluating, or auditing products, components, and purchased materials to assure conformance with



quality standards and performance requirements. Subcategories include inspection and testing of incoming material, inspection and testing at customer's plant prior to product release, product-quality audit, materials and services consumed, equipment calibration and maintenance, etc.

**Internal failure costs** – occur when products, components, and materials fail to meet quality requirements prior to transfer of ownership to the customer. Subcategories include scrap, rework, failure analysis, re-inspection, faulty of supplier, downsizing, etc.

**External failure costs** – occur when the product does not perform satisfactorily after the transfer of ownership to the customer. Subcategories include complaints, rejected and returned, repairs, warranty charges, errors, liabilities, etc.

Exhibit below provides some examples of these four categories of costs of quality. Management accounting textbooks suggest that dollars invested in prevention and appraisal activities ultimately reduce internal and external failure costs by an amount that far exceeds the original investment (see also Montgomery, 1991; Albright and Roth, 1992).

Quality costs can be *observable* or *hidden*. Observable quality costs are those that are available from an organisation's accounting records. All prevention, appraisal, and internal failure costs and some external failure costs are observable. Hidden quality costs are opportunity costs resulting from poor quality. Lost sales, customer dissatisfaction, lost market share are some examples of hidden quality costs.

### Methods for estimating hidden quality

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Hidden quality costs are opportunity costs resulting from poor quality. The hidden costs are all in the external failure category. Albright and Roth (1992) have outlined three methods for estimating hidden quality costs.

### The multiplier effect

One method for estimating hidden quality costs is to determine the known quality costs and then multiply that number by a constant. An organisation can use its experience to determine this constant number. For example, Westinghouse Electric Corporation, reported that its "experience indicates that a multiplier effect of at least three or four is directly related to such hidden effects of quality failure."

*Exhibit 1 Examples of costs of quality*

<b>Quality cost types</b>	<b>Examples</b>
<b>Prevention costs</b>	Quality engineering Quality training program Quality planning Quality reporting Supplier evaluation and selection Quality audits
<b>Appraisal costs</b>	Inspecting and testing of raw materials Packaging inspection Supervising appraisal activities Product acceptance measurement (inspection and test) equipment
<b>Internal Failure Costs</b>	Scrap, rework Down-time (due to defects) Reinspection Retesting Design changes
<b>External Failure Costs</b>	Costs of recalls Lost sales Returns and allowances Repair Product liability Customer dissatisfaction Lost market share

*Source: Hoque (2003)*

A second method for estimating hidden quality costs is to use market research. It assesses how poor quality and variability in products may affect market share. Heagy (1991, p. 67) describe this method as follows:

For example, a firm’s sales force knows its customers and the effects of losing customers because of poor quality. Also, trends in a firm’s market share lost to competitors can be analysed. Based on the findings of market research, a projection can be made of future loss of contribution margin. This amount can then be discounted to its present value. Making estimates like this is not so radical. After all, future cash flows are estimated in evaluating capital budgeting decisions.

### Taguchi's quality loss function

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Another method for estimating hidden quality costs is to use the "Taguchi Quality Loss Function." According to this method, the quality loss function measures the loss to society from a product that does not perform satisfactorily. In this model, costs increase quadratically as actual product characteristics deviate from a target value. For example, if a \$0.50 loss occurs when a product's actual weight deviates 0.1 grams from the target weight, then a \$2 loss occurs when the product's weight deviates by 0.2 grams. The quadratic function means that when the deviation from target doubles, the loss becomes quadrupled.

Thus the Taguchi Quality Loss Function estimates the loss that occurs from producing products that vary from a target value regardless of whether they fall inside or outside the specification limits. This differs from the traditional view of losses from poor quality (Albright and Roth, 1992). This method defines the quality loss function in terms of the deviation between the actual value and the target value of the characteristic. If  $y$  represents an actual value and  $T$  represents the target value, then the unit loss function  $L(y)$  is

$$L(y) = k(y - T)^2$$

Where:  $y$  = actual value of characteristic,  
 $T$  = target value of characteristics, and  
 $k$  = proportionality constant which is dependent upon the cost structure of the process or organisation.

$$k = \frac{c}{d^2}$$

Where:  $c$  = loss associated with a unit produced at the limit, assuming the loss at target is zero, and  $d$  = distance from target value to specification limit. Thus, the value of  $k$  depends on the loss associated with the product at the upper or lower specification limit of the quality characteristic and on the size of the specification limit.

### An Illustration

Alpha Company manufactures a product that has a target weight of 15 grams with specification limits equal to the target weight plus or minus 0.15 grams. If a unit of the product produces at the upper specification limit of 15.15 grams it loses \$15. During last month, 4,500 units were produced. Eight of these units were weighted as a sample representing the population. The weights of these eight units are shown in column 2 of Exhibit 6.2.

Exhibit  
Hidden Quality Costs Data

Unit No.	Measured Weight (y)	Measured – Target Weight (y-T)	Measured – Target Weight Squared (y-T) <sup>2</sup>	k (y- T) <sup>2</sup>
1	15.10	0.10	0.0100	\$ 6.67
2	15.25	0.25	0.0625	41.67
3	15.15	0.15	0.0225	15.00
4	15.05	0.05	0.0025	1.67
5	14.90	-0.10	0.0100	6.67
6	15.06	0.06	0.0036	2.40
7	15.24	0.24	0.0576	38.40
8	15.07	0.07	<u>0.0049</u>	<u>3.27</u>
Total hidden loss			0.1736	\$115.75
The average loss			<u>0.0248</u>	<u>\$16.54</u>

Using the Taguchi Quality Loss Function, the values of the variables are calculated, as follows:

T = 15 grams

y = actual value (e.g. 15.10 for the first one)

c = \$15.00

d = 0.15 grams.

$$k = \frac{c}{d^2} = \frac{\$15}{0.15^2} = \frac{\$15}{0.0225} = \$666.67$$

**Reporting quality costs**

An organisation can use the following tools to identify and reporting quality related problems:

**Quality cost report:** A quality cost report shows various categories of quality costs that are expressed as a percentage of sales.

**Trend analysis:** A trend analysis provides information for long-range planning. It also provides information for the instigation and assessment of quality improvement programs. Trend analysis can be accomplished by cost category, by subcategory, by product, by measurement base, by plant within a corporation, by department, by work centre, and by combinations of thereof. Data for trend analysis come from the monthly quality cost report.

**Pareto analysis:** A pareto distribution has a few items that represent a substantial amount of the total. These items are referred to as the “vital few.” Also, a pareto

distribution has many items that represent a small amount of the total. They are referred to as “trivial many.” Pareto distribution can be established for quality costs by operation, by machine, by department, by type of defect, or by product line.

### Summary

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In this chapter, I have highlighted the fact that quality has become a competitive weapon for today’s businesses. This is because quality can help an organisation improve its financial performance. This chapter has outlined the categories of quality costs and the methods of measuring and reporting quality costs. Quality cost information has now become an important part of the organisation’s management accounting system. This information is needed for improving a variety of managerial decisions and for supporting an organisation’s pursuit of continuous improvement.

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# Chapter 18

## Value chain analysis and accounting

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Zahirul Hoque

### LEARNING OBJECTIVES

After reading this chapter you should be able to:

1. Explain the concept 'Value chain analysis'
2. Describe differences between value added analysis and value chain analysis
3. Demonstrate an understanding of how Porter's value chain framework can be applied to the business for excellence
4. Outline the strategic cost classifications in the value chain framework
5. Describe differences between corporate value chain and an individual's value chain
6. Demonstrate an understanding of how management accounting systems play a vital role in the value chain analysis

## Introduction

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In today's competitive business environment, organisation can remain in business only if they are committed to provide high quality products and services at a reasonable, competitive price. To do so, companies need to analyse their cost structure and identify strategies for building long-term growth. Managing costs and monitoring effectiveness requires a broad focus that Michael Porter calls the "value chain". A good way to achieve this aim is to ascertain where a firm's products are located in the value chain. Value chain analysis is a method for deconstructing the firm into strategically important activities and understanding their impact on cost behaviour and differentiation, the generic strategies proposed by Porter. How management accounting tools can be usefully accommodated within the value chain concept has received limited attention. This chapter focuses on this contemporary issue.

### Value chain defined

A value chain describes the linked set of value-creating functions that are required to bring a product or service to the customer. It begins with basic raw materials from suppliers, moving to a series of value-added activities involved in producing and marketing a product or service, and ending with distributors getting the final products or services into the hands of the ultimate customers. Michael Porter (1980, 1985) has developed this value chain concept as a tool to help businesses analyse their cost structures and identify competitive strategies.

A value chain analysis emphasises that costs occur, not merely in manufacturing, but across the business. It provides a useful perspective for understanding non-manufacturing cost classifications. Supplying and manufacturing activities are described as 'upstream' segment of a value chain, while marketing and distribution activities are 'downstream' segments of a value chain.

Value-added analysis involves classifying activities as value-added or non-value-added. This concept is adopted to identify which activities to keep and which to eliminate. The following activities in organisations tend not to add value to the core activities: preparation time; waiting time; unnecessary process steps; over-production; rejects; set-up times; transportation/distribution; process waste; materials waste; communications; administration/decision-making; untidiness; bottlenecks; and timing (Morgan and Murgatroyd, 1994).

Value chain analysis places emphasis on understanding the total value of all operations across the business, as well as the industry. By considering the value chain organisations can determine areas where cost can be minimised (for cost leadership strategy) and areas where customer value can be enhanced (for product differentiation strategy). The value chain of a business focuses on the set of value-creating activities that range from the receipt of raw materials from

suppliers, and research and development of products and processes, to the sale of the product to the customer and the provision of after-sales customer support. Customer value refers to the characteristics of a product or service that a customer perceives as valuable.

### Porter's value chain framework

Michael Porter proposes that a firm's value chain is composed of nine categories of interrelated activities. These activities are, in part, *primary activities* and, in part, *support activities*: the later exist to facilitate the former.

Primary activities include the following:

**Inbound logistics** activities involve managing inbound items such as raw materials handling and warehousing.

**Operations** activities involve the transformation of inbound items into products suitable for resale, for example, research and development, product design, and manufacturing.

**Outbound logistics** activities involve carrying the product from the point of manufacturing to the buyer such as warehousing and distribution.

**Marketing and sales** activities involve informing buyers about products and services with a reason to purchase such as distribution strategy, promotional activities, including advertising.

**Service** includes all activities require to keep the product or service working effectively for the buyer, after it is sold and delivered. Examples of such activities include installation, repair, after-sales service, warranty claims and answering customer inquiries.

### Support activities

In support of the above primary activities of the value chain, Porter proposes four support activities:

1. procurement (purchasing),
2. human resource management,
3. technology development (R and D), and
4. firm's infrastructure (accounting, finance, strategic planning, etc.).

These activities feed into each stage of the primary activities.

Markets develop and evolve in response to changing customer expectations and the continuous improvement of offerings by the organisation and its competitors. It becomes necessary to look constantly for newer more effective ways of targeting or changing the organisation's offerings, formally done by implementing a strategic plan. Before setting the strategic plan, the corporate capabilities, market opportunities and threats, and the key success factors in the industry all need to be identified. The business is then able to set reasonable



objectives for itself, for example, to be a market leader or increase market share by a certain percentage. As discussed in Chapter 2, Porter sees competitive advantage as being created in two main ways, through cost leadership or differentiation.

### Market forces and the profitability of the firm

Porter has identified five forces that can affect the profitability of the firm:

1. the threat of new entrants;
2. the threat of substitute products and services;
3. the rivalry among existing organisations within the industry;
4. the bargaining power of suppliers; and
5. the bargaining power of consumers.

He puts all these concepts into a framework, which he labels as the value chain. Porter suggests that the initial step for a firm's strategic analysis is to define its value chain. It is suggested that competitive advantage, irrespective of whether the firm adopts a cost leader or differential strategy, be achieved in the marketplace by giving value for dollar, that is, competitive advantage comes from carrying out the value-creating activities more cost-effectively than one's competitors. According to Porter, 'The value chain desegregates a firm into its strategically relevant activities in order to understand the behaviour of costs and the existing and potential sources of differentiation. A firm gains competitive advantage by performing these activities more cheaply or better than its competitors.'

Porter's value chain analysis has several distinctive characteristics. One of these attributes of value chain analysis insists on the complex linkages and interrelationships both between the strategic business unit and its customers and suppliers as well as those found internally. If these linkages are exploited a firm is more likely to gain a competitive advantage. This necessitates management having to re-focus, looking not only at the activities internal to the firm but also at those activities external to the firm. This in turn highlights opportunities for the firm to work with suppliers and end customers, which in turn, should lead to increased competitive advantage. Value chain analysis also recognises that activities internal to the firm are interdependent rather than independent. A firm's history, its strategy, its approach to implementing its strategy and the underlying economics of its situation are reflected in the Porter value chain framework.

### Corporate value chain

The systematic examination of individual value activities can lead to a better understanding of a corporation's strengths and weaknesses. Porter (1985, p. 36)

suggests that differences among competitor value chains are a key source of competitive advantage. Wheelen and Hunger (1998) propose the following steps in a corporate value chain analysis:

- Examine each product line's value chain and consider its strengths and weaknesses.
- Examine the "linkage" within each product line's value chain. Linkages are connections between the way one value-added activity (e.g. marketing) is performed and the cost of performance of another activity (e.g. quality control).
- Examine the potential synergies among the value chains of different product lines or business units. Each value element (e.g. advertising or manufacturing) has an inherent economy of scale in which activities are conducted at the lowest possible cost per unit of output. That is, sharing resources by two separate products in the corporate value chain.

### Accounting for the value chain analysis

When organisational philosophies move to an external orientation involving customer satisfaction in order to gain a competitive advantage, accounting too needs to change its focus and become more strategically oriented. Traditional management accounting systems have been criticised for its greater internal focus within which a key theme is to maximise the difference (that is, the value added) between purchases and sales. There is the view that traditional management accounting does not give adequate information on non-financial and external factors crucial to long-term survival of the firm. The challenge, therefore, involves management accounting moving away from a traditional "managerial cost analysis" to a forward thinking "strategic cost analysis" or "strategic management accounting" (Shank and Govindarajan, 1992a, 1992b).

According to Porter (1985) a value chain cost management methodology involves the following steps:

- Identify the value chain, then assign costs, revenues, and assets to value activities;
- Diagnose the cost drivers regulating each activity; and
- Develop sustainable competitive advantage, either through controlling cost drivers better than competitors or by reconfiguring the value chain.

Within the value chain framework costs are classified into structural and executional. Structural cost drivers derive from a company's choices about its underlying economic structure. These choices drive cost positions for any given product group. There are at least five strategic choices that a firm must make about its underlying economic structure:

**Scale:** the size of the investment in manufacturing, R & D, and marketing resources

**Scope:** the degree of vertical integration

**Experience:** How many items in the past has the firm already created, and what is it doing again?

**Technology:** What process technologies are used in each step of the firm's value chain?

**Complexity:** How wide a line of products or services is being offered to customers?

Executorial cost drivers are the determinants of a firm's cost position that hinge on its ability to "execute" successfully. These cost drivers may include:

- Work force involvement,
- Total quality management,
- Capacity utilisation,
- Plant layout efficiency,
- Product configuration, and
- Linkage with suppliers and customers.

The process of costing the value chain has caught the attention of many management accounting researchers. Shank and Govindarajan's (1988) study of the Baldwin Bicycle Company shows that a change from a traditional accounting system (such as standard costing) to one that better fits with the organisation's strategy can be advantageous. Costs are assigned to each value activity comprising the chain in an organisation and cost drivers are identified for each activity. The final step is to build a sustainable competitive advantage either operating on the cost drivers to reduce costs or by rearranging the value chain, focusing on those activities in which the firm has a competitive advantage.

Accounting in the value chain covers more than the conventional concept of value added which ignores important linkages with both suppliers and customers by focusing only on value added within the firm. From a strategic approach value added has problems because it starts too late and finishes too soon. Starting cost analysis with purchases misses all the opportunities for taking advantage of the firm's suppliers. That is, firms need to develop good relations with suppliers and how costs can be reduced for both the firm and its suppliers, e.g. through ordering, freight and quality.

Porter's value chain analysis provides the better basis for strategic management accounting design. For example, Shank and Govindarajan (1988) suggest that life cycle costing relies on value chain analysis as explicit attention to post-purchase costs by the customer can lead to more effective market segmentation and

product positioning. Similarly, JIT (Just-in-Time) relies on value chain analysis as it considers supplier relationships.

In light of Porter's value chain framework, Shank and Govindarajan (1992a) suggest that a strategic-focused management accounting is required to provide managers with information to support decisions relating to each activity and process of an organisation. Others suggest that management accounting information can assist managers in: establishing new competitive strategies; evaluating existing competitive strategies; and monitoring and assessing progress towards particular strategies.

Strategic management accounting literature suggests that companies choosing cost leadership would put heavy emphasis on conventional costing and control systems, such as standard costing and variance reporting, structural cost drivers (e.g., scale, scope, experience, technology and complexity) analysis, and flexible budgeting. Conversely, firms pursuing differentiation strategy largely focus upon non-conventional information and control systems such as executional cost drivers analysis (e.g., work force involvement, TQM, capacity utilisation, product configuration, linkage with suppliers or customers), marketing cost analysis, and nonfinancial performance measures. There is the view that strategic management accounting moves from structural drivers to executional drivers because the insight from analyses based on structural drivers are too often obsolete and hence, ineffective.

As the value chain concept is radical and no longer uses many conventional measures of achievement such as contribution margin analysis, strategic management accounting needs to be adopted. Management accountants will need to identify appropriate cost drivers and activities, which can provide information about what activities are performed, why they are performed, and how well they are done. This suggests a system-wide, integrated approach, *activity-based management* that focuses management's attention on all activities of the organisation and maps the complete length of processes (Hansen and Mowen, 1997). Thus, through activity-based management accurate cost and performance information can be routinely used as the basis for decision-making, thereby enabling a firm to be better able to identify opportunities for improvements and understanding the relationships between drivers and resources/activities volume and performance measures. The immediate advantage of value chain analysis will be the result of the process itself as well as the enhanced quantitative awareness of the external competitive arena and the firm is part in it.

Simmonds (1981) suggests that strategic management accounting can enable a firm to study competitors' pricing, costs, strategies and volume, which is

essential to assess its position relative to its competitors. Management accountants must understand that each component is interdependent in each value chain in order to analyse whether or not an activity is value-added. The suggestion is for the greater use of non-financial measures in order to assess the firm's strategic initiatives (Hoque, 2000b). Recently, researchers have advocated for an 'integrated' or 'balanced' performance measurement system that combines both financial and non-financial measures of performance (Kaplan and Norton, 1996; Hoque and James, 2000).

### Summary

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This chapter has outlined the concept of value chain frameworks and management accounting's role therein. It has been highlighted that a value chain framework covers more than the conventional concept of value added analysis, which ignores important linkages with both suppliers and customers by focusing only on value added within the firm. A value chain framework focuses on a comprehensive analysis of all the value added activities within the firm. It has been suggested that firms need to develop good relations with its all stakeholders and to design a management accounting system that should provide management with the relevant and accurate costing and management accounting information.

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# Chapter 19

## Supply chain and management accounting

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Mathew Tsamenyi, John Cullen and Richard Chivaka

### **LEARNING OBJECTIVES**

After reading this chapter you should be able to:

1. Identify the importance of Supply Chain Management
2. Describe the elements and processes of Supply Chain Management
3. Discuss management accounting techniques which can be used to facilitate and add value in supply chain relationships
4. Evaluate the role of Management Accounting in Supporting Supply Chain Relationships



## Introduction

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This chapter explores the development of supply chain concepts and the role of management accounting in facilitating supply chain relations. Some of the issues are illustrated in a detailed case study from South Africa, which explores supply chain processes in the retail sector.

## Importance of supply chain management

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The recent years have seen an increasing interest in supply chain management (SCM) in achieving competitive advantage. In fact, Gunasekaran (2004) argues that SCM has been viewed as one of the most powerful ways of improving organisational competitiveness in both manufacturing and services. The Supply Chain Council (2000), defines a supply chain as a chain of business processes that are involved through upstream and downstream linkages to produce value in the form of products and services to the ultimate consumers. Supply chains are essentially processes that require integration along the chain and SCM aims to unify the systematic planning and control of all technologies, materials and services of companies in the value chain with the objective of meeting customer requirements. This requires the organisation to work actively beyond its own legal boundaries to encompass relationships with suppliers and customers along the value chain. In order to support this, management accounting systems must be capable of identifying costs and value adding processes across traditional organisational boundaries and focus on supporting and influencing the successful transition towards more co-operative ventures between organisations.

The real results of SCM come from the integration of processes throughout the entire supply chain from the supplier's supplier to the customer's customers. Several benefits are expected to accrue to firms involved in supply chain management because the flow of incoming materials, manufacturing operations and downstream distribution are configured to mirror the changes in end-use customer demand (Lockamy III and Smith, 2000). Supply chain participants should therefore be able to benefit from cost savings due to lower inventories, better order fulfilment, improved product quality and customer service, lower infrastructure costs, and value creation through customised products and services (Horwath, 2001; Zhao *et al*, 2002). One way of reducing transaction costs, and aligning incentives of firms within the supply chain is through improved supplier management techniques.

For the benefits of SCM to be realised, the relationships between suppliers and their customers should be characterised by a long term perspective, mutual commitment, intense information exchange, a limited number of suppliers, multiple supplier selection criteria, trust, and mutual dependence (Holm *et al*, 1999; Spina and Zotteri, 2000). Thus in pursuance of specific objectives and

benefits, supply chain management emphasises the overall and long-term benefit to all parties along the supply chain, through cooperation and information sharing.

### Key elements in the supply chain management

A successful supply chain relationship is built by exchanging information pertaining to product development, product improvements, costs, demand schedules, and materials and supplies needed to meet production schedules. It is crucial to relay information about end-use consumers to manufacturers back through the chain. This results in better product information about customers' needs and improved production operations. To achieve this would require understanding and managing the elements in the supply chain. These activities are important because they contribute to the value of the final product.

The key elements of the supply chain are location, production, supply, inventory, transportation or logistics (Russell, 2001), and information.

- (i) It is imperative that the company considers the location of its production facilities, stocking points and sourcing points as these determine the paths along which goods will flow. For example, it may be possible to locate production or distribution points near customers if this is perceived as necessary to enhance the company's competitiveness.
- (ii) In terms of production, the company needs to make decisions regarding the nature, types and volume of product that customers want, what production facilities to use to manufacture these products, which suppliers will service those plants, and which plants will supply specific distribution centres as these decisions significantly affect the revenue, costs and customer service.
- (iii) From a *supply* perspective the company should make decisions about what it can produce (or what service it can provide). Cost, efficiency and quality considerations are paramount in making such a decision. Here the company should evaluate, for example, whether it is viable making the product in-house or outsourcing it.
- (iv) It is necessary that the company determines the amount of *inventories* such as raw materials and parts that each link in the supply chain has to keep as a buffer against uncertainties. It is important to hold the right amount of inventories as holding too much inventories may not be cost effective due to storage and other inventory related costs. On the other hand not keeping enough inventories may result in disruption of production activities in case of delay in delivering inventories. Thus, the company needs a strategy to manage its inventories in terms of order quantities and reorder points, and set safety stock levels.

- (v) Important *transportation* or logistic decisions should be made about getting the materials, parts and products from one link in the supply chain to the next.
- (vi) For supply chain to be effective, appropriate *information* should be obtained and managed from the point of end-use, and ensuring that it passed through the chain. This is necessary to improve communication between the parties and speed up processes within the supply chain. Information technology such as network computers, the internet, and enterprise resource planning can contribute significantly to the supply chain management process.

### The supply chain management process

The implementation of a supply chain management requires careful planning to avoid any pitfalls (Lambert et al, 1998). Effective supply chain management requires a vision and a sense of mission and demands that the company develops and implement appropriate benchmarks and key performance indicators. The supply chain management process can be divided into several stages:

- (i) Every company implementing a supply chain requires a strategic *plan* to integrate and manage all its resources. A key issue to be addressed at the planning stage is developing performance evaluation metrics.
- (ii) The next stage in the process involves identifying who the key *suppliers* are. Issues to be considered at this stage include pricing, delivery schedules, payment options, and managing inventories from suppliers.
- (iii) The next stage involves the *manufacture* of the product (or delivery of a service). Issues to be considered at this stage are for example, production scheduling, testing, and packaging.
- (iv) The fourth stage in the process involves the distribution or logistics which is necessary to ensure that the goods get to customers and an appropriate invoicing and collection system is put in place.
- (v) The fifth and final stage in the supply management process involves dealing with return goods, which is referred to as reverse logistics.

### Supply chain management accounting

Supply chain developments require the contribution of the ideas from management accounting (Seal *et al*, 1999). Management accounting takes a broader business perspective in supply chain management to provide a framework within which the partners can create value for their end-use customers, as well as creating value for themselves.

One area where management accounting can contribute to supply chain management is with the use of Activity Based Costing (ABC) or Activity Based Management (ABM) to allocate and manage costs. This is important as the

identification of cost drivers, and analysing costs through the value chain, are essential components in the search for competitive advantage. ABC/ABM focuses on how activities consume resources and uses this as a basis for apportioning costs. ABC/ABM can act as a catalyst for integrating isolated logistics functions, leading to substantial improvements in costs, cycle times, inventories and levels of customer service. ABC can also be used as a basis for price negotiation and as a means of exploring with suppliers how they have arrived at a price (Lere and Seraph, 1995).

- (i) Management accounting can also contribute to measuring performance in a supply chain relationship. The concept of the balanced scorecard could serve as a useful framework for measuring the supply chain performance. The balance scorecard requires the integration of the four perspectives of customers, internal business, innovation and learning, and financial. Brewer and Speh (2001) suggested that a balanced scorecard approach will bring new levels of operating efficiencies and financial performance to all of the supply chain partners. The authors noted that for balanced scorecard to be applied successfully in a supply chain relationship, the company should ensure that: (i) the partners in the relationship manage their portion of the supply chain in a cross-functional manner, (ii) senior management is totally committed to the balanced scorecard application, (iii) the balance scorecard is implemented with only one or two supply chains initially, as involving too many partners at the beginning may introduce complexities, (iv) only few measures of performance are used at the initial stages of the balanced scorecard application. The measures selected should be those identified as key to driving the collaborative behaviour leading to competitive advantage, and (v) the application of the balanced scorecard in the supply chain management is used as a learning process. Thus, the company should consider itself as a participant in a learning process with the other partners.

In addition to the use of the balanced scorecard in measuring supply chain performance, the company can also use cost information to analyse the cost performance of supply chain activities, to calculate the cost consequences of changing supply chain operations and to periodically monitor the development of supply chain costs over time (Dekker, 2003).

- (ii) Two other management accounting techniques that can be used in supply chain management are target costing and open book accounting. Target costing deals with determining the maximum cost at which the proposed product can be produced in order to generate a target profit at an anticipated selling price. Target costing starts by determining what price customers are willing to pay and then establishes the target cost

considering the company's expected profit margin. Open book accounting requires that the parties in the relationship open their books to each other. Berry *et al* (2000) and Mouritsen *et al* (2001) provided examples of the use of target costing and open book accounting in inter-organisational relations such as supply chain. The study by Mouritsen *et al* (2001) focussed on the use of inter-organisational management accounting systems in two small innovative high-tech firms. Target costing, functional analysis<sup>10</sup> and open book accounting were used by managers in those organisations to initiate action both inside and outside the organisation. Proactive use of these new management accounting systems were important factors in ensuring that these organisations remained in a strong competitive position. Whilst these new management accounting techniques seem to be particularly useful in supporting supply chain management, it must be recognised that there is still evidence of the positive role that can be played by more traditional forms of accounting in these situations. For example, Hakansson and Lind (2004) found that established accounting methods (e.g. responsibility accounting, budgets, reward structures and profit measures) played a key role in forming new relationships between Ericsson and Telia in the Swedish Telecommunications sector.

Accounting can also play a role in developing trust between supply chain partners. Dekker (2004), in a study of a strategic alliance in the railway industry, found that the use of management accounting control systems to create mutual transparency, enhanced the trusting relationships between the partners in the alliance. This aspect of mutual transparency is quite important, although Seal *et al* (1999) found that problems with incompatible systems could cause difficulties.

Information technology, such as Electronic Data Interchange (EDI) and Enterprise Resource Planning systems (ERP), also play an important role in the development of supply chain management accounting initiatives. Developments in information technology have now enabled strategic information systems to be utilised across organisational boundaries (for example SAP systems). However, it is important to recognise that information technology mainly acts as an enabler (Cullen *et al*, 2001) and that a willingness to take advantage of the opportunities that are available depends critically on an understanding of the relational aspects of supply chain accounting.

There is also evidence of the use of management accounting techniques to facilitate re-engineering in logistics. For example, Goldsby and Closs (2000)

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<sup>10</sup> Functional analysis is the basis for a customer-oriented definition of products (p.226).

reported on the use of activity based costing to re-engineer the reverse logistics channel in the Michigan beverage industry. Farris II and Hutchinson (2002) discuss the concept of cash-to-cash (C2C) and describe it as the new supply chain management metric. C2C basically reflects the length of time between cash payment for supplies and the collection of accounts receivable generated by the sales of these goods.

**Example of supply chain management**

The case reported here focuses on supply chain relationships between three companies in the South African retail sector - Keen Appetite (KA), Quality Meat (QM) and African Foods (AF). QM supplies beef to KA, which is used to make pies, which are then supplied to AF. AF is one of the major retailers in South Africa. It has a strong influence over the activities and processes undertaken within the supply chain because the pies produced by KA bear its brand name. The supply chain relationship is shown in the figure below.

*Fig. 1 Supply chain configurations*

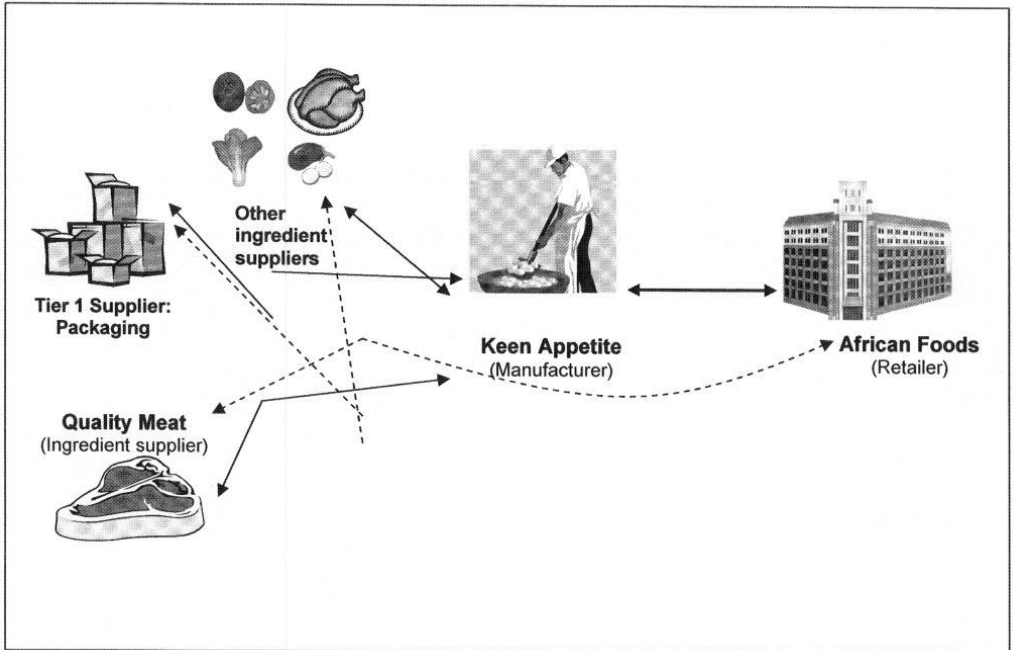
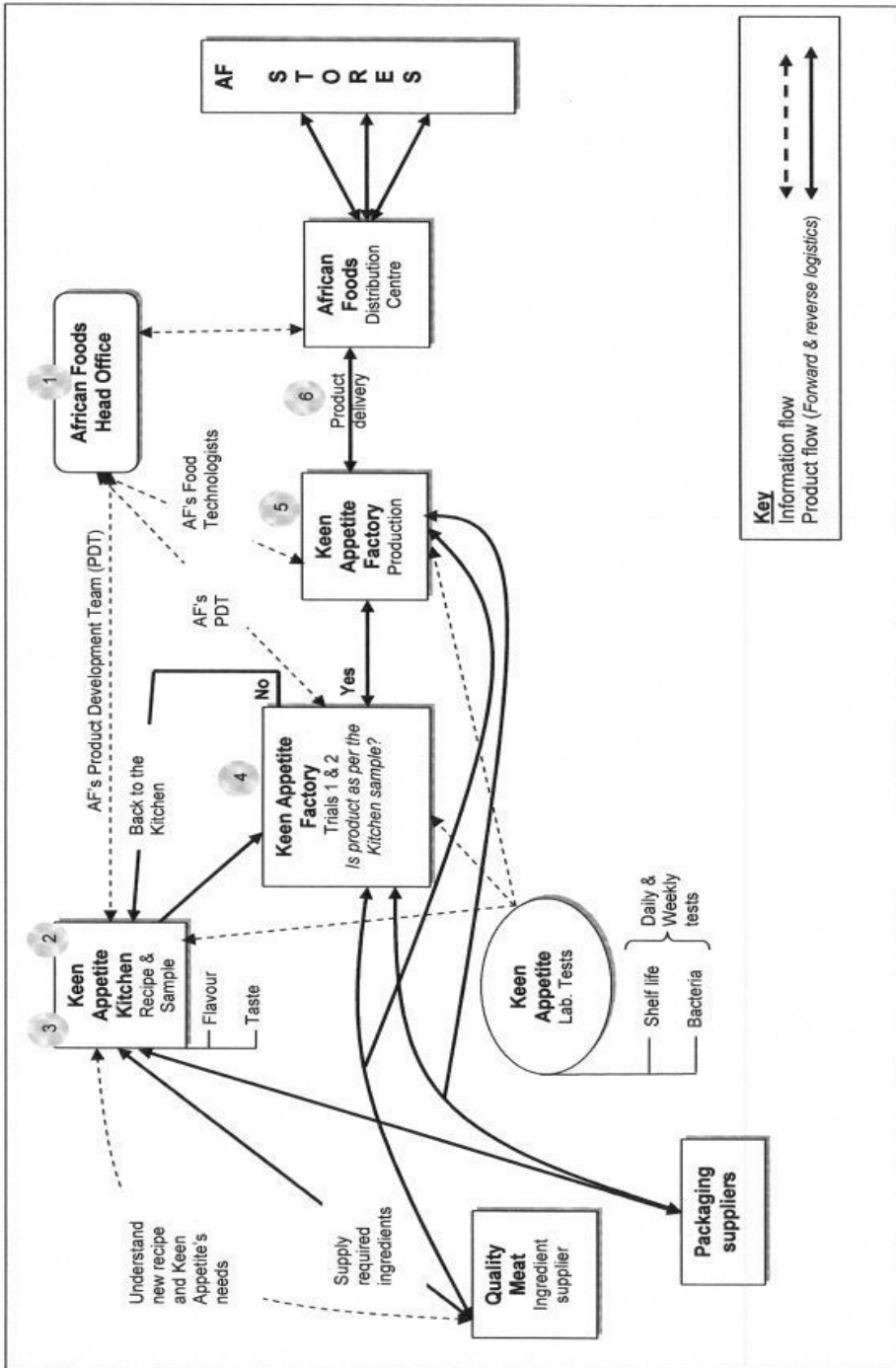


Figure 2 below presents the key processes within the supply chain in the context of the development of a new product.

Fig. 2 Key processes within the supply chain



## Key processes within the supply chain

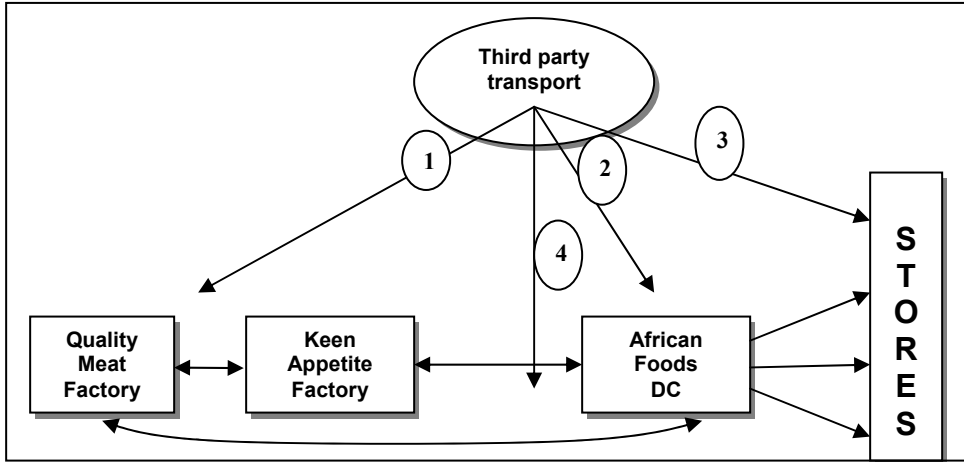
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- (i) *Strategy meetings:* AF and KA hold regular strategy meetings which are largely influenced by AF's strategic thrust. The purpose of the strategy meetings is to enable KA to understand the nature of the products that will take AF's business into the future and to map out product strategies based on that understanding. As part of the strategic meetings, the partners also have joint overseas trips to benchmark products around the world. The strategy meetings are supported by monthly and weekly meetings between the two companies, during which progress towards the achievement of the broad objectives as set out in the strategy meetings is reviewed. The sharing of strategic information supports and is supported by the open book policy practised along the supply chain. These meetings also create a platform for addressing major problems. KA and AF also discuss, on an ongoing basis, the possible use of shared resources (such as transport) aimed at eliminating the duplication of activities/processes, which would in turn result in cost savings.
- (ii) *Recipe creation:* In order to achieve meaningful cost reduction at the development stage of a product, KA's product development centre (PDC) and AF's product development team (PDT) work together in KA's kitchens to create cost-effective recipes. Joint product design facilitates cost reduction through target costing. AF's PDT is involved from the time a recipe is created, right up to the time the product is handed over to KA's production managers. Knowledge and experiences are openly shared between the two teams, together with KA's purchasing personnel who suggest alternative ingredients as part of the cost reduction process.
- (iii) *Kitchen sample:* Before a kitchen sample is produced, AF, KA, QM and packaging suppliers meet at KA's premises to discuss the product strategy and the specific input needs required by KA to make the product. QM's production manager emphasised how important customers' specifications are in the company's cost management process. The meeting of the key supply chain participants is also used to share ideas about the cost implications of the recipe on ingredients and packaging. The capacity of KA, QM and that of packaging suppliers are also discussed during the Kitchen sample strategy meeting. Kitchen samples are jointly made by AF's PDT and KA's PDC. The focus at this stage is on the desired flavour, taste and cost. Cost information is known by both KA & AF through the PDT and PDC. Once a kitchen sample is approved in terms of flavour, taste and cost, the recipe goes for factory trials.



- (iv) *Factory trials:* Factory trials are aimed at understanding the recipe in factory conditions and training KA's factory personnel on how to make the product as per the kitchen sample. QM and packaging suppliers are involved not only in terms of supplies but also in ideas on the best ingredients and packaging. KA conducts lab tests to establish shelf-life and presence of bacteria in both trials and presents the information to the PDC the PDT. After factory trial 2, AF and KA discuss the results in terms of quality and cost. If at this stage the product quality and cost are not as per kitchen sample, then the process goes back to the drawing board – the kitchen sample stage. If however, the cost and quality targets are in line with the kitchen sample, then the product is approved for launch.
- (v) *Product launch & Factory production:* By the time the product is ready for launch, KA's factory employees know how to make the product efficiently, reaching the required yields on ingredients. At this stage, the product is handed over to KA's factory to be produced on a daily basis after KA's PDC and AF's PDT are satisfied with (i) quality and (ii) cost of the product. The cost information related to the product is available to KA and AF through the inter-company teams. On AF's side, the product responsibility is handed over to its buyers and Food technologists. KA's production managers and AF's buyers agree on specific product delivery dates. KA, QM and packaging suppliers agree on specific input delivery dates and times, based on the product delivery dates into AF's distribution centre and the lead times between orders from AF and delivery of product. KA's production managers work closely with AF's Food Technologists to ensure quality of the product.
- (vi) *Product delivery:* KA and AF have a unique relationship in that KA does not have a logistical function of its own. The company uses AF's highly sophisticated logistical function (outsourced from a third party) that allows both companies to use the same transport for inputs and delivery of products, as shown in figure 3 below.

Fig. 3 The logistical function along the supply chain



The following is an example of how transport is shared. A truck uplifts two different beef products from QM, the first (item 1) constituting ingredients for KA used for the production of meals sold by AF. The second product is raw beef, for sale as such in AF stores (item 4). The truck delivers the ingredient to KA (item 1), and then uplifts finished goods from KA for delivery to AF's distribution centre (item 2). Proceeding to AF's distribution centre (DC), the truck then offloads KA's finished goods (item 2) and QM's raw beef (item 4). Now empty, the truck is loaded with other finished products at AF distribution centre, for delivery to selected AF stores (item 3). This way, AF's logistical function ensures that trucks are always carrying product (be it raw beef or finished product), resulting in an efficient utilisation of the trucks. Consequently, the cost of delivery is significantly reduced which further contributes to the achievement of cost targets for products sold to end-use customers. Furthermore, the configuration of the logistical processes facilitates reverse logistics, i.e. where products have to be returned from AF stores due to quality and other problems.

Cost reduction is achieved on both sides in that QM can carefully plan the processing of meat and be ready when the trucks come to collect the ingredients. On KA's side, delays in the factories are eliminated, given the severity of failure to deliver to AF's DC as expected.

### The Use of Management Accounting Information in the Supply Chain Relations

The two main management accounting techniques used in managing the supply chain relations between AF, KA and QM are target costing and open book accounting.

- a) *Target costing* is used mainly during factory trials. AF's Accountant explained the purpose of cost targets as: *"The main objective of cost targets is to make sure that we do not launch a product until we are satisfied that we will be able to meet the target selling price, taking into account our margins."*

Cost targets are based on AF's budgeted purchases and margins. When AF sets its purchasing budgets, the budgeted cost per food item becomes the target cost that is communicated to KA. In addition to this figure, AF also gives KA its target selling price for the food item, plus its required margin. AF's product development team then work together with KA's PDC to create a recipe which will enable the product to be sold at the target selling price.

The achievement of cost target is particularly important in this supply chain due to competition in the local market. From AF's side, the new product development department is being revamped to make it more structured. As the Supply Chain Manager of the company put it: *"The idea here is that before a product is developed, we have to take into account upfront, from a commercial point of view, what exactly we want to do, where the product fits into AF's product categories, what competitors have, what the expected costs are, the selling price and the margins"*.

Thus the use of target costing is seen as an integral part of achieving a commercial view of all new products due to the level of competition as well as the strategic thrust of the company. As such, margin management is a key factor in AF's quest to achieve its cost and profit targets. Consequently, a lot of emphasis is placed on the ability of buyers to meet their budgeted margins. The achievement of budgeted margins impacts heavily on the company's cost target setting, and on the ability of KA to negotiate a reduction in AF's margins where cost targets have not been met.

KA also examines its own internal processes in order to further reduce costs. The company's production manager explained the importance of cost management at the product design stage as: *"Before the product gets to the factory, it is costed, and the ingredients yields calculated and the packaging decided upon. This is done to see whether the product will achieve the desired selling price as required by AF. If it does not achieve the target selling price, we re-engineer the product to meet the price or agree with AF to sell the product at a higher price."*

KA also manages its input costs through cost targets set for suppliers like QM. The cost targets are negotiated rather than imposed, in the context of openness as explained by QM's Accountant as: *"Ingredient cost targets set by*

*KA are negotiated. When we negotiate with KA, we also take into account the cost of the meat, the labour required to process it, e.g. the cost of removing bones from the meat. Our customer's buyers fully understand our cost structure."*

- (b) There is openness or transparency (open book accounting) between KA and AF in that both companies know each other's costs and margins. This information is shared during the product design phase and throughout the lifespan of a recipe. AF gives KA a list of the selling prices of the products they trade with each other, plus information regarding the company's desired margins. KA is responsible for applying price tags to AF's products in its factories before the products are delivered to AF's distribution centre. Thus negotiations during the product development stage involve the disclosure of all information pertaining to the costs and margins of each company.

AF's Accountant explains open book policy between KA and AF as: "KA gives us the cost of the product in form of a cost-breakdown, i.e. cost of ingredients, labour, transport, overheads, packaging and their required margin. We then negotiate the price of the product and once we agree, the price remains the same for the next three months. We then review the price to take into account inflation and other factors."

There is also openness between KA and QM, as explained by QM's Accountant as: "KA fully understands our cost structure. If we achieve cost savings, we always make sure that KA benefits. We reduce our selling price, so that KA can also reduce their cost of products. Thus cost savings are shared through adjusting our margins."

### Summary and conclusions

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To remain competitive, companies must focus on improved supply chain efforts to enhance customer service through increased frequency of reliable product deliveries. Increasing demands on customer service levels is driving partnerships between customers and suppliers. Having a successful relationship with a supplier results in trust and the ability to be customer driven and customer focused. The objective of a company in a supply chain is to see itself as part of a supply chain that has to compete against other supply chains, rather than as a single company competing against other individual companies. Businesses that adopt supply chain management generally view the entire supply chain as a single, integrated entity. Cost, quality, manufacturing, delivery, and customer service considerations are shared by every company. The case study included in this chapter provides an illustration of the way in which independent companies work together in a supply chain relationship. The case study also illustrates the

use of management accounting systems to facilitate and add value to the relationships.

Inter-organisational cost management techniques are necessary for managing a supply chain relation. However, criteria should be developed for sharing any cost savings accruing from the partnership. Supply chain relations also require openness and transparency. The implication of this for management accounting is the opportunity for open book accounting which requires that each party to the agreement allows access of its books to the other party. This would not only allow for information sharing about cost, but can also contribute to enhancing trusting relationships between the parties. Thus, the success of inter-organisational relations, such as supply chain, requires trust between the parties and management accounting information can play a role in this.

As the overarching aim of a supply chain relationship is cost reduction and value creation, target costing techniques can be utilised to achieve this purpose. The use of target costing requires that the supplier is made aware of the buyer's target cost before the product is manufactured and where it is determined that the target cost will not be met, the partners can then take the necessary step to make changes that will result in meeting the target cost. The use of target costing should be a joint decision and requires the commitments of both parties, with any cost savings being shared between the parties on the basis of agreed criteria.

Activity based costing/management could also be used as a tool for understanding and managing cost along the supply chain. Thus the use of cost drivers under ABC/ABM to calculate accurate cost data would enable the partners to understand each other's cost structure and therefore assist them to work together to reduce overall costs. Instead of organisations focusing only on managing intra-firm costs, supply chain creates the opportunity for ABC to be used in managing inter-firm cost.

Finally, management accounting can also play a role in measuring supply chain performance and this is an area where most practitioners see a need for improved systems. Managers require performance measurement systems to be developed that both identify the costs and measure the benefits of closer working relationships. The use of the balanced scorecard is seen as potentially providing managers with a broader understanding of the company's supply chain performance.

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# Chapter 20

## Environmental management accounting: an overview and application of the concept

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Craig Deegan

### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

1. Explain what an 'environmental cost' is;
2. Explain what 'environmental management accounting' is;
3. Appreciate the limitations inherent in 'traditional' management accounting systems in respect of how they typically fail to recognise 'environmental costs';
4. Discuss how the use of traditional overhead accounts can often tend to 'hide' the consumptions of resources that have significant environmental implications;
5. Understand how and why waste costs are typically understated by business entities; and,
6. Explain the difference between 'private costs' and 'societal costs' and be able to discuss alternative approaches for accounting for externalities.



## Introduction

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This chapter will introduce the concept of environmental management accounting. As we will demonstrate, environmental management accounting can be undertaken in a number of ways – from approaches that represent a minimal departure from traditional management accounting practices (for instance, changing how overheads are accumulated and subsequently allocated) to practices that represent radical departures from traditional practice (for example, placing a cost on the externalities – for example, pollution – generated by a business organisation).

This chapter will demonstrate that traditional approaches to management accounting typically ignore “environmental costs” (which we will define at a later point) and fail to provide guidance for any efforts undertaken to reduce such costs. However, with minimal refinements, existing management accounting systems can be modified to enable decisions to be made that will both reduce environmental costs and also improve financial profitability – the so-called ‘win-win’ situation.

This chapter will also draw upon findings that were generated by four environmental management accounting studies that were undertaken within Australia in 2002 and that formed part of a report entitled *Environmental Management Accounting: An Introduction and Cases Studies for Australia*.<sup>11</sup> In all case studies, financial and environmental benefits accrued as a result of the organisations implementing environmental management accounting systems. The material produced in this chapter is based in large part on this report (which also happened to be written by the author of this chapter).

The balance of this chapter is organised as follows. Firstly, we consider the motivations for implementing an environmental management accounting system. We will then define a number of key terms, including ‘environmental costs’. We will then discuss some limitations of traditional management accounting systems and argue the case for modifications to be made to make the accounting systems more ‘environmentally friendly’. We will then refer to the four environmental management accounting case studies that were undertaken within Australia in 2002. A brief discussion will then be given to accounting for environmental externalities before we make with some concluding comments.

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<sup>11</sup> The research for the report was funded by a consortium involving the Department of Environment and Heritage (Australian Commonwealth), Environmental Protection Agency (Victoria), and the Institute of Chartered Accountants in Australia.

## Why bother with environmental management accounting?

Throughout the world, it is generally accepted that the environment is in crisis (Suzuki and Dressel, 1999). A great deal of the blame and responsibility for this 'crisis' is often targeted at business entities (Gray et al, 1998). Across time, the community is increasingly expecting organisations to minimise the impacts their operations cause to the environment. Business is in control of most of the technological and productive capacity needed to bring about shifts toward sustainable development and hence shifts towards sustainability need to be embraced by business organisations if any real advances are to be made. As business is increasingly being expected to focus on sustainable development,<sup>12</sup> it is becoming important for businesses to indicate that they embrace the concepts of sound ecological management, congruent with changes in society's expectations.

Failure to embrace the community expectations in relation to minimising environmental impacts will mean that the community will revoke the organisations 'license to operate' (see Deegan, 2002 for a discussion of the 'community licence to operate'). Recent community based surveys seem to clearly indicate that a vast number of individuals within society believe that corporations have an accountability for their environmental performance. For example:

The Canadian Democracy and Corporate Accountability Commission noted (2002, p. 11): "In our national survey of Canadians, we found that 72% believe that corporate executives should take social-responsibility concerns (impacts on communities, employees, the environment, and charitable activity) into account in pursuing profits. Only 20% said that corporate executives should have "only one responsibility, to operate competitively and make profits".

In an international poll undertaken in 1999 by Environics (involving samples of 1,000 citizens in 23 countries) in collaboration with the Prince of Wales Business Leadership Forum in London and the Conference Board in New York, Environics undertook a corporate responsibility survey to determine global public opinion on the role of companies in society. Approximately 70% of people expected corporations to be completely responsible for ensuring that their products and

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<sup>12</sup> An often used definition of sustainable development is the definition provided by the Brundtland Report (1987) which defined sustainable development as 'development that meets the needs of the present world without compromising the ability of future generations to meet their own needs'.

operations do not harm the environment. Within the Australian sample, the level of concern appeared to be even higher.

Results of surveys by The Australian Bureau of Statistics (ABS) 1999 show that the Australian community is becoming increasingly concerned about the state of the environment, and the role corporations play in impacting the environment.

If organisations fail to embrace accountability for their environmental performance<sup>13</sup> and fail to reduce their environmental impacts then it would be expected that the support they receive from various stakeholder groups will fall, and this will have obvious implications for organisational survival. Organisational survival depends upon support from stakeholders – particularly those in control of resources necessary to the organisation’s operations (Ullmann, 1985). With increased community concern about the environment and sustainability issues, corporations are expected to respond by demonstrating that they accept that they have accountability for their environmental performance.

If we do accept that organisations must act responsibly in relation to their impacts upon the environment – arguably not an unreasonable position – then the accounting systems must respond to encourage the organisation to reduce its consumptions of resources that are known to have environmental impacts. Accounting systems cannot simply fixate on providing information about financial performance if it is accepted that organisations have accountability for their social and environmental performance as well. Accounting systems must adapt as expectations regarding corporate accountability evolve. Introducing environmental management accounting into an organisation is one step in this evolution.

Recent evidence suggests that most managers are unaware of the extent of the environmental impacts of their operations and most organisations do not separately identify environmental costs. As the United Nations Division for Sustainable Development (2001, p.1) states:

Information on environmental performance of organisations might be available to some extent, but, internal company decision-makers, as well as those in public authorities, are seldom able to link environmental information to economic variables and are crucially lacking environmental cost information.

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<sup>13</sup> Gray, Owen and Adams (1996, p. 38) provide a definition of accountability, this being “the duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible”.

That is, there are many costs being incurred by a business that are simply ignored. For example, organisations might not be separately accounting for their waste costs, or they might not be identifying the energy costs attributable to particular processes - hence strategies will not be put in place to reduce such costs. This situation can be alleviated, in part, by refining existing management accounting systems. This refinement, which can be made through environmental management accounting, can often be undertaken at relatively minimal cost by many organisations, including small and medium sized organisations. Cost effective strategies can be implemented across a variety of organisations, including those involved in manufacturing, or in providing services. As we will demonstrate in this chapter, refining existing management accounting systems (for example, 'rejigging' how overhead accounts are used, or how waste costs are calculated and disclosed) can lead to changes in strategies that improve both financial and environmental performance. Initiatives that refine existing management accounting systems to enable the accounting systems to focus on environmental costs can lead to what are considered to be environmental management accounting systems. As the United Nations Division for Sustainable Development (2001, p. 3) notes:

Doing environmental management accounting is simply doing better, more comprehensive management accounting, while wearing an "environmental" hat that opens the eyes for hidden costs.

Hence, what we refer to as an 'environmental management accounting system' could potentially only involve fairly straight forward refinements to existing management accounting systems with the refinements being aimed towards providing more detailed or accurate information about the consumption of particular resources that are known to have relatively significant environmental implications (of course, an environmental management accounting system could also involve much more – the point being made is that environmental management accounting systems can take on a variety of forms – there is no single definition of environmental management accounting).

Capturing data about 'environmental costs' seems essential if organisations are going to improve their environmental performance. However, evidence indicates that organisations typically do not have a good grasp on understanding the magnitude of their environmental costs. As Ditz, Ranganathan, Banks (1995, p. 30) state in relation to a number of case studies that were undertaken:

Firms seeking a keener appreciation of their environmental costs may find some managers resistant. In part, their scepticism reflects a mistaken belief that environmental costs are already well known. At the outset of these case studies, a number of individuals indicated that they already knew

where most environmental costs originate. But, more often than not, they were seeing only part of a much larger, more complicated picture. If the focus on sources and magnitudes of costs is limited, opportunities for improving environmental and economic performance will be missed.

### What is environmental management accounting?

Before we define environmental management accounting it is useful to provide definitions for 'environmental accounting' and 'environmental costs'. We have used the term 'environmental costs' a number of times already in this chapter – but as you should appreciate, this term can take on a multitude of meanings.

Environmental accounting is a broader term that relates to the provision of environmental-performance related information to stakeholders both within, and outside, the organisation. According to the US EPA (1995, p. 18):

An important function of environmental accounting is to bring environmental costs to the attention of corporate stakeholders who may be able and motivated to identify ways of reducing or avoiding those costs while at the same time improving environmental quality.

Environmental management accounting (EMA) is a subset of environmental accounting. EMA can be used to provide information for decision making within an organisation, although the information generated could be utilised for other purposes, such as for external reporting.<sup>14</sup>

The International Federation of Accountants (1998) defines environmental management accounting as:

The management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. While this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management.

The United Nations Division for Sustainable Development (2001, p. 1) provides a slightly different definition of environmental management accounting. Its definition emphasises that environmental management accounting systems

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<sup>14</sup> The view that *environmental management accounting* predominantly relates to providing information for internal decision making is consistent with the definition provided by the US EPA (1995) which describes environmental management accounting as "the process of identifying, collecting and analysing information about environmental costs and performance to help an organisation's decision making."

generate information for internal decision making, where such information can be either physical or monetary in focus. As the UNDSO states:

The general use of environmental management accounting information is for internal organisational calculations and decision making. EMA (environmental management accounting) procedures for internal decision making include both physical procedures for material and energy consumption, flows and final disposal, and monetarized procedures for costs, savings and revenues related to activities with a potential environmental impact.

Environmental management accounting can therefore, depending upon the system implemented, provide a broad range of information about financial and non-financial aspects of an organisation's environmental performance. According to definitions such as those provided above, environmental management accounting systems have the dual purpose of managing and improving the financial and environmental performance of an entity.<sup>15</sup>

Discussion of environmental accounting and environmental management accounting generates reference to environmental costs - a term that as we can now appreciate, might take on a variety of meanings - that is, there are no consistencies in the meanings attributed to environmental costs in either the economic or accounting literatures (Schaltegger and Burritt, 2000). Environmental costs have traditionally been thought of as being the 'end-of-pipe' costs, such as the costs associated with cleaning up sites after production, or waste-water treatment costs. Environmental management policies that focus on these end-of-pipe costs and technologies can generate short run returns, but such a focus will be costly in the long run as it will ignore the consumption of resources within the organisation. A broader interpretation would see the term environmental cost also encompass material and energy used to produce goods and services (particularly from non-renewable sources), the input costs associated with wastes being generated (including the capital costs, labour costs, materials and energy costs used to produce the waste) plus any associated disposal costs, storage costs for particular materials, insurance for environmental liabilities, and environmental regulatory costs including compliance costs and licensing fees, inclusive of any fines.

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<sup>15</sup> This can be contrasted to conventional management accounting systems typically in use within organisations. Such systems do not give separate recognition to environment-related costs or impacts, but instead, focus on particular issues on the basis of their economic or financial decision making relevance.

For a minority of organisations, the environmental costs might also include the environmental and social impacts caused to other entities by the organisation's operations. These 'externalities' are typically referred to as 'societal costs' – costs imposed on individuals, society and the environment for which the organisation is not directly held accountable. With very few exceptions (and these exceptions typically originating in Europe would include BSO/Origin, Ontario Hydro, Interface Europe, Anglian Water, Wessex Water), organisations do not tend to account for the negative externalities caused to other entities as a result of the organisation's activities. Most costing systems only consider the costs that arise within the boundaries of the organisation (referred to in financial accounting as the application of the 'entity concept').

What should be stressed is that there is no single accepted definition of environmental costs such that different organisations will employ different definitions. To minimise potential ambiguity, an organisation using the term environmental cost should provide a definition that clearly delineates the scope of costs included. Whilst in the minority, a number of organisations throughout the world are referring to the 'environmental costs' they are generating – but if one investigates their reports more fully it is clear that they are predominantly applying the term in different ways. At this stage it is not essential that a single definition of environmental costs be developed. Indeed, much time could potentially be wasted arguing about the semantics of what should be included in environmental costs – many people will have different opinions. As long as the processes involved in classifying and measuring environmental costs are logical and appropriately communicated, and as long as significant and relevant costs are considered when decisions are made, then progress should result. What is important is that environmental costs are not ignored.<sup>16</sup> Obviously, some consistency in how an organisation defines environmental costs from period to period will enable more meaningful inter-period comparisons.

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<sup>16</sup> With this said, there is work being undertaken towards the establishment of a uniform classification system for *environmental costs*. As Osborn (2001) notes, "the Classification of Environmental Protection Activities (CEPA) is the most developed element within the UN's System of Integrated Environmental and Economic Accounting (SEEA) .... The UN's CEPA has been developed to pool financial transactions into activities according to their environmental impact .... The Australia Bureau of Statistics is one among many national statistical agencies using the CEPA to construct national EPE accounts." The CEPA provides classifications of costs at a fairly high level and individual organisations will break the major cost-classifications into lower level categories to satisfy their specific information requirements. For details of the SEEA see <http://unstats.un.org/unsd/environment>.

The US EPA has provided a useful dichotomy - private versus societal costs. According to US EPA (1995, p. 1), the term environmental cost has at least two major dimensions: it can refer solely to costs that directly impact a company's bottom line (termed "private costs"), or it can also encompass the costs to individuals, society, and the environment for which a company is not directly accountable (termed "societal costs" by the US EPA, but typically referred to as externalities). Externalities generated by an organisation, although possibly ignored from an accounting perspective, are often recognised as costs by other entities. For example, an organisation might release waste-water to a river system. To the extent that they pay no fines in relation to the releases and to the extent they do not pay for permits for waste water releases then the waste-water releases would not be captured by the organisation's accounting system. However, if there is an organisation down-stream that requires clean water for its operations then that organisation would incur costs in relation to removing the contamination caused by the pollution added by the up-stream company. If the up-stream company accounted for the 'externalities' generated by its business then it would possibly calculate the cost of the damage being caused by its waste water release and deduct this amount from its reported profits. We will return to the issue of accounting for 'externalities' at a later point in this chapter.

In relation to 'scope considerations' associated with defining and measuring environmental costs, US EPA (1995) discusses the range of 'environmental costs' an entity might choose to consider, ranging from the easier to measure, to the more difficult to measure. This range (in ascending order of difficulty) is detailed in Table 1.

**Table 1: The range of environmental costs an entity might chose to consider**

Tier	Description
Tier 1	Conventional costs (include costs of direct raw materials, utilities, labour, supplies, capital equipment and related depreciation)
Tier 2	Hidden costs (include up front environmental costs, such as search costs relating to finding environmentally-conscious suppliers, initial design costs of environmentally preferable products, regulatory costs which are often obscured in overhead costs, future decommissioning or remediation costs)
Tier 3	Contingent costs (defined in probabilistic terms and include fines for breaching environmental requirements, clean up costs, law suits relating to unsound products)



Tier 4	Relationship and image costs. These costs are difficult to determine and would seldom be separately identified within an accounting system. However, they could be expected to have some influence on the value of some intangible assets, such as goodwill, brand-names, and so forth. The sum of the costs in Tiers 1 to 4 can be referred to as “private costs” and they can directly impact an organisation’s reported profits
Tier 5	Societal costs. These costs are often referred to as <i>externalities</i> and represent costs that an organisation imposes upon others as a result of their operations, but which are typically ignored by the organisation. Could include environmental damage caused by the organisation for which they are not held accountable, or adverse health effects caused by organisation-generated emissions for which the organisation is not held responsible. It is difficult and sometimes controversial to put a cost on these effects and with the exception of a few organisations worldwide, most entities ignore these costs when calculating profits. However, physical measures can be developed, and related KPIs can be used to assess performance.

Tiers 1 to 4 above have been classified as private costs, costs that directly impact a company’s bottom line, as distinct from societal costs, costs to individuals, society, and the environment for which a company is not directly accountable. This distinction is not one that is fixed across time, or across state or countries. Many costs that were once societal are becoming private. For example, carbon taxes will be levied in many countries and additional ‘clean-up’ requirements, environmental levies, and so on, are being introduced across time. As costs become ‘private’ there is an expectation that they would tend to be captured within accounting systems.

Accounting for externalities or ‘societal costs’ is a very difficult task and would not be recommended for organisations that are embarking on the journey towards measuring the environmental costs of their operations. It is simply too ambitious for most managers – particularly in the early phases of developing an environmental management accounting system. Nevertheless, it does show how far the definition of environmental costs can extend (and as we have already indicated, we will briefly return to the issue of accounting for externalities at a later point in this chapter).

What are some of the limitations of ‘traditional’ management accounting practices when it comes to measuring and reducing environmental costs?

The vast majority of management accounting systems in place within organisations pay little or no attention to attributing any form of environmental cost to an organisation’s operations. This has meant that many opportunities for reducing environmental costs (however defined) are being lost. For example, questions such as how much waste does a particular product create, how much electricity is used to produce a particular product, or which parts of the business are using more water than ‘normal’ cannot typically be answered. One major problem in many accounting systems is the way overhead accounts are used in that they often aggregate an assortment of costs such that costs attributable to particular resource consumption (for example, the consumption of energy and water) cannot be determined except on a very aggregated level.

Accumulating an assortment of costs in overhead accounts can also tend to ‘hide’ various costs. Many of the costs accumulated in overhead accounts, are product or process specific and have environmental consequences – for example, energy and water costs, waste treatment costs, stationery costs, insurance pertaining to holding volatile substances, or regulatory costs associated with particular emissions or releases.

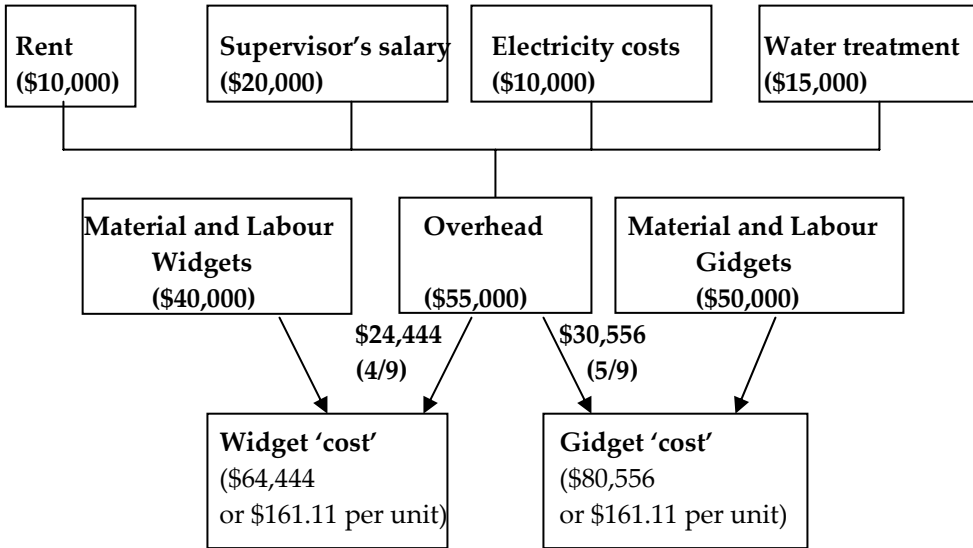
The opinion that the traditional use of overhead accounts can conceal or even distort information relating to environmental costs is not new and is consistent with the views of the United Nations Division for Sustainable Development, which states (2001, p. 1):

Conventional management accounting systems attribute many environmental costs to general overhead accounts, with the consequence that product and production managers have no incentive to reduce environmental costs and executives are often unaware of the extent of environmental costs .... A rule of thumb of environmental management is that 20 per cent of production activities are responsible for 80 per cent of environmental costs. When environmental costs are allocated to overhead accounts shared by all product lines, products with low environmental costs subsidize those with high costs. This results in incorrect product pricing which reduces profitability.

As a very simplistic illustration of the distorting effects overhead accounts can create, we can consider the following figure, Figure 1, adapted from US EPA (2000), which identifies how an organisation accounts for the production of its widgets and gidgets. In this very simplified example, total overhead is construed as relating to factory rent (\$10,000), supervisor’s salaries (\$20,000), electricity costs (\$10,000), and water treatment costs (\$15,000). Direct material and direct

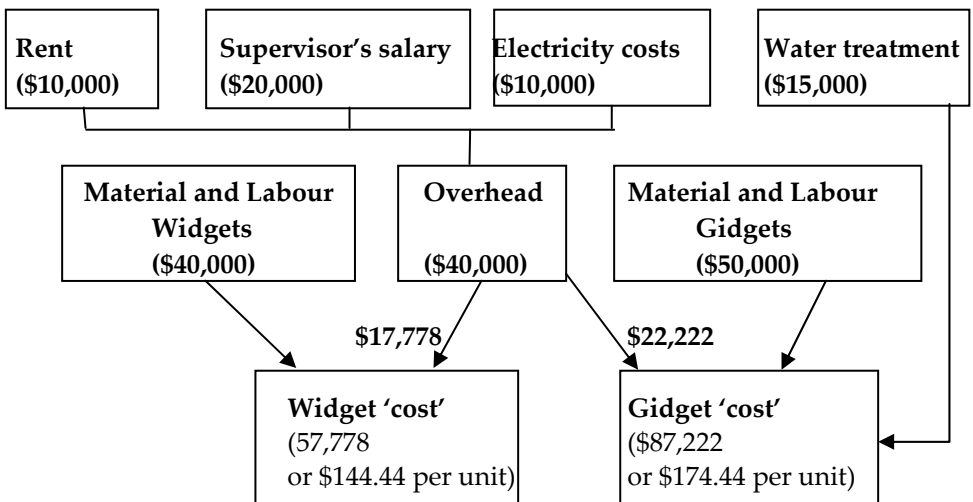
labour for widgets and gidgets amounts to \$40,000 and \$50,000 respectively. Overhead is allocated on the basis of completed units, with 400 and 500 widgets and gidgets being produced respectively.

Figure 1: Simplified illustration of environmental costs being misallocated



On closer analysis however, it is apparent that all the water treatment costs relate to gidgets as the production of widgets is almost water free. If we allocate these costs to the gidgets (that is, to the activity that caused the cost in line with the general thrust of activity based costing), the revised costing diagram can be produced as follows:

Figure 2: Revised cost allocation



The 'dirtier' product (gadgets) had initially been under-costed. By allocating costs on a more 'activity-based' approach some of the under-costing is eliminated. It will also enable costs of the product to be more responsive to initiatives that reduce the necessity to treat the water (because the change in costs will not be shared with other products).

Where overhead accounts obscure or hide environment-related costs (such as energy usage, waste, water usage) there tends to be a bias against pollution prevention projects as although they might reduce costs – they are reducing hidden costs. Once knowledge is gained about how many environmental costs are being hidden then actions can be taken, in accord with the general practice of activity-based accounting, to relate particular costs to particular activities. The above example showed how water treatment costs would be more logically assigned to gadgets. Of course, additional investigation might show that it would be more appropriate to assign electricity costs on a different basis other than completed units.

Therefore, reviewing overhead accounts is a key procedure when embarking on a project aimed at identifying and subsequently reducing environmental costs. This will be the case for service-based organisations as well as for those organisations involved in manufacturing. When costs are 'hidden' in overhead accounts fairly simple questions pertaining to the waste costs of an organisation, or to the water or energy used to produce particular products or to provide particular services cannot be easily answered. Overhead accounts often include rent, property taxes, repairs and maintenance, training costs, auditing or verification costs, waste removal and disposal, transportation costs, water costs, factory cleaning, licensing fees, stationery costs, packaging costs, indirect material and labour, and insurance. Energy costs also are often either included in overheads without any attempt to attribute them to particular products, or simply treated as a period cost without any allocation to products. For example, in research undertaken in the UK, Gray et al (1998) found that the majority of UK companies did not allocate energy costs to specific products meaning that the pricing of their products did not reflect the energy consumed by the products. This finding was also replicated within the Australia environmental management accounting case studies as reported in Deegan (2003).

Costs pertaining to packaging and other 'auxiliary' materials are also frequently accumulated in overhead accounts, although their usage may be relatively higher for a limited number of products. Overhead accounts are used as a result of simplistic direct and indirect costing dichotomies being employed within an organisation.

Where a variety of costs are being accumulated in overhead accounts, subsequent allocation of the accumulated costs to particular products are frequently made in terms of such bases as sales volume, production output, floor space occupied by particular departments, machine hours, or labour hours. For example, in one of the four case studies undertaken within Australia (Deegan, 2003) one participant (a major Australian organisation) accumulated costs related to rent, maintenance, signage, cleaning, electricity, water, and waste into an account which was then charged to cost centres by way of a 'Single Office Service Charge'. This charge was levied back to cost centres on the basis of the square metres of floor space the centres occupied – something that would only crudely reflect the usage of the resources. Arguably, such methods of allocation provide limited incentives for managers to reduce their centre's levels of resource consumption (and hence, environmental impact). Certainly, this is not a sensible approach for an organisation seeking to motivate improvements in its environmental performance.

Whilst making the task of cost allocation easier, using such allocation bases can lead to the misallocation of many costs, including those relating to the environment. This is consistent with Bennett et al (1996, p. 34) who suggest:

It is not uncommon for a small number of products to generate a large proportion of emissions or wastes. If these costs are not allocated to individual products but treated as a general overhead, then clean products will appear to have higher costs than is actually the case while dirty products will appear to be cheaper to produce than they really are.

It should be noted that some 'overhead costs' are more appropriately traced and allocated to specific products or services than others. As US EPA (1995, p. 20) indicate:

Separating environmental costs from overhead accounts where they are often hidden and allocating them to the appropriate product, process, system, or facility directly responsible reveals these costs to managers, cost analysts, engineers, designers, and others. This is critical not only for a business to have accurate estimates of production costs for different product lines and processes, but also to help managers target cost reduction activities that can also improve environmental quality.

Apart from the potential problems inherent in using overhead accounts, many costs are also 'hidden' because they are wrongly included in particular costing categories. For example, 'waste' costs can be quite significant, yet are either unrecorded or are greatly understated. In relation to waste, Glad (1996, p. 26) states:

From a financial perspective it (waste) has a much wider connotation, and represents one of the most significant (hidden) costs in organisations. It will not be surprising to find that 30% of an organisation's resources are wasted.

Waste costs are often included in the cost of a particular product when in fact, particular materials did not make it in to the final product. For example, in many organisations it is simply accepted that in making a particular product a certain percentage of material will be wasted (perhaps an off-cut) and as such, the product will simply bear the cost of the waste without any separate identification of the financial (and environmental) implications of the waste. Because waste costs are understated – often because they are not separately recorded and reported - no remedial action might be taken through an ignorance of the magnitude of the costs. Again, if an organisation is seeking to reduce its environmental impacts then such an approach to cost allocation is unacceptable.

What is common in nearly all organisations is that the costs attributed to waste are simply the costs paid to have the waste removed and dumped (for example, waste paper removed by a contractor), or if waste is going to the sewer, the sewerage costs being paid. This ignores the costs of the raw material, paper, labour, depreciation of machinery, energy, and so on that actually go into generating the waste. These 'additional' waste costs are frequently referred to as 'non-product output'. For example, in many service based organisations the waste costs attributed to the organisation are often restricted to the amounts paid to contractors to remove waste bins. In such a scenario the waste costs ignore all the office paper that perhaps has been misused and placed in bins (as well as energy and ink costs involved in photocopying and so forth). Unless the waste costs reflect the disposal of such 'bought-in' material there will be limited actions taken to reduce such wastage and the magnitude of the 'actual' waste will be underestimated meaning that counter measures are less likely to be put into place. According to the United Nations Division for Sustainable Development (2001, p.2):

The largest part of all environmental costs lies in the material purchase value of non-product output and can come up to 10 to 100 times the costs of disposal, depending upon the business sector.

Organisations need a separate account for waste, which records the costs that have been incurred in producing the waste stream – not simply the waste disposal costs. Introducing an environmental management accounting system

that 'simply' refines how waste is accounted for might, on its own, provide the necessary impetus for significant financial and environmental improvements.<sup>17</sup>

Many suggestions that might be made to organisations seeking to better control their environmental costs might simply relate to how various costs were being allocated to products – not a complicated issue. In doing so, greater use can be made of activity based costing. As indicated in another chapter of this book, activity based costing (ABC) is not new to management accountants. However, its use is more limited than perhaps it should be. The objective of ABC is to direct management attention to the activities incurring those overheads rather than to fully recover the overheads. To do this, it is necessary to first identify the major activities being performed by the organisation and assess the resources (such as labour, occupancy, IT network, power costs etc) actually consumed by each activity. It is then necessary to establish what causes or 'drives' each activity and the relationship between the driver and the activity. The organisation would then apportion the cost using that driver. For example, rather than accounting for energy use at an aggregated level, an organisation that is serious about monitoring its usage of energy should track how much energy is used by in generating the different products or services being generated by the organisation.

### Evidence from environmental management accounting case studies

Whilst many authors have written about environmental management accounting, there is a general lack of research that has documented the implementation of an environmental management accounting system within an organisation. For this reason we will briefly refer to four separate case studies that were undertaken in Australia in 2002 as part of what was referred to as the Environmental Management Accounting Project. For full details of the case studies and the results of the implementation of the researchers' recommendations reference should be made to the websites of the consortium responsible for funding the research undertaken.<sup>18</sup> In the discussion that follows we will summarise the findings of the case studies.

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<sup>17</sup> According to United Nations Division for Sustainable Development (2001, p. 15), a further survey of several companies, mainly in Germany and Austria has shown that the costs of waste disposal are typically 1 to 10 per cent of total environmental costs, while the purchase costs of the wasted material represents 40 to 90 per cent of environmental costs depending on the business sector examined. These waste costs are often not recognised separately as 'waste' but are incorporated in other product or service costs.

<sup>18</sup> For example, see the website of the Department of Environment and Heritage at <http://www.deh.gov.au/industry/finance/publications/project.html>.

The parties involved in the case studies were diverse, but the limitations in their management accounting systems were very similar (with respect to failing to monitor their 'environmental costs'). The case study participants comprised:

- Services@AMP which is an organisation that provides various services to AMP organisations throughout Australia;
- Cormack Manufacturing Pty Ltd, an manufacturer of plastic caps and bottle tops;
- GH Michell & Sons Pty Ltd, Australia's largest processor of wool; and
- Methodist Ladies College, Perth – a school with over 1,000 students.

Although the organisations involved in the case studies were diverse, as indicated above, there were a great deal of similarities between the case studies in terms of the findings. For example, the case studies all identified a need to revise existing bases of cost allocations, as well as the need to put in place measures to properly account for the waste costs of the organisations. The four case studies restricted their focus predominantly to Tier 1 and Tier 2 costs (applying the US EPA classification scheme provided earlier). Table 2 below describes the specific environmental costs that were investigated in the respective case studies.

**Table 2: Environmental costs analysed within this project**

Organisation	Costs							
	Energy	Water	Paper	Raw Material	Packaging	Detergent	Transport	Waste
Services@AMP	X	X	X					X
Methodist Ladies College	X	X	X					X
GH Michell & Sons Pty Ltd	X	X				X	X	
Cormack Pty Ltd	X			X	X			X

We will briefly consider each of the case studies in turn.

***Case Study 1: GH Michell & Sons Pty Ltd***

In this case study attention was concentrated on a particular process to do with processing 'dirtier' wool types. The wools used in the particular cleaning process typically include a relatively large amount of dirt, vegetable matter (for example, burrs) and water-soluble salts. To remove this matter, there are various inputs



into the process, including wool, water, detergent, acid, sodium bicarbonate, hydrogen peroxide, energy, labour and machinery use.

In undertaking the GH Michell and Sons case study, the case study participants focused on resource consumptions that are known to have environmental implications. *Environmental costs* were defined quite narrowly as costs that were incurred by the organisation (thereby excluding 'societal costs'), and which were deemed to have environmental implications. Specifically, the following costs were reviewed:

- electricity costs (which have various environmental implications, including those related to the generation of greenhouse gas emissions);
- water costs (use and subsequent release of waste-water has obvious environmental implications);
- use of detergents (which necessitate removal at a waste-water treatment facility prior to release to waterways) and;
- transport costs (which also has implications in relation to the generation of greenhouse gases).

The view taken was that if these costs were brought to the attention of management, and if it was possible to find ways to reduce these costs, then *prima facie*, the initiative would generate positive environmental (and financial) effects.

In Michell, electricity, water and detergent costs were accumulated in an account that specifically related to the cleaning process. These costs were then allocated to the different classes of wool as they were being processed. If different classes of wool use approximately the same resources to process then a fairly arbitrary basis of allocation can be used with little need for further refinement. For example, allocation on the basis of kilograms of wool entering processing could be appropriate. Indeed, this was the actual basis of assigning detergent, water and electricity costs to the various classes of wool. Implicitly, this assumes that all types of wool, regardless of the associated foreign matter included therein, require the same amount of detergent, water and electricity to process. Of course, this sounds unrealistic, but whether the costs associated with refining the costing data would provide benefits (the usual costs versus benefits test used by economists and accountants) in terms of influencing purchasing and processing decisions was not something that was initially clear.

In relation to transportation costs the investigation showed that these costs were also added to the cost of the processed wool. However, these costs per truck delivery (averaging \$2,000 per truck – Michell does not own the delivery trucks) were simply allocated on the basis of bales such that all wool types receive the same allocation for transportation costs.

A major accounting issue was whether the existing basis of cost allocation was appropriate. Given that many costs were assigned to the products on a kilogram of input basis this tended to ignore the fact that particular wool types required more processing and hence more energy, water, detergent, and acid than others (for example, a kilogram of inputted product will generate a different amounts of 'final' wool depending upon amount of vegetable matter and so forth). Preliminary estimates indicated that if the case study participants focused on actual water, detergents, and energy requirements, then costs would be different depending upon the input type (class of wool) and these cost differences, if made part of the costing to be considered by the traders, could impact wool traders' purchasing decisions.

As noted earlier, 'transport costs in' were added to the cost of the processed wool. However, allocating the delivery costs on the basis of bales being delivered ignored the fact that some bales were 75% useable wool by volume, some was only 50 % by volume, and so forth (this information is reflected in the wool grades as initially acquired by the traders). If transport costs (which also have environmental implications) were allocated in terms of the expected yield of the unprocessed wool (rather than simply on bales of input), then this would further affect traders' acquisition decisions (again, one must always keep in mind the low margins on wool). What is being emphasised here is that many costs (including energy, water, detergent, transport) were being allocated effectively on a basis which beared little relationship to what wool was ultimately being recovered from each bale – if these costs were recalculated to reflect recovery rates then projected margins would probably change, with consequent implications for trading decisions.

It was argued within the case study that the costs would be more correctly estimated if a revised measure based on proportion of final product (wool) per bale was considered. The calculations would be based on sample runs that were used with particular lines of wool types, and average costs per wool type would be determined. A process of material tracking (which in many respects is a necessary precursor to any form of activity based costing) would be used.<sup>19</sup>

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<sup>19</sup> These processing runs when monitored provided average resource consumption data and formed the basis of subsequent costing revisions. These runs would have to be measured periodically to determine that the physical flows remained relatively unchanged. Within Michell these runs do happen to be constantly checked as to their use of resources, but in the past this had tended to be in relation to environmental and production efficiency decisions, rather than for product costing purposes. This is probably reflective of many organisations, where production people tend not to 'talk' to the accountants, and *vice versa*.

The implications of the pre-existing system of cost allocations were, basically, that 'dirty' wool inputs were being subsidised by 'clean' wool inputs with the possibility that some wools which are really generating low (perhaps negative) returns were being acquired when they ought not to be (unless of course the traders could acquire the wool at reduced costs which compensate for the additional processing costs). That is, no allowance was being made for the different yields of the wools being processed and the fact that the 'dirtier' wool need more processing. Changes in acquisition decisions will have implications for energy, water, detergent, and transportation use.

Clearly, the way the accounting system allocated the costs, on the assumption that each bale used the same amount of resources to process, was not terribly realistic.

In doing the analysis it became apparent that greater amounts of water, detergent and electricity went into processing 'dirtier' lines of wool, yet costs were being allocated on a per bale or per kilogram of input basis. Whilst the difference in allocated costs (being the difference in the amount allocated on the basis of weight, versus the allocation on the basis of yield) was only small in some cases, given the low margins on wool, this was a significant finding.

Subsequent discussions also revealed that there were other costs that could be reassigned to the wools on a basis which reflected the expected yields of the wools being introduced into the processing. There are costs associated with storing and insuring potentially hazardous chemicals (for example, acids and detergents). Arguably, the wool-types that use more chemicals (the 'dirtier' wools) should bear more of these costs. Previously they did not. Allocating the storage costs on the basis of expected yields further changed the costing mix between the cleaner and dirtier (higher and lower yield) wools. Also, the releases to waste-water systems could be reduced if cleaner grades of wool were acquired, thereby relaxing load constraints, and associated risks, associated with discharges.

All up, the result in the GH Michell case study showed that revising cost allocation bases to ones that better reflected resource usage made significant changes to the perceived profitability of particular products. Further, making the appropriate changes to the accounting system were not difficult or costly.

### ***Case study 2: Services@AMP***

AMP Ltd is a financial services organisation operating in a number of countries around the world with approximately 14,500 employees. The case study focused on the Services@AMP division which provides a number of shared services to AMP in Australia. What became apparent to the case study participants was that

there were a number of limitations within the existing management accounting system. For example:

- The existing accounting system provided information on costs by vendor, but did not provide information on the type or quantity of goods or services procured. For example, information was not collected in relation to the actual quantity of energy used, or water consumed by particular locations. This made it hard to put in place effective initiatives to reduce resource consumption.
- Costs for many of the building services provided or paid for by Services@AMP were combined across all buildings and charged back to cost centres in the form of a Single Office Service Charge (SOSC). This charge was based on the office space occupied, rather than actual consumption. This charging system aggregated rent, maintenance, signage, cleaning, electricity, water, wastewater and waste charges within the one account. Accumulating such costs within a single account and then allocating the costs back on the basis of office space did not make a great deal of sense if an organisation was seeking to monitor and control the costs related to the office charges.
- In most instances, the building manager controlled the cleaning contracts, which included waste collection and disposal, and paid for the wastewater bills. These costs were included in the rent paid by AMP, but were generally not specified as separate cost items.

Ideally, cost centres should be charged a fee based on their actual use of electricity, water, generation of wastewater, and collection and disposal of waste. This would allow cost centres to monitor these environmental impacts and stimulate improved environmental behaviour. It would also allow cost centre managers to be monitored and rewarded to environment-related key performance indicators.

It was identified within the case study that the key opportunities for changing the management accounting system relate to improving the availability of information on the costs and quantities associated with AMP's main environmental impacts. Further, a review of the approximately 1,250 stationery items purchased over a five-month period showed paper and toner cartridges account for approximately one third of stationery costs. This information was not included in the management accounting system, although the supplier provides stationery data in separate reports to Services@AMP. Other suggestions within the case study included:

- Establishment of a baseline for resource use and waste generation and the ability to monitor deviations against the baseline.

- Inclusion of environmental key performance indicators in the monthly management report (for example, number of paper reams and toner cartridges ordered).
- Determination, communication and application of relevant environmental criteria in the compilation of the preferred items list (e.g. recycled material content of stationery items).
- Use of the vendor's monthly reports to compare stationery use between cost centres and locations and determine trends, to identify areas for potential reduction in costs and consumption.

None of these activities were previously undertaken, however an analysis of the contract with the stationery provider suggested Services@AMP could take action to address these issues with little or no additional costs.

Also, a waste audit conducted for one of AMP's offices was reviewed to obtain an insight into the feasibility for AMP to request that building managers identify waste costs as a separate item in the rent. An additional waste audit was conducted for the building in which Services@AMP resided. This information was analysed to identify opportunities for potential cost savings associated with waste reduction and recycling.

### *Case study 3: Cormack Manufacturing Pty Ltd*

Cormack Manufacturing Pty Limited is a plastic injection moulding business based in Western Sydney. As with the other case studies, limitations were found to exist in the management accounting system of Cormack Manufacturing Pty Ltd. These limitations included:

- Packaging and materials costs were 'hidden' within an aggregated COGS account that was not separately allocated to particular products. This made it difficult to determine which products were responsible for the packaging costs;
- Energy costs were not allocated to particular products other than on a fairly arbitrary basis, based on assumed management estimations of energy usage;
- All stock losses were accumulated at an aggregated level. These included obsolete stock, spills, wastage on the production lines and misappropriation. There was no allocation between product cost centres and no identification of particular components of the cost – for example, how much related to waste.

The results showed that it was relatively inexpensive for revisions to be made to how the above costs were allocated. Once relatively straightforward modifications were made to the management accounting system the revised

costing data lead to initiatives that significantly saved the amount of resources being consumed. This also led to significant costs savings.

#### ***Case study 4: Methodist Ladies College, Perth***

Energy, paper costs, and waste were not allocated to particular cost-centre categories, but were part of 'administrative and general overheads' account. Waste management expenses were reported under 'caretaking and cleaning' overheads and were not allocated to particular activities. As we are seeing through these case studies, similar themes were emerging from all the case studies.

As part of the modifications brought about by the review, activity based costing (ABC) was used to assign various costs. ABC was particularly beneficial to MLC as the school had a high level of costs allocated to the 'administration and general' overheads classification ('administration and general' overheads represented 27.1% of total expenditure). ABC could be used to apportion all of the costs within the 'administration and general' overheads classification. However, for the case study the focus was only on the apportionment of costs associated with the key environmental impacts. For each category of environmental impact, a cost driver, or basis for allocation, was identified. For example, it was decided that photocopying was a significant expense. This expense did not initially include associated costs such as labour, energy and paper storage. For the actual cost of photocopying to be managed, it was recommended that the full cost should be recognised and then allocated to Responsibility Centres, and where appropriate, further allocated to photocopying activity sub-centres. To facilitate this, each photocopying activity to be costed was to be identified and records maintained to show photocopier usage by activity to form the basis for allocating the full cost of photocopying.

Costing data was also to be used in making capital budgeting decisions. In the past, the school had undertaken three major air-conditioning capital works projects and additional air-conditioning projects were under consideration. The capital expenditure decisions had previously been based purely on initial tender costs when consideration should have been given to total costs associated with the projects. It was shown that if a broader approach to cost analysis had been adopted as part of the decision making process then there would have been additional and ongoing costs taken into consideration. The analysis showed that when the total costs associated with the three air-conditioning projects, before disposal are taken into account, the revised costs were more than double the tendered costs upon which the capital budget for air-conditioning was agreed. The capital expenditure decision was made without consideration of the ongoing expenses that will be incurred over the life of each project or the additional

capital expenditure required as a consequence of proceeding with the projects. Future capital expenditure decisions would take into account energy and maintenance costs and the costs associated with ultimate disposal.

In summarising the results of the four case studies, the evidence showed that there was a great deal of similarity between the case studies in terms of what limitations were found, and in terms of what improvements were suggested. The following were common across the case studies (and by extrapolation might be assumed to occur if similar studies were done within other organisations):

- The methodologies of the review all focused on considering how existing accounting systems accounted for environmental costs, and whether improvements could be made to make the allocations of environmental costs to products or process more reflective of the actual use of resources. It was generally agreed that once a determination is made of what environmental costs should be monitored, then some form of activity based costing would be worthwhile to attribute the environmental costs to the activities that generated them.
- Initial investigations were limited to Tier 1 and Tier 2 costs (using the classification scheme provided by the US EPA, as discussed earlier).
- Certain environmental costs, for example, costs that arise in relation to the use of energy, water, or other resource consumption were hidden (commonly accumulated in overheads) by the existing accounting systems. Consequently costs were being allocated to processes or products in a manner that did not necessarily reflect their actual usage and therefore some operations or processes were effectively subsidising others because of limitations in existing accounting information.

It was generally found that the waste costs of the organisations were either not reported, or were grossly understated because they did not consider the costs of bought in resources which were included within the waste. Waste costs typically reflected the amount paid to subcontractors to remove the waste.

Failure to properly account for environmental costs had meant that numerous opportunities for improving the financial performance of the organisations had been lost.

Fairly minor and low cost changes to existing systems of accounting could lead to significant improvements in how the business conducted its operations.

The inclusion of an additional field into the accounting system to provide non-financial information provided benefits in terms of being able to monitor resource consumption. For example, when amounts are paid for electricity or

water, we could also include a data field to record the amount of the resource actually consumed.

Failure to allocate particular environmental costs, such as electricity and raw material costs, to particular processes had implications when capital budgeting decisions were being undertaken.

There were a number of lessons learned from the case studies. Generally speaking, the following points related to all the case studies:

- It was important that agreement was reached very early on within the project in how environmental costs were to be defined and exactly what they would include, and exclude. The determination of environmental costs was determined after a consideration of the environmental impacts of the business, and which environmental costs contribute most to that impact. It was essential that the scope of costs considered in the early phases of the project be reasonably limited. Environmental management accounting is probably more successful when it is introduced in an incremental manner.
- It was imperative to have the support of senior personnel and that this support is clearly communicated to people involved in the process of implementing environmental management accounting. Some consideration should be given to educating staff about the importance and benefits associated with being more environmentally focused. It was found that such a message could actually have secondary impacts in terms of positive implications for the morale of employees.
- It was important that a team of people be involved in developing the environmental management accounting system. This team should include people who understand accounting and the existing accounting systems; people who have an environmental background and are able to identify the significant environmental impacts of the business; and, somebody who understands how resources are being used within the various activities of the business.
- It was important to undertake some form of material tracking in relation to those resources that contributed most to the environmental impacts of the organisation. The information gathered from this process was then used as the basis for applying activity based accounting. Accountants were generally comfortable with activity based costing as it is a costing approach that is generally accepted within the accounting profession.
- It was suggested that organisations using overhead accounts should consider reviewing such accounts to see what types of costs they are effectively hiding, and how the use of an overhead account could lead to some products effectively subsidising other products.



- It is not to be assumed that accounting systems reflect the actual use or flow of resources. Simplifying assumptions might have been made in relation to allocating costs, including environmental costs, to particular products or processes. As the costs of certain resources increases, and the importance of sound environmental performance increases, such simplifying assumptions may no longer be appropriate and can have the potential to be damaging to an organisation (both from a financial perspective, as well as from a reputational perspective).
- Organisations did not generally account for their waste. The analysis suggests that all organisations should establish a separate account for waste, and apart from including waste disposal costs within the account, other costs such as the cost of purchased resources that are wasted, should also be included.
- Modifications to existing management accounting systems can be relatively inexpensive, yet generate significant financial and environmental benefits.

Related to the above point, environmental management accounting should initially, where possible, be integrated into the existing management accounting systems and processes for data collection. Essentially, an environmental management accounting system can simply involve 'rejigging' existing management accounting systems so as to identify relevant environmental cost data.

Some systems of accounting which provide relevant management information might be outside the direct control of the organisation. This might particularly be the case in an office environment where a building manager provides an assortment of services (for example, cleaning, waste removal, provision of electricity) which are all part of a combined office charge. In such circumstances, tenants could request a break-up of charges and the ability to negotiate for reductions in charges should they be able to initiate activities which reduce the amount of resources or services required. Also, where services are outsourced, the organisation also can tend to lose control of the ability to reduce the environmental implications of its activities. Where service are being provided by other organisations, then management should consider asking for these external parties to provide information that enables the organisation to have information about related environmental costs and performance.

In an office environment, where environmental costs are relatively low compared to labour, IT and residency costs, it does appear to be more difficult to make a business case for implementing systems to reduce environmental costs. Reference should be made to the absolute (rather than the relative) magnitude of

environmental costs. The case for environmental management accounting can also be strengthened by referring to other 'intangible benefits', such as potential impacts on employee morale, reputation, value of brand-name, legal compliance, and associated risks.

We will now briefly discuss a more 'radical' approach to environmental accounting – one that attempts to place a cost on the externalities caused by business entities.

### Full cost accounting

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Whilst the previous discussion had restricted the analysis to 'private costs' it should be noted that some approaches to environmental management accounting could also try to measure the environmental externalities generated by a business operation. As already emphasised in this chapter, it would not be recommended that organisations initially embracing environmental management accounting should try to account for their externalities.

Two organisations that have attempted to place financial values on their externalities, albeit by way of different approaches, are BSO/Origin (Dutch) and Ontario Hydro (Canadian). They, respectively, use approaches known as 'cost of control' and 'damage costing'. BSO/Origin is a Dutch computer consultancy company that calculated hypothetical costs that would have been incurred if it was to bridge the gap between its actual environmental impacts, and those that were 'desired'. It calculated an 'extracted value' which is deducted from 'traditional' operating income to give 'sustainable operating income'. According to BSO/Origin:

Extracted value is treated as a cost factor on top of existing costs categories. It means that environmental loss can be added to the bottom line, where it is subtracted from net income. The resulting figure could be termed sustainable net income. In this BSO/Origin annual report 1995, however, the calculated extracted value will be deducted from the operating income. The resulting management parameter BSO/Origin proposes to call: sustainable operating income.

Ontario Hydro used modelling techniques to estimate the costs associated with external impacts. In relation to Ontario Hydro's approach to recognising externalities, US EPA (1996) notes:

Monetised external impacts are external impacts for which Ontario Hydro has developed monetary value. To date, Ontario Hydro has developed preliminary external cost estimates for the operation of its fossil stations and external cost estimates for fuel extraction through to decommissioning for its nuclear power stations. Ontario Hydro supports the Damage

Function Approach, rather than the Cost of Control Approach, to identify, quantify and, where possible monetise, the external impacts of the full life cycle of its activities. This approach first considers site-specific environmental and health data; then uses environmental modelling techniques which consider how emissions/effluents etc. are transported, dispersed or chemically transformed in the environment; and then considers what receptors (e.g. people, fish) are affected by these emissions. Finally economic valuation techniques are applied to translate physical impacts into monetary terms.

Again, it should be stressed that accounting for 'societal costs' in the way Ontario Hydro and BSO/Origin have undertaken it is far from common practice and it is unlikely that many organisations would embark on this process. Approaches such as that adopted by Ontario Hydro are quite controversial as they have been known to put a value on human life (and death) and on the environment. They are also based on many estimates and guesstimates of expenses that will often never be paid, which is something accountants do not typically like. Companies that have recently adopted some form of 'full-cost' accounting also include Baxter International Inc. (USA), IBM (UK), Interface Europe, Anglian Water (UK), Wessex Water (UK), and Landcare Ltd (NZ). Perhaps this is the future of environmental management accounting.

### Concluding comments

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This chapter has introduced the concept of environmental management accounting. As we have demonstrated, environmental management accounting can take on a variety of forms and can address a variety of 'environmental costs'. Traditional management accounting, with its (over) use of overhead accounts and its lack of emphasis on costing waste, has tended to mask the environmental costs being generated by business entities. Relatively simple modifications can be made to management accounting systems with the outcome that both financial and environmental benefits can result. Having read this chapter you should ask yourself whether your training in management accounting has tended to introduce approaches that 'conceal' or 'reveal' environmental costs. You should also consider how the organisations you are associated with (perhaps work for) account for their environmental costs.

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## PART 8

### Performance Evaluation

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Chapter 21      Measuring divisional performance in the short-run  
*Zahirul Hoque*

Chapter 22      Measuring performance in the long-run and application of the balanced scorecard approach  
*Zahirul Hoque*



# Chapter 21

## Measuring divisional performance in the short-run

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Zahirul Hoque

### **LEARNING OBJECTIVES**

After completing study of this chapter, you should be able to

1. Understand the importance of a performance measurement system in an organisation
2. Identify and explain the type of responsibility centres that can be found in an organisation
3. Understand how organisations can measure their performance by using conventional financial indicators
4. Understand the limitations of conventional financial measures of performance



## Introduction

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Assessing the outcome of organisational actions is an important function of an organisation. In practice, top management evaluates the performance of both individual managers and organisational departments or divisions. From a practical point of view, organisations use a series of performance measures to evaluate performance of their business units and their managers. These measures allow managers to keep them focused on the organisation's goals. Some measures tend to focus on the short-run performance and some tend to focus on the long-run performance. Financial measures such as return on investment or net earnings are important performance evaluation tools for the short-run. In this chapter, I will discuss the various financial measures that managers can use in performance evaluation. To do so, let me first discuss the role of a performance measurement system in an organisation.

### The role of a performance measurement system

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The role of performance evaluation (or measurement) is not merely to monitor managers' performance and the firm's progress in achieving desired goals, but also to assist managers in the monitoring of the firm's strategic position. Through performance measures, an organisation communicates how it wishes the manager to behave and how this behaviour will be judged and evaluated.

Performance measurement is an essential part of an organisation's planning and control because it shows if organisations are achieving their targets set at strategic (or unit) and operational levels. Organisations must measure their business outcomes regularly. Performance measures or performance evaluation systems should be emphasised to measure specific characteristics of the business that will help provide the business with a competitive advantage. Lynch and Cross (1991) suggest that one purpose of a performance evaluation system is to assess the performance of the particular manufacturing process or the progress of improvement, if the measure is not related to either of these concepts then it will not be able to convey to management the actual performance of the particular process. According to them performance indicators must be made to fit to the process flow and focus attention on causal relationships and teamwork, which enables any non-value activities or faults to be recognised.

Performance can be focused on products, processes and people (employees and customers). Managers use performance measures to track their performance against targets set. This allows managers at all levels of the business to assess progress in achieving targets, and to take corrective actions if necessary. It may also indicate the need to amend plans and targets when there have been changes in the internal (micro) or external (macro) environment of the business.

Organisations have to move fast in order to remain competitive. Thus, it is essential for organisations to use a range of performance measures that reflect their competitive environment and strategies to ensure that managers are motivated and rewarded for achieving the things that matter. Performance measures should not just inform managers of the outcomes of past decisions and

operations, they should give an indication of the capability of the firm to compete effectively in the future and point to areas of future growth.

### ***Responsibility centres***

To measure performance, it is important to know who is responsible for what. A responsibility centre can be defined as follows: Any organisational or functional unit headed by a manager who is responsible for the activities of that unit. All responsibility centres have their own budgets and use resources (inputs or costs) to produce outputs (products/services). An organisation can assess its divisions' performance by using the following four types of responsibility centres:

**Revenue centres** are those organisational units in which outputs are measured in monetary terms, but are not directly compared to input costs. A sales department is an example of such a unit.

**Expense or cost centres** are those organisational units in which inputs, but not outputs, are measured in monetary terms. Budgets are devised only for the input portion of these centres' operation. Administrative, service, and research departments are examples of such centres. We can see two types of expense centres: engineered and discretionary. Engineered expenses are those for which costs can be calculated or estimated with high reliability – for example, the costs of direct labour or raw material. Discretionary expenses are those for which costs cannot be reliably estimated beforehand (e.g. research & development costs) and must depend largely on the manager's judgment (or discretion). At review time, actual input expenses will be measured against budgeted input expenses (Stoner, 1982).

**Profit centre** is responsible for earning a profit. In a divisionalised organisation, in which each of a number of divisions is completely responsible for its own product line, the separate divisions are considered profit centres. The expenditures of all a division's sub-units are totalled and then subtracted from the revenues derived from that division's products or services. The net result is the measure of that division's profitability.

**Investment centres** are decentralised units or divisions for which the manager is given maximum discretion for making short-run operating decisions on product mix, pricing, and production methods as well as the level and type of assets to be used (Kaplan and Atkinson, 1989). In addition to inputs and outputs, in an investment centre, a control system also assesses how those outputs compare with the assets employed in producing them. For example, a company requires a capital investment of \$40 million in property, buildings and equipment, and working capital. In its first year, the company has \$4 million in labour and other input expenses and \$8 million in revenue. The company would not be able to earn a \$4 million profit for two reasons: a deduction from revenues would have to be made to allow for depreciation of buildings and equipment; and the cost of that investment, in terms of what could have been earned if the funds had been invested elsewhere, would have to be taken into account. In this way, a much more accurate picture of profitability would be obtained. Any profit centre can

be considered an investment centre as well, because its activities will require some form of capital investment. However, if a centre's capital investment is minor or if its managers have no control over capital investment, it may be more appropriately treated as a profit centre.

### ***Financial performance measures***

Financial performance measures focus on the financial aspects of the organisation. Financial measures are also referred to as accounting based measures because they are based on financial statements such as income statements and balance sheets.

Accounting based measures generally include measures such as return on investment (ROI), residual income (RI), net earnings or profits, earnings per share (EPS), revenue growth, cash flows, and economic value added. These methods are used to evaluate an organisation's performance in dimensions that are crucial to its health and survival. I will discuss some these financial measures of performance in turn.

### ***Return on Investment***

An approach to financial performance measurement that has received considerable attention and study is the Du Pont system of financial measurement. The key rationale of the Du Pont system is *return on investment* (ROI), which is expressed as follows:

$$\text{ROI} = \frac{\text{Sales}}{\text{Investment}} \times \frac{\text{Profit}}{\text{Sales}}$$

The first line determines the total asset turnover ratio. It is arrived at by adding current assets to fixed assets, which equals total capital employed, and then dividing this total into the total sales revenue. The second line determines the profit margin on sales. As shown above, dividing the net profit by total sales yields the profit margin on sales. For both of these measures, the intent is to capture the firm's rate of return per dollar of investment (Gordon, 1998).

An ROI encourages management to adopt an integrated approach to assessing organisational efficiency. For instance, if the ROI is low (relative to that of competitors or the organisation in the past), managers can backtrack to find possible sources of the problem – say a low turnover ratio. ROI also discourages excessive investment in assets.

The ROI system has two major limitations. First, a satisfactory ROI may actually conceal weaknesses. An efficient use of manufacturing assets, for example, might be offset by a particularly effective sales campaign and still result in a satisfactory ROI. If sales return to normal, the continued efficient use of manufacturing assets will cause marked decline in the ROI to appear. Once managers are aware of these possibilities, they can establish additional standards

and control at each point in the system. The other problem is that concentration on ROI, with its emphasis on current sales and capital utilisation, may tend to overshadow the company's long-term goals. Current return on capital, for example, may sometimes need to be sacrificed in order to build a firm foundation for future expansion. Such pitfalls can be overcome by establishing additional standards and controls for the firm's other activities and goals (Stoner, 1982).

### **Residual income (RI)**

Residual income (RI) is expressed by the following formula:

Residual income (RI) = Net income before tax (NIBT) – CC (capital charge).

Capital charge is the firm's cost of capital multiplied by capital employed. The RI corresponds closely to the economist's (but not the accountant's) measure of income, discussion of which follows. Measuring a sub-unit's performance based on RI is equivalent to establishing the sub-unit somewhere between a profit and investment centre (Gordon, 1998).

Like ROI, RI also focuses on short-term benefits and cannot be used to evaluate the relative performance of different-sized sub-units (for details, see Kaplan and Atkinson, 1989; Gordon, 1998). In spite of this weakness, RI has many positive uses. RI takes account of the sub-unit's required rate of return in assessing performance and it maximises the economic wealth of the sub-unit. Therefore, it is usually accurate enough to justify its use as a decision making aid and as a control device.

Information for financial measures comes from three financial statements: the profit and loss account (or the income statement), balance sheet, sources and application of funds and the budget. That is why financial measures are sometimes referred to as *accounting based performance measures*.

### ***Economic value added (EVA)***

Strategic management literature suggests that management should strive to increase the value of the company. Management can, in fact, be operating a business at a profit and increasing its net worth, but could be reducing the value of the company in relation to what could be earned elsewhere on the capital employed in the business (Digman, 1999). Economic value added (EVA) provides this kind of information. It indicates whether a business is creating wealth or, in fact, destroying capital. EVA can be expressed as follows:

$$\text{EVA} = \text{After-tax operating profit (r)} - \text{Cost of capital (c)}$$

If the EVA figure is positive, wealth is being created, that is, the firm is adding more capital than it is costing. If negative, the reverse is true, this implies the firm would get a better return on its capital by investing it elsewhere.

EVA is the best measure of periodic performance, setting suitable targets for monopoly or competitive behaviour, and enabling direct comparison with other similar companies.

Digman (1999) suggests three ways for management to improve EVA: (1) use less capital (i.e. cutting invested capital perhaps by outsourcing, leasing, etc.); (2) increasing profits without increasing capital invested, this implies cost cutting; and (3) invest in high-return projects (earning more than the total cost of capital required).

**An illustration**

To compute EVA, as an illustration I shall use the following:

Alpha Products uses economic value added (EVA) analysis in its performance management system. The following information is available:

	2001	2002	2003	2004	2005
Net operating profit after tax (\$m)	-	1,350	1,260	972	1,292
Total capital employed (\$m)	8,919	9,123	9,068	9,082	9,995
Cash flow from operation (\$m)	-	1,078	1,334	(80)	900
Cost of capital	12.5%	12.7%	11.6%	11.5%	9.3%

**Required:**

- a) Calculate the required rate of return on investment for the Corporation for each of the years 2002, 2003, 2004 and 2005.
- b) Calculate the Economic Value Added (EVA) in total dollars for the Corporation for each of the years 2002, 2003, 2004 and 2005.

Based on your calculations conducted for part (b) of this question, do you believe the Corporation has performed well in the period 2002-2005?

**Solution:**

$r = \text{the required rate of return on investment} = \text{Net profit after-tax} / \text{total capital employed (beginning)}$

2002 =  $\$1350 / \$ 8919 = 0.1514$  or 15.14%

2003 =  $\$1260 / \$9123 = 0.1381$  or 13.81%

2004 =  $\$972 / \$9068 = 0.1071$  or 10.71%

2005 =  $\$1292 / \$9082 = 0.1423$  or 14.23%

$EVA (\%) = r - c$  (cost of capital)                       $EVA (\$) = EVA\% \times \text{total capital}$

2002 =  $15.14 - 12.7 = 2.44\%$                        $2.44\% \times 9123 = \$222.60$

2003 =  $13.81 - 11.6 = 2.21\%$                        $2.21\% \times 9068 = \$200.40$

$$2004 = 10.71 - 11.5 = (0.79\%) \quad (0.79\%) \times 9082 = (\$71.75)$$

$$2005 = 14.23 - 9.3 = 4.93\% \quad 4.93\% \times 9995 = \$492.75$$

Overall performance for 2002-2005:

$$\text{Average } r = [15.14\% + 13.81\% + 10.71\% + 14.23\%]/4 = 13.47\%$$

$$\text{Average } c = [12.7\% + 11.6\% + 11.5\% + 9.3\%]/4 = 11.28\%$$

$$\text{Total EVA} = [\$222.60 + 200.40 + (71.75) + 492.75]/4 = \$211$$

Based on the above information, the company has performed well for the 2002-2005 period except the financial year 2004 on average for four years being or having a positive figure of \$211m from 2002-2005.

***Limitations financial performance measures***

ROI and RI are important accounting-based measures of conventional responsibility reporting and performance evaluation. In today’s competitive environment, one that encompasses fierce global competition, advancing technology and increased customer awareness, these measures of performance reporting can be inadequate for a business unit. Kaplan (1994), in his book *Measures for Manufacturing Excellence*, states that although many companies had made enormous strides during the 1980s to embrace total quality management (TQM), just-in-time (JIT), manufacturing and distribution processes, design for manufacturability (DFM), and flexible manufacturing systems (FMS) into their operations, they were much slower to adjust their managerial accounting and control systems to the new operating environment and as a result, operating improvements, which were significant, were not being tracked well by traditional financial performance measurement systems.

ROI, although can aid in detecting weakness with respect to the use, or non-use of individual assets, particularly in connection with inventories, and focus management’s attention upon earning the best profit possible on the capital available, avoid isolating individual business units, in that, it may not be reasonable to expect the same ROI for each unit. If the unit sells their respective products in markets that differ widely with respect to product development, competition, and consumer demand, lack of agreement on the optimum rate of return, might discourage managers who believe the rate is set at an unfair level.

For the sake of making the current period performance measure look good, be it, ROI, RI, operating income or EPS, managers may be influenced to make decisions that are not in the best long-term interests of the firm. Research in the United States has shown that these measures produced irrelevant and misleading information, and also “provoked behaviour that undermined the achievements of strategic objectives” (Kaplan and Norton, 1996). A major concern with accounting-based performance measures is that these performance measures focus on results largely internal to the firm.

## Summary

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Organisations need a formal performance measurement system to assess its operations as well as divisional managers. Divisional managers make a variety of decisions in their relevant division in line with the corporate goals. Top management regard performance measurement systems as an important tool when determining managers' compensation. This chapter has outlined how top management could assess their divisional performance in the short-run. In this regard, this chapter has discussed several financial measures of performance in the preceding sections. It has been suggested that during the last decade there has been an over-emphasis on the use of financial criteria to measure firm performance. This has resulted in the organisation losing sight of important indicators, which measure levels of customer satisfaction, process flexibility or adaptation in response to changing needs. Broader measures such as customer-based measures, product and process measures and continual improvement and innovation measures, enable the organisation to establish longer-term improvements, which further effective competition. The following chapter concentrates on this issue.

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## Chapter 22

Measuring performance in the long-run and application of the balanced scorecard approach

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Zahirul Hoque

### **LEARNING OBJECTIVES**

After completing study of this chapter, you should be able to

1. Understand the importance of non-financial performance measurement systems in an organisation
2. Understand how organisations can measure their performance by using non-financial performance indicators
3. Understand the role of the balanced scorecard approach to performance measures
4. Understand the four dimensions of the balanced scorecard



## Introduction

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During the last decade there has been an over-emphasis on the use of financial criteria to measure firm performance. This has resulted in the organisation losing sight of important indicators, which measure levels of customer satisfaction, process flexibility or adaptation in response to changing needs. A strategy which concentrates on financial criteria is too closely related to short-term profit maximisation. Broader measures such as, customer-based measures, product and process measures and continual improvement and innovation measures enable the organisation to establish longer-term improvements, which further effective competition. This chapter introduces this issue.

## Importance of non-financial performance measures

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As discussed in the previous chapter, traditional financial performance measures such as return on investment or net earnings do not consistently support the intended strategy. In recent years, numerous authors have expressed discontent with traditional measures of organisational performance, which mainly focus on financial criteria (Lynch and Cross, 1991; Kaplan and Norton, 1996). The suggestion is that markets are changing swiftly and innovation is considered paramount. Consequently, the past over-emphasis on such financial criteria as operating income, sales growth, return on investment and earnings per share to measure firm performance has resulted in the organisational losing sight of important indicators, which measure levels of customer satisfaction, process flexibility or adaptation in response to changing needs.

There is also the view that non-financial measures should reflect the drivers of future financial performance (Kaplan and Norton, 1996). The bottom line is that the traditional performance measures should be replaced with more flexible, dynamic measures. Broader criteria such as customer-based measures, product and process measures, and continual improvement and innovation measures, enable the organisation to establish longer-term improvements, which are likely to lead to increased productivity and competitiveness (Simons, 1995; Kaplan and Norton, 1996). The argument put forwarded in the relevant literature is that use of non-financial measures for performance evaluation enables managers to understand those factors that are most critical to the firm's long-term success (Lynch and Cross, 1991; Maisel, 1992; Newing, 1995; Thorne, 1995).

Note that performance measures do not merely monitor managers' performance and the firm's progress in achieving desired goals, but also assist managers in monitoring the firm's strategic positions. Several writers (e.g. Kaplan and Norton, 1996; Simons, 1995) suggest the appropriate performance measures to include in a performance reporting system depend on the business strategy. Ittner et al. (1997, p. 233) suggest one potential determinant of the relative information content of alternative performance measures is the firm's business strategy. Thus performance measures, if devised strategically, will profoundly influence business performance.

## Key non-financial performance measures

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Performance measurement literature identifies the following common measures of non-financial performance of a business. Note these measures are by no means all inclusive, they are cited mostly in the literature.

**Efficiency measures** are those used for tracking intra-organisational indicators to determine whether the business units are effectively using internal processes and resources. It focuses on quality, time and efficiency measures: these are direct materials efficiency variances, effect yield, manufacturing lead time, head count and inventory together with a focus on manufacturing geometry versus competition, and actual introduction schedule versus plan.

**Innovation measures** assess an organisation's innovative capacity which measures such things as: number of new patents, number of new product launches, process time to market, and time taken to develop 'next generation' products.

**Learning and growth measures** assess organisational learning capacity to enhance organisational long-term growth, which measures such things as: employee intellectual capacity, employee training and development, employee incentive system, employee turnover, etc.

**Customer measures** trace performance leading to relationships with customers that encompass such measures as: market share, customer response time, on time performance, product reliability, share of key accounts purchases, ranking of key accounts and number of cooperative engineering efforts.

## The balanced scorecard

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The imperative for improved performance measures cannot be ignored with today's worldwide competition and advancing technologies. Once new technologies are introduced, major organisation changes are required, as the interaction between people and technology is essential to ensure business processes become more and more effective and therefore, performance measures, which focus on only financial criteria, will not reflect the new technological environment. New performance measures, if devised strategically, will profoundly influence business performance. Scholars, for example, suggest that more attention needs to be placed on generating suitable performance measures to be a successful competitor, given today's environment.

Research has revealed that for many companies, the difficulty is that there are "too many performance measures", ones that are outmoded and that are not harmonious. Performance measures should observe changes in the market environment, determine and assess progress towards business unit objectives, and affirm achievement of performance goals (Kaplan and Norton, 1996).

The literature suggests that any fresh, competent combination of measures must look to four essential focuses that are missing in traditional measures, firstly, a method to trace customer satisfaction; in a competitive environment, customers must be content, or market share will drop. Customers care more about price,

faster and reliable deliveries, design, quality and level of service. Secondly, a method to trace appropriate financial performance, that is, is the company profitable? The third area, is that firm's need a plan to ascertain competitive performance. Finally, there must be a method for tracking inter-organisational indicators to determine whether the business units are effectively using materials and resources.

Because of the focus on these factors, top management must aware that if they are to fulfil their strategic plans, they should adopt a more "balanced approach" to gauge performance by considering financial and non-financial performance measures. Significant attention is now being given by academics and managers to building a more extensive and linked set of measures for appraising and directing corporate and divisional performance, influenced largely by Kaplan and Norton's (1992, 1993, 1996) notion of the 'balanced scorecard'.

### *Dimensions of the balanced scorecard*

The balanced scorecard approach focuses on both financial and non-financial measures. The financial measures indicate if improvements in financial performance resulted from sacrificing investments in new products or on-time delivery. The balanced scorecard includes financial measures that tell the 'results of actions already taken'. Kaplan and Norton suggest that financial measures should not be eliminated altogether, as a well-designed financial control system can actually enhance rather than inhibit an organisations management program. The 'balanced scorecard' supplements the financial measures with operational measures on customer satisfaction, internal processes and the firm's innovation and improvement activities. Kaplan and Norton suggest that operational measures are the drivers of future financial performance.

The components of the balanced scorecard are firstly, the financial perspective, which includes profitability measures such as, cash flow, quarterly sales growth and operating income by division, increased market share, and return on equity. Secondly, the customer perspective that encompasses such measures as: market share, customer response time, on time performance, product reliability, percent of sales from new products, percent of sales from established products, on time delivery, share of key accounts purchases, ranking by key accounts and number of cooperative engineering efforts. Thirdly, the internal business processes use such things as number of new patents, number of new product launches, process time to market, time to develop next generation, quality, time and efficiency measures (such as direct materials efficiency variances, effect yield, manufacturing lead time, head count and inventory). Learning and growth perspective identifies the infrastructure that the organisation must build to create long-term growth and improvement. The objects in the learning and growth perspective are the drivers for achieving excellent output in the initial three scorecard perspectives. Three essential principles for this perspective, identified by Kaplan and Norton are employee capabilities, information system capabilities and motivation.

### *Arguments for balanced scorecard adoption*

Several companies, especially in the United States, have already adopted the 'balanced scorecard', as Kaplan and Norton observed, "their early experiences using the scorecard have demonstrated that it meets several managerial needs". Firstly, the scorecard brings together in one report, many miscellaneous elements of a company's competitive plan, that is, customer orientation, improving response time, quality, promoting teamwork, encouraging shorter product launch times as well as looking to the long term. Secondly, the scorecard guards against sub-optimisation. By forcing top management to think about all the important operational measures together, the 'balanced scorecard' enables them to see if improvement in one area has been achieved at the expense of another area.

Kaplan and Norton's 'balanced scorecard', has been put forth presumably because traditional measurement systems have developed from, as they suggest, the finance role, and that traditional systems have a control bias. That is, traditional performance measurements systems stipulate the type of behaviour that employees should take and are then used to determine whether the employees have in fact behaved in the particular manner. As such, traditional systems attempt to control behaviour as opposed to the 'balanced scorecard', where it is used to encourage behaviour directed at improving the key indicators.

The 'balanced scorecard' focuses on strategy and vision, not control, this focus is the kind of focus that many organisations are trying to accomplish, that is, "cross functional integration, customer supplier partnerships, global scale, continuous improvement, and teams rather than individual accountability". By utilising the 'balanced scorecard' firm's can establish management goals and that managers will take whatever actions are necessary, and adapt their behaviour as necessary to accomplish those goals.

In their 1993 paper, Kaplan and Norton suggest that different market situations, product strategies, and competitive environments require different scorecards and that business unit will create their scorecard to match their strategy, mission, technology and culture. Kaplan and Norton identify a number of firms who have implemented the 'balanced scorecard'. Some examples are: Apple Computers, who use the scorecard as a device to plan long term performance, not as a device to drive operating changes; Advance Micro Devices, a semiconductor company, who wanted to consolidate their strategic information and Rockwater, a global engineering and construction company, which is a worldwide leader in underwater engineering and construction, whose executives wanted a metric that would communicate the importance of building relationships with customers.

Research has found that many companies that are now implementing local improvement programs such process re-development, total quality management, and employee involvement are moving to the 'balanced scorecard' as a means of measuring the success of these endeavours (Hoque et al., 2001; Hoque and James, 2000). Furthermore, the 'balance scorecard' communicates priorities to

management, employees, investors, and even customers. It is used as the focal point for the firm's efforts in achieving its goals. Firms using the 'balanced scorecard' do not have to rely on short-term financial measures as the sole indicators of the company's performance; the scorecard contributes to linking long-term strategic objectives with short-term processes. Creating a 'balanced scorecard' has forced companies to unite their strategic planning and budgeting, which has helped ensure that their budgets support their strategies.

The academic community has recognised that the BSC advances the management literature by specifying a range of measures stated above that managers should attend to in order to build long-term, sustainable competitive advantage. Atkinson et al (1997) suggest that the BSC has the potential to provide planners with a way of expressing and testing a sophisticated model of cause-and-effect in the organisation, a model that provides managers with a basis to manage desired and actual results.

The use of a BSC does not mean just "using more measures": it means putting a handful of strategically critical measures together in a single report, in a way that makes cause and effect relations transparent and keeps managers from sub-optimising by improving one measure at the expense of others. To achieve a balance among the four dimensions of the BSC, a company should pay attention to all of them, according to Kaplan and Norton (1996). In other words, one can achieve this by putting equal emphasis on both the financial and non-financial measures of the BSC. Atkinson et al (1997, p. 93) suggest that the name "scorecard" is misleading because BSC is not a scorecard in the conventional sense. Rather, it is a sophisticated information system and management approach that links effects (also called organisational objectives, such as profit levels) with causes, such as customer or employee satisfaction. This argument makes sense because one should not take the BSC as a blueprint; it is a philosophy. It has the potential to provide managers with a linked set of measures that specifies how the four perspectives of measures stated above can be aligned with overall company strategy, how managers should attend to both financial and non-financial measures of performance, and how they can integrate them (Hoque, 2003).

No doubt, Kaplan and Norton's BSC philosophy is extremely useful as one of the "new" theories that can be applied (with positive effect) to many organisations. It is a logical conclusion to a complex problem and after studying it there are a number of points that make straightforward common sense. It has been put forward with clarity, articulation and rationality, this itself contributes to its worth as a sound and reasonable theory. The biggest criticism that can be made is that the BSC attempts, in my opinion, to convey that an all-encompassing solution to performance evaluation problems has been found. Deriving useful results from its application is dependent on a number of factors, namely industry concentrations, the operating environment and management systems of the organisation.

## Summary

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This chapter has noted how an organisation can use both financial and non-financial measures of performance. Increasingly, organisations world-wide tend to supplement their conventional financial measures with measures that are non-financial in nature such as quality, efficiency, and customer satisfaction. Some companies present their performance measures in a single report called 'the balanced scorecard'.

Each firm is unique and so directs its own course for building a balanced scorecard. As a result of this process, an entirely new information system that links top management objectives down through to the plant floor and particular site operational measures could be developed. Its primary benefit is its ability to join manufacturing capabilities in a strategic environment and financial control. It could be seen to be a bridge between financial and manufacturing goals.

The exercise of creating a balanced scorecard forces companies to integrate their vision and strategic objectives into measures that will support short and long-term goals. A balanced scorecard creates a framework for managing an organisation's operations to gain competitive advantage.

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## PART 9

### Cases in Public Sector Costing and Budgeting

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Chapter 23 The challenge of managing the human relations aspects of accounting control systems change: an Australian experience

*Jodie Moll*

Chapter 24 Cost information and management systems in a public hospital

*Carly Webster*





## Chapter 23

The challenge of managing the human relations aspects of accounting controls systems change: an Australian experience

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Jodie Moll<sup>20</sup>

### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

1. Appreciate the importance and value of the paying attention to the human relations aspects of change.
2. How accounting change can produce unintended effects when human relations aspects do not receive full consideration.
3. Understand how an understanding and appreciation of employee values, attitudes and norms can help to produce successful systems change.

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<sup>20</sup> The author would like to thank Professor Bob Scapens for his useful comments on this chapter.

## Introduction

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Why do accounting control systems (ACS) fail? One of the reasons is because of the lack of attention to the behavioural consequences associated with these systems. In this chapter, we investigate how accounting change can produce unintended effects when human relations aspects do not receive full consideration, drawing on a case study of a large Australian university to illustrate our arguments. More specifically, the study follows employee responses to a change in the budget system to understand how, despite the design of technically sound management tools and worthy management intention to design sound planning and control procedures in the organisation, employee reactions and behaviours can have corrosive effects on how change is enacted, rendering system changes ineffective.<sup>21</sup>

The chapter is comprised of three sections. First, we sketch out some of the accounting change and human relations literature to provide insight for the study of accounting change. The remaining sections present and discuss one institution's experience with accounting change to illustrate the importance of attending to the human relations aspects of change, as well as the technical. First, the case background is outlined to provide social and political context to the case organisation. This is followed by the empirics, which describe an eight-year period of budgetary change in the case organisation, constructed through interviews with organisational participants and documents collected from the organisation. In this section, we concentrate on describing the employee attitudes and feelings about the budgetary change and compare these with senior management views of the change to try and understand how the change was enacted in the organisation. The final section brings together the concepts drawn from the human relations literature and the case evidence and provides a more explicit discussion of how the various forms of reinforcement and reward systems stated and implied by the budgeting process shaped what was going on in the organisation.

## Managing the Human Relations Aspects of Accounting Change

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Changes in the socioeconomic and political environments provide signals propelling organisations to undertake accounting change so that the systems continue to operate effectively. Despite worthy intentions to undertake changes to improve the organisation's overall effectiveness, often managers sabotage their own efforts by thinking that the most important part of change is technical (Hopwood 1974). Because control systems are man-made and operated, some scholars suggest that in enacting change managers need to pay closer attention to the emotional satisfaction of the individuals affected by the change (i.e. their employees) to make a successful transition to the new system (Johnston, Kast et al. 1986). From this perspective, the effectiveness of any changes to an accounting system is dependent on how employees use it and how employees respond to it.

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<sup>21</sup> In this case we regard the change efforts to be ineffective or unsuccessful based on their inability to improve the efficiency, motivation and productivity in the organisation.

Typically, individuals do not resist new systems because these offer a way to order and make sense of their activities (Johnston, Kast et al. 1986). Resistance to change may however be traced to the management of the change, in particular the signals managers send to employees about the change and their employee efforts in making the change.

As suggested above, how managers respond to their employee efforts and needs has significant bearing on the level of employee commitment, morale, and productivity in the organisation (Argyris 1953; Cherrington and Cherrington 1973). In principle, all management behaviours, whether undertaken with the intention to elicit a particular response or not, are interpreted by their employees. Commonly, rewards such as money, promotions, and verbal praise are used to reinforce a particular behaviour and ensure its subsequent replication. Alternatively, by using punishments, such as the withdrawal of resources or the removal of responsibilities or decisions, managers indicate to employees that their behaviours are considered inappropriate. Often, however, such punishments evoke employee resistance (Johnston, Kast et al. 1986). The challenge for managers is to make sure that all of their behaviours and attitudes reinforce employee behaviours that are supportive of systems change, or eliminate unproductive employee attitudes and behaviours.

Managers need to consider the values, attitudes, behavioural norms and interpersonal relationships of their employees in order to gauge their emotional satisfaction and their likely response to system changes. Argyris (1953) for example asserts that people who are committed to doing a good job view punishment, such as the loss of budget, bonus schemes, or reputation, as a failure of their own efforts and are consequently more likely to suffer as a result of the punishment than those less committed. In such cases, punishments can invoke any number of adverse effects ranging from frustration, a loss of employee confidence, morale, and commitment to more serious organisational problems such as employees resistance to formal authority through strikes, quitting, absenteeism, project delays, or by forming groups to combat management pressure.

In this section, we provided some insight into the relations between management, accounting change, and employees. The remainder of this chapter reports a longitudinal case study of a university to demonstrate the importance of managing such relations for successful systems change.

### Insights from an Australian Experience

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The case presented in this section describes an eight-year period of organisation life in a large Australian university.<sup>22</sup> The case was constructed using the narratives from forty-six face-to-face interviews conducted with managers and employees in the case organisation and three managers from the State Education

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<sup>22</sup> For reasons of confidentiality, in accordance with the Human Research Ethics Guidelines, the university name cannot be disclosed.

Department<sup>23</sup> and documents (i.e. annual reports, business reports, chart of accounts, newspaper clippings, and university statistics) collected from the organisation. In this paper, we concentrate on the case organisation's efforts to change its budgeting system; however, it should be noted that these changes represent part of the broader developments that management had undertaken to improve the management of the organisation.

The history of the organisation is that of a dominantly publicly funded institution established in the 1970s with a single campus and 475 students. Today the case university operates with six campuses and provides a range of teaching and research activities, employing 2870 staff and serving 26,000 students in a variety of disciplines such as Nursing and Health Sciences, International Business and Politics, Music, Education, Law, Accounting and Information Systems. The increase in the number of campuses and student population is largely attributed to the forced Dawkins reform<sup>24</sup> mergers. The case organisation was selected because of its significance politically and economically, because of accessibility, and because the management had undertaken significant changes to their planning and control processes in recent years.

Since its inception, the organisation adopted a top down approach to budgeting whereby senior management allocated funds to the schools. The University Council had delegated the Vice-Chancellor the responsibility for the control of university finances. Despite this, the University Act 1998 requires the budget to be approved by the Finance and Property Committee and the Council. Although not considered a formal university committee, the Vice-Chancellor, used a budget committee to allocate funds to the various budget elements. Interviews with senior management and documentary evidence revealed that this committee consisted of the Vice-Chancellor, the Deputy Vice-Chancellor, and the Pro-Vice-Chancellor of Administration. The Director of Finance and Business Services (FBS) and the Academic Registrar also acted in an advisory capacity providing this committee with information. Where required the four academic Pro-Vice-Chancellors also provided advice on behalf of their respective groups. Commonly, the Vice-Chancellor chose to formulate and make budget decisions in a sole capacity using the authority vested in him by the Council. The organisational budget period ran from January to December.

Traditionally, in the university, accounting was not a dominant part of the culture. Employees, including academic staff spoke of the budget in terms of their own school deficit or surplus, but few knew or understood the system. For

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<sup>23</sup> The State Education Department operates with three managers and twelve general staff members in total.

<sup>24</sup> The Dawkins reform was designed as a strategy for managing the Australian Higher Education Sector. It involved two key changes to the sector: (1) the abolition of a binary sector which consisted of both colleges of advanced education and universities to consist solely of universities, (2) the introduction of the higher education contribution scheme (HECS), a student fees system.

this reason, in the past the budget system had been commonly referred to as the 'black box' budget model. Employees said that this term was coined because of the lack of transparency and perceived inequities in budget allocations. The basic understanding was that the Vice-Chancellor allocated resources to Faculties for further distribution to schools and for other initiatives. Some also said that resources were allocated by linking funding to key areas of performance.

At this time, most universities in Australia used similarly opaque principles to the case organisation. Watts (1996a) explains that one of the key reasons for this was because the Commonwealth Tertiary Education Commission (CTEC)<sup>25</sup> had not revealed the formulae by which funds were allocated prior to the introduction of the Relative Funding Model (RFM) and because of this universities were unable to mimic its approach.

The Vice-Chancellor first instigated changes to the budget process in 1994. At this time, he declared that the budget methodology needed to be amended to improve the equity of resource distribution, by funding comparable teaching activities across the University on a similar basis. In order to achieve these objectives he introduced a formula based funding model that was said to cater for the interdisciplinary culture of the university.

Under this new model, revenue was aggregated into a single funding pool including revenue from fee-paying students, student contributions, and Commonwealth payments. In principle, funds were to be allocated to Faculties depending on the academic activities undertaken by the faculty. This meant that schools operating similar activities should receive the same \$ Equivalent Full Time Student Units (EFTSU) per student.<sup>26</sup> The Vice-Chancellor also changed the University's funding methodology for Research Higher Degree (RHD) students at this time: funding was allocated at twice the rate of total undergraduate and postgraduate EFTSUs. The funding pool was then divided up and a single line allocation was distributed to the four Pro-Vice-Chancellors for the faculties on their campuses. The Pro-Vice Chancellors then allocated the budget line to the Faculty Deans to distribute in their respective groups.

Whilst the 1994 model was a more attractive alternative than the previous model because it was claimed to be a more rational and equitable method of resource allocation, employees explained that its use in the organisation told a different story. By 1996 it was becoming clear that the budget methodology was not being applied as it was intended. Whilst on the surface it appeared that management had improved the fairness of allocations, many senior managers were found to be allocating funds in accordance with their preferences and not in line with the budget formulae. Furthermore, because few staff were engaged in the resource allocation process, Deans were able to restrict access to financial information. This meant that Heads of Schools were not versed in what funds other schools

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<sup>25</sup> The Commonwealth Tertiary Education Commission was the distributor of the Federal Government Operating Grant before the RFM was introduced.

<sup>26</sup> The term student load is used to refer to the total EFTSU allocation.

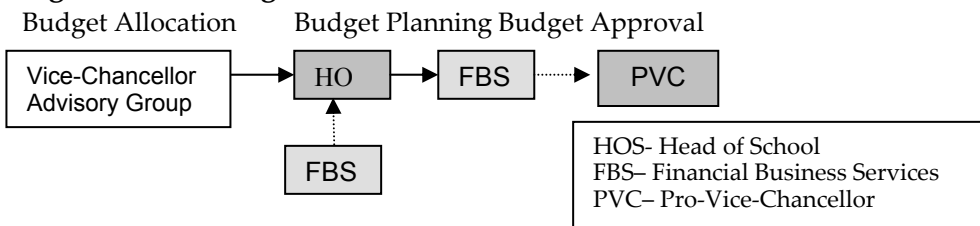
were receiving and were not fully aware of the on going political negotiations between various individuals and the Deans.

As a result, senior management were forced to review the structures and controls again. This decision was led by the Vice-Chancellor who felt he needed to improve the effectiveness of budget allocations to appease staff equity concerns. The result of the review was a restructuring of both academia and administration and the introduction of new budget methods, beginning 1st July 1997. Prior to this time, the university operated with three administrative divisions and had similar academic schools on several of its six campuses. The new structure was designed to have university wide faculties in four groups – Arts, Science, Health, and Business. Each group was to be managed by a Pro-Vice Chancellor. As part of the broader structural changes being implemented the Vice-Chancellor devolved management responsibilities to the Heads of Schools. This had significant implications for Deans and Heads of Schools management responsibilities, in particular their budget responsibilities.

At this time, the Vice-Chancellor developed a second formulaic budget model based on line item budgeting where schools and administrative departments were identified to be the line items. The devolvement of budget responsibility was considered to be the most significant change made to the budget process at this time because it meant that resources were allocated directly from the Vice-Chancellor’s operating budget to individual schools by-passing both the Pro-Vice-Chancellors and the Deans. According to the new methodology, the authorisation for budgets remained the responsibility of the Pro-Vice-Chancellors. In theory, devolving responsibility to lower line managers can improve the efficient and effective use of resources, because managers involved with service delivery can direct resources to those areas critical to their goals and objectives (Rees 1990; Scott 2001).

The organisational budget process is summarised in Figure 1. There are three main stages to the budget approach represented by ‘budget allocation’, ‘budget planning’ and ‘budget approval’. The ‘budget allocation’ refers to the process of allocating funds to the budget lines – the schools. The ‘budget planning’ process refers to the Head of School allocations of their line item. As shown in the figure, this involves consultation with FBS Staff. Following this, the budget is formalised by FBS before being sent to the PVC for ‘budget approval’, the third budget process. More details of the schools budget approach follow in subsequent sections.

**Figure 1: The Budget Process**



Employees felt that the Vice Chancellor's main motivation for devolving the structure at this time reflected his desire to be seen to be keeping up with those institutions viewed to be the more progressive institutions in the State. Similar changes have been noted in other higher education institutions who acknowledge that the devolving of responsibilities has been a global response to the need to demonstrate improved resource efficiency and effectiveness (Groves, Pendlebury et al. 1994; Marginson and Considine 2000).

Apart from this, there were several other antecedents, linked to the budget, which may have factored into the Vice-Chancellor's decision to undertake such a revolutionary change in the organisation. One was the lingering inefficiencies of the Dawkins amalgamations. The number of university campuses increased from one to six under the direction of the Dawkins reforms. Each campus, however, continued to operate with the same structure as prior to the reforms (i.e. the same schools continued to operate on each campus, managed by the same number of staff). As a result, some suggested that too many resources were being consumed by management structures at the faculty level and by duplicate schools.

Operating with the same budget methodology that had been used when the University was a single campus was also proving to be impracticable in the new environment because it led to increased micro-political activity in the form of increased competition between schools on different campuses, fuelled further by the reduction in the school funding allocations from the central operating budget. In particular, there was competition between schools for student places, prompted by their related funding contributions. Because of this, employees felt that the University needed to restructure to reduce the competition between schools. It is worth noting that in the years proceeding the Dawkins mergers, there were increases in student numbers and faculty programmes. The increase in student numbers and programmes were some of the strategies the University used to reposition itself in the new competitive environment. In this case, the change in structure was rationalised on the basis that there were duplicate schools that offered the same courses, but each used a different curriculum. For example, marketing, a first year business course was offered on two campuses with two different assessment criteria, depending on the campus the student studied at. Such practices were said to be cost ineffective for schools and were also thought to be confusing to the university's industry partners. Thus the changes were made in recognition of the university's need to become more cost conscious to deal with tightening fiscal resources and increasing management complexities.

Therefore, the new structure was rationalised on the basis that the university could not afford the existing structure because there was too much duplication in efforts of the schools and administrative departments and that further streamlining was required to deal with the diminishing resources. Furthermore, staff felt that faculties were receiving more or less funding for the same level of activity depending on the Pro-Vice Chancellors historical association with



various faculties (recall that originally the faculties operated on a single campus) and thus there was the view that it was a disadvantage to work at certain campuses. Therefore, the new model was designed to increase transparency by demonstrating that similar activities carried out by the duplicate schools were receiving the same funding irrespective of their campus. At the same time, it was also felt that if the existing model continued to be used, and the University restructured to eliminate duplicate schools and courses, all of the Deans could be situated on a single campus. There was a fear that if this happened, because the Deans were involved in allocating most of the funds to the schools, schools operating on the campus where the Deans were located might receive more favourable budget treatment. Consequently, some thought that the devolution of budget responsibility was the Vice Chancellor's way of making sure that the second formula-based budget model was not rejected by employees who would see it as another way to cover-up any bargaining between individual schools, Deans, and Pro-Vice Chancellors. It was said that if used properly the formula-based methodology could offer a fair and transparent basis for allocating resources (see for example, Thomas 2000).

Finally, the looming 2000 review of the one of the university campuses was thought to have been one of the influential factors for the change.<sup>27</sup> Traditionally the University had operated with the same faculties on each campus post Dawkins mergers. Therefore, the faculties were distinguished not only by discipline but also by campus. By straddling the faculties across campuses so that the faculties operated with schools on as many campuses as possible, it was thought that it would be more difficult to separate any of the campuses. In this case, employees said the Vice Chancellor's motivation for changing the budget was related to his desire to maintain control of this campus, especially given its growth in student numbers (it was the second largest campus) and the related funding increases.

When the new budget method was introduced in July 1997 all budget allocations were revisited to align the budget with the new reporting lines. This required staff to revisit every transaction that had occurred over the previous six months to ensure that budget allocations were reasonable. This process was considered critical for the effective implementation of the new model because it was felt that unfair divisions of the existing school surpluses and deficits would escalate the tensions between staff working in different schools.

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<sup>27</sup> On the 8<sup>th</sup> November 1989, the University entered a Memorandum of Agreement for a review of the Albert Campus to be carried out in 2000. The purpose of this review was to determine if any changes should be made to the campus, including a possible separation from the University. The Council appointed a review committee in accordance with the terms of the Memorandum on the 5 June 2000. The University Advisory Council received the Review Committee's recommendations on the 29 November 2000. The outcome of the review process was that Albert campus did not separate from the University.

## Allocation to the Schools

The principles of the new model dictate that funds are allocated to the schools using the following categories: undergraduate/coursework postgraduate target load,<sup>28</sup> research higher degree target load, and institutional grant scheme (IGS), and research performance. To allocate funding to schools for undergraduate/coursework postgraduate target load and the research higher degree target loads, the funding rate applicable to the school is multiplied by the student load. The undergraduate/coursework allocation represents the largest allocation made to schools. Coursework postgraduate, research higher degree, fee based international students, and fee based domestic student loads allocated to the schools are calculated based on actual enrolments. Undergraduate loads, however, remain set at the targeted rate, despite over or under enrolments in the schools. The academic registrar of the University is responsible for determining student load. Although the private sector and now much of the public sector delivers products and services on the basis of market demand, this is not the case in the University. Student loads in the University are determined using various modelling methodologies, factoring in such things as customer choice, political sensitivity, and space capacity. Through EFTSU funding, the Federal Government also influences the academic register's calculation of funds to the various disciplines.

The IGS funds are allocated to the schools according to the research output of the staff in the school. The final category, research performance, includes a 5% pooling of the total undergraduate/coursework postgraduate funds allocated to schools using the national institutional grant scheme formula and a range of multipliers.

## Budget planning in the schools

The previous section explained that budget planning in the schools begins with a single budget line being handed down from the Vice-Chancellor to a school and that the Head of School has responsibility for budget management. The school budget lines comprise approximately 60% from Government revenue and 40% from initiatives taken up within the school. These initiatives commonly referred to as 'soft money' by staff in the University included money from grants, consultation, and professional development courses.

Many schools criticised the undergraduate/course work budget allocation because they felt that the Vice Chancellor's rates per EFTSU calculations did not reflect the costs of course delivery. For example, the Department of Education Science and Training (DEST)<sup>29</sup> provides up to a \$6000 difference for business students compared with science students. The University allocation however only allocated a maximum \$2000-\$3000 difference for the course delivery of

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<sup>28</sup> By definition student load is equal to the number of students.

<sup>29</sup> The Commonwealth Tertiary Education Commission was renamed the Department of Education Science and Training.

science students compared to business students. It should be pointed out that neither the University rate nor the DEST rate is based on the cost of delivery.

The University did not operate using a budget manual. Instead, group resource managers<sup>30</sup> approached the Head of School in the second half of the year (actual timing varied from year to year) with a tentatively prepared budget. This budget, prepared by FBS, outlined the committed school's funds (e.g. salaries). To forecast expenditure items and levels, FBS staff explained they used the previous year's budget and spending patterns. During a single meeting the Head of School and the group resource manager plan a triennial budget for the school. In particular, the meeting is used to plan the expenditure for the schools, and more recently has also involved discussions on other possible revenue sources to supplement the revenue received from the Vice-Chancellor. According to the Heads of Schools if the school reported a deficit, they felt that it was FBS staff responsibility to balance the school budget. There was also a general understanding that the allocation of funding within the schools should help the department to achieve the objectives set out in the school business plan.

The schools major expenditure items vary little from year to year. As there was no budget manual and Heads of Schools' positions were tenable for three-years, Heads of Schools also tended to rely on the previous years budget and spending patterns or FBS advice for allocating discretionary income. Such behaviours are consistent with comments by Jönsson (1982, p. 289) who claimed that managers use the previous year's budget to simplify the budget process when faced with complexity and uncertainty.

Most Heads of Schools had knowledge of new programs, staff going on sabbatical or taking long service leave, and increases in student numbers.<sup>31</sup> Heads of Schools did not however have such information as whether there was sufficient space to cater for an influx of students, or what the University plans were for expansion of infrastructure. Such information according to the FBS staff is essential for setting realistic budget projections.

Apart from FBS financial consultants and the Head of School, few of the staff were consulted in the school budget planning process. At the most, some senior staff members were involved in discussions about how best to spend discretionary funds. Some financial information was also disclosed at school committee meetings. Normally, however, the Head of School did not show other academics the school budget. While some Heads of Schools suggested that staff participation had the potential for improving the budgeting process, because of expected morale and greater initiative gains, most felt that time and the lack of expertise did not permit such an approach. For instance, as the budgets were constructed in the latter part of the year, a fully consultative process would

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<sup>30</sup> Group resource managers are employed by FBS.

<sup>31</sup> It is important to realise that detailed knowledge of the School operations and University expectations is limited by the length of time the Head of School has held the position.

further reduce the timeliness of budget preparation. They also said that they struggled with trying to understand the budget and therefore maintained that it was inconceivable to provide each member of staff with a comprehensive understanding of the budget for their participation to be valuable. It was also felt it would be a futile exercise to involve the school committee in budget decisions because of political indifference amongst staff.

Unlike other schools at the University, the three Education schools situated on Omega and Charlie campuses did not adopt the single school budget approach described above.<sup>32</sup> Instead, these schools are treated as a single budget unit. In these schools, the three Heads of Schools jointly decide how the resources will be spent for the budget unit, with the assistance of two FBS financial consultants. The Education schools budget model is designed so that one Head of School has the power to sign off on major items of expenditure for the three schools during the budget year. There is an expectation that this person acts on the recommendations of the collective Heads of Schools. The Head of School from the smaller school normally has the responsibility for this role because it was felt that they had more time to commit to the budget than the others. Aside from this, the Education School's budget approach was similar to the other schools; the business plan as well as the previous years spending influenced funding allocations. According to the Education Heads of Schools, this process has put them in a sound financial position. A manager from FBS suggested that this worked well in these schools because each school had a different strength; one school was strong in research, one school was strong in teaching, and the remaining school was strong in specialist areas. Thus, even though some schools subsidised other schools, there was a common goal amongst the schools: education graduates.

The Education School's motivation for defying the new model stemmed from existing budget problems. In particular, the Education Heads of Schools believed the proposed budget model would exacerbate budget deficits and in turn the schools' capacity to retain quality teaching and research. It was also felt that it would be difficult to determine the programmes that belonged to each of the schools making it impossible to fairly allocate funding.

Initially, senior management was not happy about the Education Schools defying the proposed budget model because of the expected efficiency gains their proposed model offered. Furthermore, senior management were sceptical

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<sup>32</sup> The three schools located on the two campuses included the School of Cognition, Language and Special Education, the School of Curriculum, Teaching and Learning, and the School of Vocational, Technology and Arts Education. It should be noted that one other education school exists at the University. This school chose not to be included in the one line budget of Omega and Charlie campuses. Those involved with the management of the education schools at the time suggested that the fourth education school had not been included because of political indifferences in the management methods used in the schools.

whether the Education Schools budget model would work because they felt that the schools had not been able to work as a collective group in the past and thus the model might cause further tensions between the schools. The Heads of the Education Schools acknowledged this and stressed the importance for recruiting Heads of Schools who would trust their counterpart Heads and have the capacity to work as a team. Without consideration of these criteria, it was felt that micro-political activity would escalate and be detrimental to their financial position.

The Pro-Vice-Chancellor responsible for the Education disciplines supported the budget planning procedures used by the Education Schools. He also recognised the difficulties involved with allocating a separate budget to each of the Education Schools, given that in the past their financial performance had been in a state of decline. Because of the overall improvement in the collective schools financial position in the years following the change, by 2002 other Pro-Vice-Chancellors and Deans pointedly made it plain that the Education Schools model offered a viable alternative for modelling future university budget allocations.

### **Budget control in the schools**

In theory, one of the reasons why organisations devolve budget responsibilities is to improve the responsiveness of decision-making and control so that local needs are addressed in a timely fashion (Nutley 1999). Not all of the Heads of Schools at the University adopted this view. There were two types of Heads of Schools at the University: those that worked hard to maintain a surplus; and those that prepared budgets but did not really use the budget for decision making or control in the school. Furthermore, it was the Heads that did not use the budget for decision making or control that confessed to being in deficit. Of those Heads of Schools that worked hard to maintain surpluses there was a perception of implied threats to either close the school or amalgamate it with a more profitable school if severe deficits were reported.

Heads of Schools were able to monitor the school budget using their personal computers. Despite this, they tended to rely on monthly financial reports from FBS to highlight any anomalies or budget areas of concern for their school. The Heads of Schools said that it was very difficult to understand the online reports and this was why they had not used their computers to monitor their financial position.

Staff that used the reports to monitor their financial position compared the monthly funds spent with the total amount of wages allocated for payment for that period. The logic behind this approach was that the major budget expenditure was salaries. There was a common understanding between Heads of Schools who worked hard to control the school's expenditure that "overspending in one account didn't count as long as there were savings in other accounts." Most however, suggested the receipt of budget reports was more a matter of routine than a measure of control.

Several factors prompted the second type Heads of Schools' lack of interest in budget management. These Heads of Schools said that their situation was so dire

that monitoring budget spending was a waste of time. In many cases, the Heads also justified this behaviour by reasoning that the budget problems were inherited and not something they could be held accountable for. Administrative personnel also mentioned that Heads had little say in the income for their schools because it was set by top management and that controlling expenditure was difficult since a large portion of the budget was committed to salaries.

In many schools, the combination of diminishing resources and general disregard for budget performance were viewed to be disincentives for budget management. Furthermore, some argued that budget control was the responsibility of the FBS staff, not theirs. Therefore, in reality, many Heads of Schools felt they could do little to 'manage' the situation. They suggested that it was not possible to hold them accountable for the budget when they had no prior experience managing a budget. These managers added that even if they wanted to exert greater control over the budget, their lack of understanding of financial statements and financial data prevented them from doing so.

Apart from this, it was also felt that the availability (or unavailability) of up-to-date information had also reduced the Heads of Schools ability to maintain control. According to the Heads of Schools, the inaccuracies often amounted to hundreds of thousands of dollars. If senior managers really wanted them to manage their budgets, they argued that they would be more concerned about providing accurate information. To overcome this problem, some Heads of Schools maintained a separate set of accounts using photocopies of any receipts to record expenditure items. Related to this, the oversimplified budget categories were also thought to signal to the Heads of Schools senior management's expectations for them with regard to the budget. It was felt that the oversimplified categories made it difficult for spending to be tracked very closely. Benjamin (1996) presents a similar view, suggesting that when new accounting systems are introduced attention needs to be paid to the coding structure to ensure that information caters for the users needs.

To make matters worse for the schools with reported deficits, by 2000 they faced additional financial pressures from a round of Enterprise Bargaining Agreement (EBA). The EBA were not resourced through additional government funding and as a result were not funded by the Vice Chancellor's budget allocation. So the EBA salary increases had to be funded by school initiatives. Senior management added further budget pressures by demanding that all school budgets be balanced by the end of the 2004 financial year. Heads of Schools felt they had little choice but to respond to these demands so that they would not be amalgamated with similar, but profitable schools, or closed down.

Within the schools, between 75-90% of the budget was consumed by salary-related expenses. The actual amount of the budget consumed depended on the positions held by staff in the schools. The precommitted resources were likely to be higher when, for example, the school employed mostly Professors as compared to more junior staff. Because of the nature of these commitments,

Heads of Schools felt that it was difficult to find areas for budget savings that would not severely impact on staff.

However reluctant they were to use staffing as a means to secure savings, many Heads of Schools admitted that they had done so in recent years. From a staffing perspective, two methods were employed to realise budget savings: (1) the postponement of replacement staff, and (2) the employment of sessional staff instead of full time staff. Given that the first method means that the workload of existing staff increases, it was in principle considered an undesirable savings option. Using the second method also led to a number of perverse outcomes for the school, evidenced by poor reports of teaching quality and a lack of contribution to research outcomes; both related to the fact that the University hires sessional staff for teaching purposes only and the fact that many sessional staff had completed their undergraduate degrees but had no professional work experience. Several Heads of Schools defended their decisions to employ sessional staff suggesting that their employment allowed full time staff to engage in more research activity and therefore the arguments against using sessional staff were limited.

Some Heads of Schools also looked for budget savings in areas that did not have direct consequences for staff such as the school's promotion and advertising activity. This was viewed to be a viable alternative because it allowed for staffing levels to be maintained and there was a centralised office that provided these services. Streamlining teaching was another alternative. By streamlining teaching and/or reducing the number of subjects offered by the school, the school could be run more cost effectively. For instance, one school hoped to reduce the number of options offered to students by forty subjects to reduce their deficit. Some staff were opposed to this approach, however, arguing that subjects should not be removed on economic grounds when there is significant educational merit (see also, Jones 1994; Coaldrake and Stedman 1998; Marginson and Considine 2000 for commentary on this point).

In response to the new budgeting requirements, Heads of Schools actively began looking for additional sources of revenue. Fee-based revenue was a common method employed to buffer the effects of the diminishing budget allocations. For some schools, it was reported that such initiatives could raise as much as \$800,000 to \$1 million per annum. Masters courses, in particular, were used to generate revenue by teaching the course alongside undergraduate students, but with slightly modified assessment. Masters courses were therefore very cost effective because they only required a minimum amount of resources to deliver as the majority of the cost is borne by the undergraduate courses.

However, similar to budget savings, the Heads of School's ability to generate additional revenue was limited by the large portion of the budget line consumed by salaries. According to the Heads of Schools, it was difficult to develop and market new income generating initiatives, such as new Masters courses, with the small allocation of discretionary income in their budgets.

A combination of streamlining, changes in recruiting practices, and increases in the number of fee based students led to an increase in staff awareness of the diminishing resources, despite their lack of involvement in budget planning. Because of these changes, accounting became a dominant part of the school culture, evidenced most strongly by the fact that all discussions about the schools' activities centred on how much revenue they could bring into their school. Staff also became more active in developing initiatives such as professional development courses to help improve their school's financial position. Typically, the amount of income generated through such arrangements was however limited by the time and availability of the individuals managing the initiatives.

### **Crises Mode - Clawback and Funding Changes: A Double Whammy for Schools**

The budget methodology changed significantly again in 2000 and 2001. First, the level of funding for foreign fee-paying students allocated to schools was reduced to the same level as domestic students. Second, schools operating with significant surpluses lost half of their surplus through a clawback<sup>33</sup> of funds. Instigated in response to the budget crisis, for Heads of Schools these two changes presented a host of new problems which we will now discuss.

#### ***The Clawback***

In 2000, the University recorded a surplus of \$16 million. A surplus of this magnitude was unexplainable given the call for increases in resources across the sector and the bleak financial future of many other institutions. Because of this, unions, students, and staff began asking how the university came to report such large surpluses, whether schools were fully utilising their resources to the benefit of students (e.g., in staff: student ratios), and why there was an unequal distribution of surplus balances across the four academic groups (Arts, Business, Health, Science). The surpluses also did little to improve relations with DEST. In response, the University Finance and Property Committee and Council requested that action to be taken.

It is important to understand that up to this point, schools operating in surplus or deficit were not subject to significant changes in their allocations. Several schools in fact boasted surpluses in excess of \$1.5 million. Surpluses however were not limited to the schools; administrative divisions also recorded surpluses ranging from \$4.8 to \$5.3 million.

Four explanations were given of the surplus. Senior management and most FBS staff said that surpluses were the result of conservative spending in schools. "The budget puts the fear of God into schools!" one senior manager remarked. Another senior manager explained that the problem with the Heads of Schools

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<sup>33</sup>A clawback is defined as "a refusal to dispense funds already approved in the budget" (Wildavsky 1975, p. 205).



understanding of the budget was that the budget allocation was not seen to be the funding for a single year. Instead, it was considered to be a long-term stream that could be further enhanced by saving which would help them to cope with any future reductions in the budget allocation. He went on to explain that by doing this, they were cheating staff and students of resources that could improve their operating environment. Several other senior managers argued that the inexperience of Heads of Schools led them to adopt such conservative budget approaches. Heads of Schools also acknowledged their limited abilities when it came to budget management. Many for instance confessed to being overly cautious when spending school funds because they expected deficits to mean a loss of jobs. Given this view, it was not surprising that most Heads of Schools did not see the surpluses as excessive. It is not as one Head of School commented, 'anything you would consider excessive fiscal management.' 'The surplus is really only just what you would expect as a minimum for sound financial management' another said. In reality, Heads of Schools felt that senior management blamed their conservative spending for the unjustified University surplus to direct the University Finance and Property Committee's attention away from their own failings as senior managers delegated with the responsibility for managing the University finances.

Inaccurate funding rates and poor budget methodology also influenced the magnitude of the surpluses. Since the majority of funds allocated to schools are allocated on the basis of load, getting a fairly accurate mix is critical for the financial health of all of the schools. But the unequal distribution of surpluses and deficits in schools suggest that this was not happening. To some extent, the devolution of budget responsibilities to such a low level was blamed for the exacerbated financial situation; it was felt that some budget responsibility needed to be redirected to a higher level, such as the Deans or Pro-Vice-Chancellors.

In response to the Property and Finance Committee recommendation that action be taken to improve the financial outlook, the Vice-Chancellor ordered 50% of the total School surpluses to be returned to the Faculty Pro-Vice-Chancellors. To explain his rationale for choosing a 50% clawback to remedy the situation, he argued that the University needed to make more a more 'strategic' use of its funds. Late in 2000, the money was taken from the schools and given to the Pro-Vice-Chancellors. As a result, some Heads of Schools reported losing as much as \$700,000 from their budget.

Following the clawback schools were invited to apply to the Pro-Vice-Chancellors for the return of funds for projects that would help them to achieve their strategic objectives. In many cases, Heads of Schools said that they were successful in recovering a portion of the clawback funding. In reality, the process of redistribution led to a similar mentality to that adopted under the black box model; those that were willing to play the political game received funding. In other words, funds were being allocated again based on the Pro-vice Chancellor's own personal preferences.

Superficially, by changing the budget methodology and clawing back funding from those schools operating in surplus, the University was seen to be doing something to respond to the bad impressions that had been formed about the University's handling of its finances. They were, for instance, able to show Council and DEST that something was being done about their financial concerns. Internally, however, the 50% clawback had dire consequences for the financial positions of many schools, which post-clawback reported significant losses because funds had been saved to fund longer-term projects, and employees did not react favourably to these projected deficits.

One of the reasons for the poor staff reaction can be traced to the lack of staff involvement in rectifying the problem. There was a widespread belief by managers that the surplus would best be addressed by looking at each school on a case-by-case basis. Even when staff became aware that this was not going to happen, they had expected at the most a 10 or 20% clawback. All were astounded when they realised they were going to lose 50% of their surplus. The clawback resulted in some schools losing hundreds of thousands of dollars; money that had been committed in the business plan to various projects and activities. Because of this, Heads of Schools were very anxious about the future of their schools. They were not alone. Many senior managers also were unhappy with this solution. They did not believe this was the best way to fix the budget problem. It was felt that it would only address the problem in the short-term. In the subsequent weeks employees' grew increasingly suspicious of senior management motivations for clawing back the funding especially when some of the funds were returned to them.

At the time, Heads of Schools who had operated with surpluses felt they were being punished for what they perceived to be good management. Managers for instance felt that their surpluses had been clawed back to fix the financial position of the deficit schools, as these schools had been bailed out in the past. Because of this they did not believe the budget situation would improve. One Head of School explained that he held this view because of a recent encounter with another Head of School. He explained: 'I was walking up to the car park with another Head of School and he said, "Oh I just got my financial statements and I see my deficit has been wiped out. It is probably from your clawback. Thanks!"'

The change in the attitudes of Heads of Schools extended to all campuses. Heads of Schools that had tried to manage their budgets began spending more time on research and teaching and other administrative matters. Because in the aftermath of the clawback many of these schools had projected deficits, Heads of Schools said that now they tried to spend all or even more than their budget line in any given year to ensure they received a similar allocation in the future, even when it meant spending money on 'frivolous' items. For example, one Head of School confessed to overspending by \$20,000 to \$30,000 in 2001 for the first time to signal to management that the school was *not* being overfunded and to ensure that future funds would not be clawed back. This is not an uncommon response

to a clawback (see commentary by, Coombs and Jenkins 1994; Scott 2001). In general Heads of Schools felt that any incentive to manage the budget had been removed because the Vice-Chancellor was going to do what he wanted in any case.

### ***Fee based Students***

In the past, fee-paying student income was allocated to schools at a higher rate than HECS student income. In the *University Budget Operating Fund Allocations 2001-2003*, the Vice-Chancellor wrote, "There is no justification for this... the funding rates set out in the Budget deliver the same rate of funding to a school for a student irrespective of whether that student is HECS-liable or fee paying" (p. 8). He then adjusted the budget allocations, by pooling the foreign and domestic student income together and allocating it using the EFTSU load formula. Staff however disagreed and many conveyed views similar to the following, expressed by one Professor at the University:

Fee-paying students are more expensive to educate for many reasons. Often you find you have to spend more time with fee-paying (international) students because English is their second language and therefore they have trouble grasping the material. Furthermore, often you find yourself teaching them not only the content that you want to teach but you are teaching them how to put together a presentation or an assignment.

Because of the 2000 budget position, it was felt that the decision to change fee-paying student budget rates was a direct attempt by the Vice-Chancellor to reduce the surpluses of schools that had significant numbers of fee-paying students. The change in funding rates for fee-paying students was not well received by Heads who reacted by refusing to engage in activities to recruit international students. To ensure their survival, others, although strongly opposed to the situation, felt they had little choice but to pursue international students as a source of income.

### **Summary and Discussion**

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The case study presented in this chapter describes one organisation's attempt to undertake management accounting change. In the opening sections of the chapter, we suggested that when human relations aspects do not receive full consideration a number of unintended effects may be observed. In this final section, we take a closer look at employee behaviours in an attempt to better understand how senior management budgetary behaviours were interpreted by employees in the case organisation and how these interpretations in turn shaped their behaviours. In particular, to get a better understanding of this phenomenon we concentrate on how various forms of reinforcement and reward systems stated and implied by the budgeting process shaped what was going on in the lower levels in the organisation (Cherrington and Cherrington 1973).

Overall, we observed at least two types of budget managers in the organisation; there were some diligent budget managers and some inattentive budget

managers. The case presents evidence, which indicates at least three factors, which may help to explain why these two types of behaviours were observed. First, all of the managers indicated that they felt that they had a lack of control over the future of their schools because they were limited in their ability to generate revenue and because the majority of their budget allocation was committed to paying salaries. Some managers however continued in their efforts to manage their budgets with the general understanding that reporting deficits would mean closure of the schools and a loss of jobs. Others managers felt that the situation was beyond their control and thus any efforts to try and manage the budget would be a waste of their time.

Second, the observed variations in behaviour may be explained by the lack of the Heads of Schools financial management experience. It was clear that Heads of Schools had little to no understanding of what successful budgeting entails. This lack of consideration of management capabilities implies that senior management was more concerned with the technical elements of the budget, especially their own responsibilities to allocate funds, rather than whether the Heads of Schools were capable or even willing to manage the budget. Senior management's failure to consider both the knowledge and the experience of Heads of Schools meant that the Heads of Schools stress levels increased from the budget responsibilities. Consequently, when the other Professors in the schools sensed the stress that the Heads of Schools were feeling because of the budget responsibilities, they were reluctant to take on the Head of School position when the current term ended. Furthermore, it was common for new Heads of Schools, especially those delegated with managing schools operating with projected deficits to divert their attention to other matters in the school. These Heads of Schools often defended their actions arguing that their budget deficit had been inherited from the previous Head of School and therefore they did not believe that they could be held accountable for the poor financial position of the school.

Third, in situations of uncertainty it is common for people to mimic the behaviours of others in order to gain acceptance or legitimacy (DiMaggio and Powell 1983). But in this case, whilst the situation faced by many Heads of Schools could be described as highly uncertain because of their lack of experience and poor understanding of senior management expectations, there was little hope of mimicking senior management's budgetary behaviour. Firstly, because the model used by senior management was inappropriate for allocating funds within schools because of its formulaic nature and secondly, even if it was suitable the process was insufficiently transparent, so the model could not be replicated. Instead, there was a tendency to mimic the spending patterns set in the initial 1997 budget. Without any consequence from the previous year's behaviours, Heads of Schools believed that management were satisfied with the budgeting approach they used. Therefore, it is hardly surprising that budgeting behaviours did not change in the period from 1997 to 2000, as few senior managers challenged them. No one, for instance, provided training to Heads of Schools to teach them how to budget effectively and even though monthly

budget reports were provided, the Heads of Schools lack of confidence in the accuracy and relevance of the information contributed to the reduced effectiveness of these reports. In this sense the lack of attention to what was being done at the school level, especially for those schools operating with a surplus, served to reinforce existing behaviours; that is, managers operating with surpluses generally did not experience any obvious positive or negative consequences from their behaviours, and on this basis assumed them to be acceptable. So, senior management's silence was interpreted as an approval of the process and served to reinforce previous behaviours. Perhaps the most serious consequence observed from the lack of interest in what was going on at the school level was that Heads of Schools tried to manage their budget allocations by reducing collaborative teaching across schools and campuses and tried to introduce new courses to attract students from other similar schools. Such acts proved troublesome because the relations between staff members in these schools deteriorated. The resentment towards other schools who were believed to be 'stealing' students filtered down to even the most junior levels, as staff became increasingly reluctant to engage in collaborative research; an activity that is key to the financial wellbeing and reputation of the institution.

Without a clear direction from senior management, it would seem plausible that the manager's behaviours were shaped by the pressures from the external organisational environment. Consider, for example, the government's reduction in its level of EFTSU funding to universities and the fact that many institutions were constantly lobbying for further funding to improve their financial position (Marginson 1997). This would help to explain why many Heads of Schools believed that they needed to save to ensure the school would continue operating in the long run.

In a limited number of cases, it was also reported that senior management rectified the financial position of deficit schools by allocating further funding. Such behaviours sent clear messages to those Heads of Schools that this type of budgeting behaviour was acceptable. Managers who had experienced the benefit of a University bailout continued to believe that any shortfall in their budget would be picked up by the University. Consequently, deficits often were reported again the following year suggesting that the bail out was a temporary solution to the problem, but did not result in any change in Heads of Schools budget behaviours.

A significant change in both senior management and Head of School behaviours and attitudes was however observed following management response to the \$16million surplus. It was clear that senior managers blamed the Heads of Schools for the inappropriate financial position and not the formulaic methodology. The Heads of Schools comments made it clear that many of them saw the clawback and the changes to the funding methodology to be a punishment. The effect of both changes was immediate –the overall financial position was rectified, but the emotional response from Heads of Schools was high. Schools that had operated with significant surpluses now predicted

deficits. Combined, the changes did little to improve staff motivation to achieve budget targets and goals. Many Heads of Schools felt quite hostile towards senior management because they believed that the external environment required them to save as much as possible and this was now being discouraged by senior management. Upon closer inspection, we found the resentment Heads of Schools held towards senior management intensified following their decision to disregard individual cases for holding significant surpluses. Heads of Schools that were interested in doing a good job managing their budget expressed frustration because they felt that they had failed. In particular, the Heads of Schools felt that the clawback and changes to funding made it impossible for them to achieve any of the goals set out in the strategic plan and they said that this had affected the usefulness of the strategic planning process. To put it simply, they felt that any efforts to achieve the school's objectives and goals would now be thwarted because the school no longer had sufficient resources to achieve them. Disgruntled Heads of Schools took further action; such as spending more than their budget allocations, often on superfluous items not budgeted for, to reduce the likelihood that subsequent allocations would be decreased. This response could also be seen as a direct message to senior management, that they were unhappy with the way in which the situation had been handled. Such actions are consistent with prior budgeting studies, which suggest that punishments are likely to result in dysfunctional behaviours (Cherrington and Cherrington, 1973).

To cope with their feelings of failure many Heads of Schools defended their position; suggesting that it was inconceivable to expect anything but poor budgeting given their lack of training and experience in this role. In other words, the failures served to reinforce any doubts they had about their ability to budget effectively.

Another effect was that Heads of Schools blamed senior management for the inappropriate surplus; suggesting that it occurred because of senior managements' poor understanding of budget methodology and the funding requirements of each of the schools. For example, several Heads of Schools remarked that it would be much easier to calculate load accurately for the eight faculties than for the forty-five schools. According to Argyris (1953) the tendency to blame others is one of the common responses people use to deal with high pressure situations. In this case, the blame tactics used by the Heads of Schools represented direct attempts to shift senior management attention away from situations where Heads had neglected their budget responsibilities to the senior management actions, which may have contributed to the situation. Apart from this, Heads of Schools became very suspicious about what was going to happen to the clawback funds, in particular whether it was to be used to prop up those schools operating with significant deficit. As a result, Heads of Schools became very cynical towards those schools that they assumed were receiving the benefit of their clawback. Argyris (1953) also points to suspicion of management as one of the long term negative results of top management pressures for behavioural change.

One final interesting finding that emerged from the case related to the management of the Education Schools budgets. In these three schools, there was a recognition that the effectiveness of collective budget model depended on the behaviours of the Heads of Schools. In particular, the Education Schools worked hard to build their relations to reduce the likelihood that the model would fail. Because the resources were allocated as a single pool, unlike many other schools there was no fighting over EFTSU places or trying to steal students from their counterpart schools because this did not serve a purpose; it did not increase their budget allocation. Interestingly, because of this by 2000 it was recognised that the Education School budget model was a viable alternative for the whole organisation, especially given the significant improvements reported in their financial position.

In this chapter, we have attempted to unravel one organisation's experience with budgeting as an example of how accounting control practices can affect employee attitudes and behaviours. We reported how inadequate senior management attention to the human relations aspects of introducing and operating a formulaic devolved budget model led to increased stress for the Heads of Schools, resentment towards senior management and other schools, and perhaps more seriously a loss of the Heads of Schools commitment to the budget process. The broad message offered in the chapter is that the effectiveness of an accounting control system, such as the budget, hinges on the careful interplay between technical and human factors. If senior management do not place enough importance on the human relations aspects of implementing and operating accounting systems, they may face significant resistance towards the system, which could threaten its effectiveness as a control device.

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## Chapter 24

### Cost information and management systems in a public hospital

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Carly Webster

#### LEARNING OBJECTIVES

After completing this chapter, you should be able to:

1. Describe the features of new public management
2. Describe the traditional health care environment and the recent reforms in the Australian health care sector
3. Understand and identify the technical costing methods within the Australian health care sector
4. Apply technical knowledge to the case study
5. Identify potential problems or issues facing the case site

## Introduction

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The Australian health care sector has faced a sweep of reforms in recent years. The introduction of New Public Management (NPM) has led to significant changes in the health care sector. Specifically, the generation of cost information and management systems in hospitals has evolved to incorporate the principles underlying NPM.

The aim of this chapter is to examine the recent NPM reform that are currently being developed and implemented within Australia's health care sector. This chapter will firstly discuss the adoption of NPM in Australia and the traditional role of accountability in the health care sector. This chapter will further examine the technical aspects of costing information and management systems within the Australian health care sector. A case study of Alpha hospital is provided and will illustrate the implementation and implications with such reforms.

## New Public Management (NPM)

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NPM can be described as resulting from various social, economic, technological and global pressures. These pressures have forced the Australian government to be more efficient, effective and accountable to the Australian public with the use of public funds. NPM also encourages organisational best practices (Hood, 1995). NPM may be described as an indirect coercive policy transfer, in which the government is pressured to 'modernise' the public sector (Common, 1998). This pressure has resulted from growing public dissatisfaction with the government in terms of efficiency, government accountability, budget spending and allocations, management and the effectiveness of the government and government activities. Previous abuses of the system are another possible reason for public dissatisfaction such as corruption, waste and incompetence (Hood, 1995). Poor macroeconomic performance, responses to fiscal stress and changing social conditions may also lend to the adoption of NPM.

Similar coercive pressures can be seen worldwide resulting in many countries, particularly OECD countries, adopting a NPM philosophy in the 1980's (Hood, 1995). Globally NPM can be viewed as policy convergence. This means that this concept can be applied globally to many different political, economic and cultural environments, yet it needs to be modified according to the particular needs of each government or country (Common, 1998). It has been suggested that NPM aims to remove the barriers between the public and the private sector by adopting more business-like practices where accountability in terms of both finance and results play a central role. NPM adopts a shift in public management styles where there is a strong emphasis on managerialism and a higher focus on managerial techniques such as the adoption of 'best practice' techniques (for details see Hood, 1995; Common, 1998).

Briefly, NPM encompasses the following perspectives:

- An emphasis on managerialism and management practices, much of which have been adopted from the private sector such as 'hands on management'.
- Government outputs and the effectiveness of such outputs.

- Competition – in and between public sector organisations and also with the private sector.
- Disaggregation of public organisations – a shift from formulised procedures to emphasising resource allocation, resource use and goal achievement.
- Development of explicit performance standards with the ability to measure this performance.
- Development of employee wages or contracts based on job performance or outputs.
- Development of leaner, flatter structures and an established series of subcontracting relations with external parties.
- Outsourcing services if more efficiently, effectively and economically performed by the private sector.
- Improved financial reporting, monitoring, accountability, cost cutting, foreign debt reduction and budget efficiency.
- Adoption of many private sector management practices such as strategic and management plans, mission statements and benchmarking.

*(Hood, 1995; Common, 1998; Aucoin, 1990)*

Several of these NPM initiatives are evident in the recent reforms that have been adopted by the Australian health care sector.

### **The Traditional Health Care Environment**

Traditionally, hospitals had little incentive or demand for accounting to be used as a management tool. Managerial initiatives and cost accounting were not traditionally issues, and the provision of services had been considered to be a means of accountability (Comerford and Abernethy, 1999). Traditionally, an arms length relationship existed between doctors and hospitals with doctors possessing honorary status. However, lack of productivity and efficiency of government services created negative social views toward the government and as a result initiatives such as Medibank emerged resulting in professional negotiations (no longer arms length relationships) and a growing concern over the hospitals finance and management (Chua, 1995).

Although the health care industry has long recognised that understanding the relationship between inputs and outputs is a crucial prerequisite to effective decision-making and control, and papers describing these benefits appeared soon after the turn of the century, very little happened before the 1960s. There appears to be two reasons for this slow progress. The first is due to the inherent complexity of hospital production methods and types. The health care sector is faced with a wide range of complicated products and a turbulent environment that places actual health practice in a continual state of change. The second reason is in relation to culture. The health care sector has an embedded culture where care of the individual patient is the dominant concern. Here all patients may be seen as unique and there is the tendency to believe that the clinician should manage patients as opposed to resources. It is for these reasons that the adoption of health care reforms has been such a slow process (Hindle, 1994).

The 1960s and 1970s saw the development of management science in the health care sector. This management science incorporated the desired development of more sophisticated modelling, mathematical analysis and emphasized the importance of human factors. Around this time there was an increased understanding of aspects in health sector performance, in particular differences between equivalent products that were being billed at widely different rates became apparent. It is this inconsistency that provided for the development and adoption of the Australian National Diagnosis Related Groups (AN-DRG's) in the 1980s (Hindle, 1994).

The 1980s focused on using managerialism to overcome the deficiencies of the traditional hospital environment. Efficiency and equity were newly established terms and limits on hospital spending, benchmarking and asset and liability management and integrating clinical decision making with financial management became some of the new management initiatives. Private sector finance and information technologies were implemented due to the dissatisfaction of the quality of public administration. The public demanded higher degrees of surveillance, control and accountability, whereby moving the health care sector toward to principles underlying NPM. Today, healthcare managers are being forced to focus on issues such as cost containment, improved efficiency, such as reduction in bed days, and increased productivity in aim to achieve improved patient outcomes and performance. Health care delivered must also maximise dollars expended (KPMG, 1995).

In addition, it has been suggested (KPMG, 1995) that hospitals can benefit from implementing NPM initiatives through:

- a. greater budgetary controls,
- b. improved analysis and reporting of data,
- c. improved facilities for auditing and quality assurance,
- d. consolidated patient activity, workload casemix and resource utilisation information,
- e. provision for performance measurement criteria,
- f. improved cost centre reporting with respect to activity, analysis of work practices and improved timeliness of data provision and identification of costs at a patient level.

Therefore, there appears to be several benefits that may be derived from the adoption of NPM reforms within the health care sector.

### ***Patient Classifications***

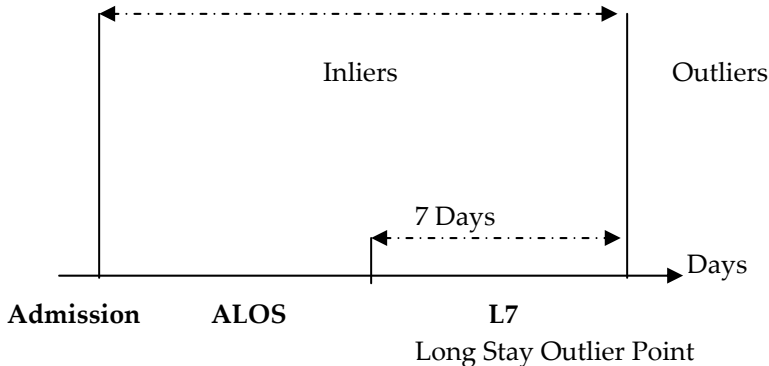
Australian National Diagnostic Related Groups (AN-DRG's) are a means by which acute inpatient<sup>34</sup> episodes of care are classified. It is the product of a process of operative procedures within the hospital that classify and code inpatients into homogeneous groups (Lloyd, Kately, Bromwich and Haddon,

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<sup>34</sup> An inpatient is a patient that has been formally admitted into the hospital (Commonwealth Department of Health and Aged Care, 1999).

1992). Hospitals may be funded according to their composition of DRG's (Harper, 1998), although it should be noted that DRG's were not originally developed for this purpose (Lloyd et al. 1992). Once DRG's are classified then it would attract a sum of money that is based on the true average cost of treating a patient under the specified conditions of the DRG (Harper, 1998).

**Figure 1. Inlier and Outlier Patients Classification**



**Legend:**

Inliers - where discharge occurs on or before the long stay outlier point

Outliers - where discharge occurs after the long stay outlier point

ALOS - patient average length of hospital stay

Source: Department of Health and Community Care, 1996. p.7.

The DRG classification system has been developed to describe what is known as inliers. As exhibited in Figure 1, these are generally normal or typical medical cases, anything outside this is described as an outlier (McGuire, Brender and Maskell, 1995). The DRG system for Australia was originally designed by Professor Fetter at Yale University in the 1970s (Lloyd et al. 1992). Australia's adoption in the late 1980s provided a significant step forward in overcoming the inherent complexity of identifying hospitals' products. Such complexities included lack of guidance relating to defining and counting hospital products and allocating appropriate costs as recorded in the hospitals' accounts (NSW Health Department, 1991). This system has many advantages in addition to validating hospital financing, such as to support the decision making process for the distribution of scarce resources, to determine hospital resource utilisation and determine maximum utilisation compositions, provision of information for planning purposes and description of current patient composition according to cases (Lloyd et al. 1992). This may assist in prioritising or budgeting.

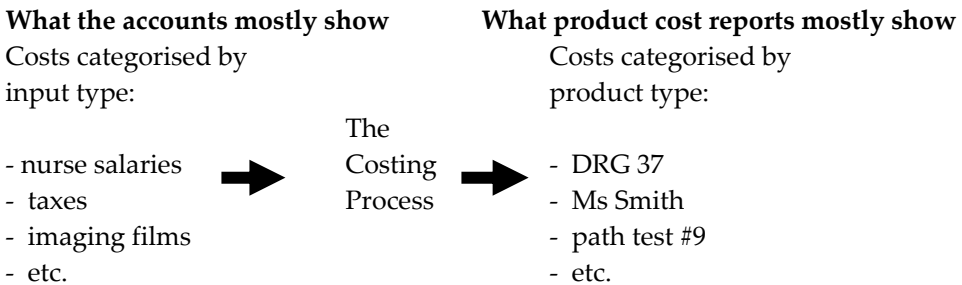
The DRG process consists of three general functions, medical record documentation, coding and data entry and DRG grouping. To ensure that all data is accurate and maintained then it is important for all information to be recorded such as all diagnoses, procedures and complications. This will provide a relatively comprehensive record of the patients' details. This information must be recorded on the patients' discharge summary. When there is more than one

diagnosis then a principal diagnosis must be selected for coding purposes (Lloyd et al. 1992). Coding and data entry information is obtained from the discharge summary and is usually coded by the Medical Record Administrators (MRAs). This information then is entered into a database and the software analyses this data and assigns a DRG to each patient record (Lloyd et al. 1992).

**Product Costing**

Product costing involves determining the cost of a product produced, it identifies the costs of inputs and allocates this to a product. Episodes of patient care are the main products that are generated in health care. Hindle (1999) highlighted several application possibilities for product costing in the health care sector context. These included: internal management; negotiating prices with external purchasers; negotiating contracts between health care delivery units; developing and refining the product classifications; and ensuring that patients and care providers are treated fairly. Figure 2 below indicates a broad overview of the purpose of product costing.

**Figure 2 Product costing – changing costs by input type to costs by output type**



Source: Hindle, 1999. p.9.

**Casemix Funding Model**

The term ‘casemix’ is used to describe the composition of patients who are treated in a hospital (Lloyd et al 1992). It is a scientific approach that is used to classify episodes of patient care, this is driven by patient information that is collected. Borden (1988) and Chandler, Fetter and Newbold (1991) described casemix costing as an accounting system developed by the hospital industry of which purpose is to generate information pertaining to the cost of delivering DRG products to patients. This approach seeks to represent faithfully the cost of provision of services, whilst emphasising the importance of actual illness diagnosis and service delivery (Covaleski, Dirsmith and Michelman, 1993).

Casemix classification requires clinical meaning and resource use homogeneity. The cost and benefits need to be weighted in relation to the process of deriving information. Casemix is an important development in the health care industry in Australia. It is an approach that is taking on more of a private sector commercial focus that aims to make the health care sector more accountable and efficient. Casemix is important in Australian hospitals as several states now use casemix as

a principal basis for hospital funding, that is hospital funding is based on the composition of DRG's of the entity. Hence, funding can be based on the number of patients treated with consideration to the patients' diagnosis and medical procedures required. Here casemix funding is asserted to "re-establish the power, and duty, of hospital boards of management and managers to operate their own hospitals" (The Hon. Marie Tehan, MP, Minister for Health, Victoria, 1993).

Casemix costing is useful for resource decisions such as resource distribution and utilisation and also the quality of care that the hospital provides. Casemix costing is also advantageous for future planning, such as new services, budgeting, benchmarking, and measurements such as: workloads, workforce planning, strategic planning and performance evaluation.

Casemix costing can be considered an important management tool that can assist in the achievement of optimal resource utilisation and efficiency. Hence, casemix is rich in the provision of information. Benchmarking is possible from the country-wide adoption of casemix costing. Without this common element of casemix costing, benchmarking would be meaningless between or within hospitals. This management technique improves the organisations' understanding of their business processes and performance drivers. It is a private-sector approach that aims toward the provision of continuous improvement, the identification of customer needs and demands, the establishment of key performance indicators, and adoption of best practice. In addition, it enforces the notion of competition that aids organisational efficiency as a means of achieving high performance (Lloyd et al. 1992).

Casemix costing aims to provide important information that allows a wide range of analysis to be conducted and can also be used as the basis of decision making, such as the outsourcing and contracting out of services such as specialist services (Lowe, 2000a). Lowe (2000a) describes the casemix technology as an "hierarchical network of interrelating data collection systems" (pp. 100-101). He emphasised the importance of reliable and accurate data collection as these represent the integrity of the network and provide the system with the ability to produce 'facts'. Lowe also mentioned the importance of the timely provision of management information as being important for the effectiveness of the system. This included the timely provision of casemix information to clinical staff throughout the organisation to educate and guide them regarding costing decisions.

Aside from the technical considerations that make up the casemix model, human characteristics are also considered vital for its survival and effectiveness. This network of human and non-human allies must hold together in order for the casemix system to function properly and have the ability to provide convincing facts (Lowe, 2000b). Clinicians and nurses are indispensable allies to this process as they provide the data that is essential to the system. Staff commitment is also considered important, hence securing the involvement of all staff is critical. In many instances, casemix teams have been established and where this is evident,

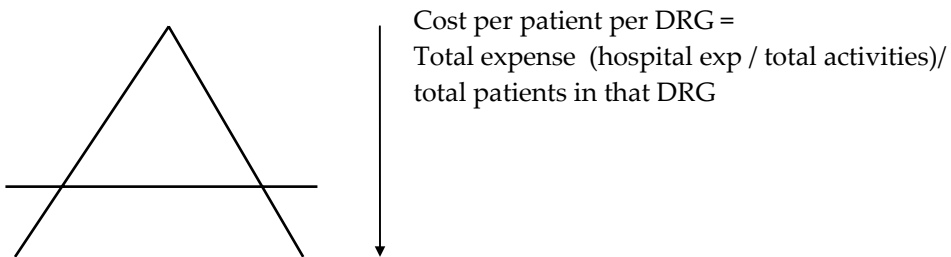


they play an important role in the enrolment and mobilisation of other staff within the organisation (Lowe, 2000b).

### Cost Modelling System

Cost modelling can be used within casemix. It aims to achieve an average cost per patient, dependent on their DRG. Cost modelling is a 'top down' approach as illustrated in figure 3, and it does not depend on resources consumed by individual patients. It uses an allocation of DRGs that identify costs associated with hospital production or output. The output of the hospital is viewed as a commercial product and therefore patient costs are important. There are views that elements of efficiency and effectiveness can be derived from cost modelling (Lloyd et al. 1992).

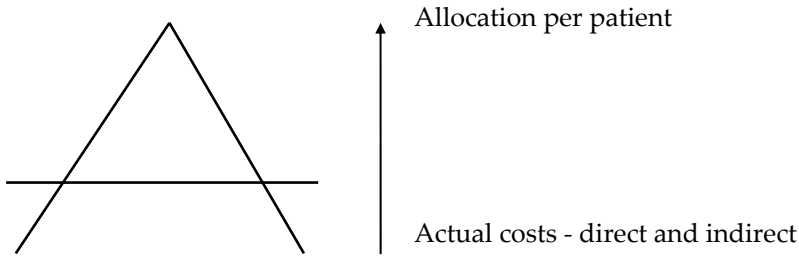
**Figure 3 The top down approach of cost modelling**



Cost modelling has several advantages, these include the speed of implementation, low cost, it links clinical and financial data, and information is easy to access. It is also a relatively basic concept, hence is easy for managers to understand and become more familiar with concepts such as cost centres. In addition to this it still has the ability to reflect case differences and complexities (Lloyd et al. 1992). Cost modelling, however, is subject to some data quality weaknesses and only identifies estimates of costs rather than identifying true costs (NSW Health Department, 1991).

### Clinical Costing

Clinical costing is aimed at deriving an actual cost per patient. It is referred to as the 'bottom up' approach as exhibited in figure 4. Clinical costing relies on a feeder system to record resource consumption for variable expenses such as nursing time. For fixed costs such as administration, average costs are applied (Lloyd et al. 1992). Clinical costing has been criticised due to the expenses incurred in generating individual patient information and both clinical costing and most modelling have been criticised for not providing the 'true' costs of treating patients. It has been found that both methods only provide estimates of costs which can be useful for benchmarking and comparative purposes (Rose and Vaughan, 1997).

**Figure 4. Clinical costing bottom up approach**

However generating a highly specialised costing system has many advantages such as sophisticated benchmarking, the development of specific costing information that may be more useful in decision making, and it also has the ability to identify, analyse and explain the differences between patients (Lloyd et al. 1992; Prentice, 2000).

### Case Study – Alpha Hospital

Alpha Hospital is one of Australia's largest public hospitals, that has adopted many of these NPM reforms. Alpha is one of the largest teaching hospitals in Australia and provides an extensive range of primary and secondary clinical and tertiary services. In addition to servicing the local population, Alpha provides referral services to a range of neighbouring health districts. Alpha is a large and complex organisation with an array of clinical, finance and administration divisions. Alpha will be used to illustrate the application and the implications of NPM reforms, with a focus on the cost information and management systems at Alpha hospital.

#### *The Costing System at Alpha*

At the time of the study both clinical costing and cost modelling existed at Alpha. As previously discussed, clinical costing is aimed at deriving an actual cost per patient whilst cost modelling is aimed at deriving an average cost per patient. Clinical costing was primarily utilised in the organisation and a pure cost modelling had not been used for the past few years. However, there are some elements within the organisation that were currently cost modelled, overheads are one example of this. Another example where cost modelling was used is with pharmaceutical expenses. There was no electronic system at Alpha that could record each drug as it was prescribed to each patient. The cost modelling was therefore used where the total ward pharmaceutical costs are spread over all of the patients in that ward.

At Alpha, a clinical costing approach had been used to manage organisational performance and to distribute to clinicians details about their clinical behaviour and by finance for the generation of costing data. It had also been utilised for organisational analysis. At the time of the study, clinical costing information

only costed inpatients and within this established details such as patient demographics and patient utilisation of resources from activities such as pathology, radiology and theatre. Production was costed by the use of relative value units (RVUs). RVUs are a measure of the relative value of one product compared with all other products of a similar type (Commonwealth Department of Health and Aged Care, 1999). RVUs are allocated to each product in each department and are measured in units such as cost or time. RVUs are then used as an allocation method to allocate costs to account codes, otherwise known as cost buckets. These cost buckets consist of all of the costs that are produced under that code and then they are distributed per RVU. RVUs can be different in every cost bucket. From this process the costs, such as the cost of a blood count, can be established per individual patient based on the RVUs consumed for that patient. RVUs can also be used to cost individual patients through the patient dependency system for nursing hours. Here patients are coded on a scale from a – g depending on the acuity of the patient with (a) denoting that the patient needed less intensive care and (g) denoting more intensive care. Weighted separations were also found to be relevant. These were based on separations that go through the hospital and there are weights that are associated with these, if one has a high weight the patient is considered complex, where a lesser weight is less complex. The costs associated per weighted separation were a measure which the organisation was currently judged on.

Interviewee comments suggested that the use of clinical costing had the advantage of providing costs per patients and also identified elements such as care treatment given per patient and the types of activities that were occurring, how many of them were occurring and it also enabled a profile of clinical care to be established. One Clinical Costing Projects Officer commented:

I see clinical costing systems as doing two things. They will be very good business management tools because we will be able to look at the actual costs for outcomes rather than just model the outcomes. Secondly, they will be very good as a clinical tool because DRGs are fairly good from a resource protocol perspective... we are probably about 18 months away from getting to that level of information and indicators into clinical practice.

### ***Cost Information and Management Systems at Alpha***

The devolution of cost management was a slow continuing process within the hospital. There were different types of mindsets within Alpha where the managers were pushing down the responsibility and health professionals were responding 'I don't have the skills to manage this cost'. However, health professionals acknowledged that the 'accountability and cost management' concepts within the organisation were something that could not be ignored and needed to be embraced.

Interviewees' comments often emphasised that in order to achieve organisational efficiencies there needed to be an organisational integration between managerial responsibilities for resource utilisation with clinical responsibility for patient

care. One Business Manager suggested that a strategic management approach is needed at the hospital level to drive this process.

Criticisms of implementing NPM concepts commonly found, were based on the argument that the new public sector concepts, in terms of costs and expenses, were often too high up on the agenda, when the objectives of the health care sector is to provide quality health services and generally just to make people better. In this context, NPM concepts have been viewed as much of a threat to the organisation as a friend. One Medical Executive Director commented:

This is not our core business, we are not in the business of talking about money, we are in the business of treating people, making people better and population outcomes, access indicators, quality and all those sort of things.

A Nursing Informatics Officer suggested that the narrow focus on cost containment and profitability budgets and the downsizing of the 1980s indicated that although you may improve short-term, in the long-term you may lose in areas such as innovation. This is because for innovation to occur in the health sector, a surplus of people's time is needed. He saw specific areas where NPM concepts had affected the organisation, such as through budget integrity and the management of length of stay for patients. However, he also contended that there might be some adverse consequences in the organisation due to NPM reforms. He saw one such consequence as being the pressure that new public sector reforms has on driving up the intensity of nursing services in order to reduce the patient's length of stay. He suggested that other consequences might include re-admissions or poor patient satisfaction. Some health professionals have seen NPM reforms as a threat to them as a clinician. One clinician suggested:

Clinicians and business people talk different languages. How they function and how they think are completely different. So new public sector concepts such as efficiency, economy and effectiveness are almost threats to us, and I can say that because I am a clinician. I see the best model of managing an organisation as complex as this is using your best tools in different areas.

In contrast to these criticisms, one Nursing Manager advocated that quality in health care couldn't exist without the examination of cost effectiveness, efficiency and resource utilisation. He contended that these were inherent characteristics of quality. In addition, he believed that a business approach had been taken within the organisation, however, it still had a long way to go. A Deputy Executive Medical Director emphasised that hospitals are unique in their structure where the power resides with health professionals. He contended that the new public sector is more evident within the organisation as power appears to be moving from the clinician to more managerial-focused people (Hardy, 1996). One Executive Finance Manager asserted that casemix has been the birth of the new public health care sector. He believed that casemix changed the organisations

perspective about things and made the hospital look at its activities, costs, clinical pathways and feeder systems.

***Users and Utilisation of the Costing Data at Alpha***

When examining the users and use of cost information in the organisation, participant responses varied. One view was that the clinical costing system was implemented largely to gain external legitimacy, such as complying with the requirements of the National Competition Policy and expectations of State Health<sup>35</sup>, professional associations, and the public. Therefore, according to many, the actual use of cost information primarily rested at an executive and management level and also tended to vary across health professional staff and finance and managerial staff, such as business managers. Most interviewees suggested that casemix data was often used to support management processes and to respond to external contingencies, such as governmental funding authorities, regarding resource allocations. A Nursing Informatics Officer commented:

I think that it (cost information) can force hospitals just to look at their core business so any fat in the system tends to go and certainly there is more focus on profitability and cost neutrality of services that we are offering.

In contrast, a Nursing Director commented:

It has never really been sold, in my mind, as a proper method of actually doing things or managing business.

He suggested that there is a need to further advocate benefits associated with the use of cost information throughout the hospital. Interviewees commonly asserted that the people who were going to use the cost information were those that are interested in improving their practice, whether they are business management or clinical management. In addition, by using a combination of clinical and financial management information together, the organisation can examine this information and determine its impact from an overall management perspective.

A Clinical Costing Manager revealed that there was not a great deal of information relating to clinical data, however this was evolving. A Clinical Officer suggested that the use of cost information from a clinical perspective had more long-term benefits in contrast to short-term. For example, comparing trends of patient care with peers and looking for potential areas of improvement.

Several interviewees' suggested that for health professionals to be really interested in cost information, they have to know the benefits involved. A Medical Director commented:

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<sup>35</sup> "State health" is used in aim to disguise the state in which the research was conducted.

At the moment they feel as if they are just getting hit over the head and can treat less patients, they can't see the benefits of it – they just see the downside.

Health professionals generally held the view that they were more interested in indicators such as the length of stay, infection indicators and quality indicators as opposed to cost indicators and cost information. Often cost data was not considered relevant, as the best clinical procedure for the patient and the clinical effectiveness was the primary concern for health professionals. However, several health professionals, particularly at the director level, did consider cost information to be relevant. However, these advocates stressed that the timing of the information was crucial. Giving health professionals information that is dated (such as one year old information) has no advantages, as the cost information was considered irrelevant. One major disincentive to using casemix costing data was that the casemix model changed every year for a decade. This made year-to-year or period-to-period comparisons impossible. An Executive Medical Director referred to the process as a continuous refinement where the organisation was constantly trying to better the system and this resulted in not being able to compare results on a period to period basis. He further commented that because of the constant change then people are going to care less about the system, particularly if it is perceived to be changing for the wrong reasons such as political reasons.

He suggested that casemix cost information is not necessarily the only tool that can be utilised to facilitate budget savings in a hospital environment. In addition, nursing participants often portrayed the concept of cost efficiency as 'working more for less' where there is little incentive to be cost effective in the organisation. However, interviewees identified that due to nurses being the second largest cost generators in the organisation (the first being doctors), how well they managed resources was relevant and important to the organisation. It was perceived that nurses could do a lot to affect the costs of the hospital, and hence they should be informed as to the importance and possible uses of cost information. Interviewees revealed that a general awareness of cost information was present at a nursing manager level and above. This knowledge of cost information was also desirable when it came to understanding hospital restrictions, such as staff replacement restrictions, that may be present at the divisional levels. In addition, there appeared to be an increasing realisation of the finite amount funds. A Medical Director commented:

There is a realisation now that there is an opportunity cost in every thing that you do and every time you prescribe an expensive drug that may mean that someone might not get something else. That is the reality.

Therefore, in this sense, the relevance of cost information to health professionals at all levels was evident. Whether cost information actually affects patient management was another issue. A Clinical Nurse Consultant revealed that attitudes towards costing information might depend on personal characteristics, such as familiarity with decision-making using casemix, their background or

professional stream or academic preparation. In addition, he suggested that some health professionals might be in a comfort zone and only be comfortable using information that they have used in the past.

In contrast, it was commented by a Medical Director on the importance of cost effectiveness in clinical decision making. He emphasised that in addition to this, the information provided needed to be accurate and that often clinicians did not have the time to assess cost effectiveness. He also suggested that the State Health department appeared ambivalent about casemix, and while there is this perception, health professionals will be reluctant to take any notice of it until it is evident that the State Health department had become clear in their thinking.

Whether clinical costing information or cost modelling information is more useful, results indicated mixed responses. On one hand, some health professionals considered clinical costing information as being the only way to look at the actual services that they were providing so that alternatives could be examined. From a finance perspective, the use of clinical costing information provided the finance division with the ability to question the activities of health professionals, and (as asserted by a Finance Manager) to help facilitate health professionals' awareness of the costs involved with their patients. In addition, the Finance Manager stated that this information may also make health professionals look at their own patterns of how they treat patients. Costing information in general can be used to identify trends or for looking at doctor behaviour, however the general feeling here is that this needed to be done very sensitively.

There seemed to be a general consensus that many health professionals, including those that were situated in executive or managerial positions, did not have the financial training to effectively use and understand cost information. Another common perception was the difficulty in obtaining cost information. It was often commented that the information was not freely available and hence there were perceived barriers to the information in the hospital. Several health professionals warned that not only does the information need to be available and current, but also if the organisation does not start using this information then it would soon be seen as insignificant or unimportant. The implementation of any system in the organisation would achieve little if it was not embraced and used for decision-making (Miller, 1999).

In summary, the actual penetration of cost information in the organisation was at a high level, such as across the finance division, divisional directors and business manager levels (Meyer and Rowan, 1977; Covaleski et al. 1993; Prentice, 2000). The organisation was in the process of devolving this information and there was an aim to get this information down lower levels of the organisation, such as to the divisional level with the ability to drill down to an individual level, such as individual doctors and specialists. Directors and management considered this an important step in getting health professionals to actually look at their service and their practice. The time frame for this devolution to department level was estimated to be from 18 months to two years.

## Summary

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The Australian health care sector has undergone a sweep of reforms, based on NPM principles that have led to significant changes. The importance of cost information and management systems have become crucial elements to the performance of hospitals, as cost information plays a more important role. This chapter introduced the principles underlying NPM and described the traditional health care environment. Costing techniques and terminologies illustrated the types of innovative management and costing systems that can now be found within Australian hospitals.

Alpha hospital, based on an actual case study, illustrated the costing and management environment within one Australian hospital. The case study found that there were several important managerial issues that needed to be resolved within the hospital environment. These included advocating the benefits of cost information throughout the hospital, while continuing to also focus on quality indicators, such as quality of care and length of stay. In addition to this, devolving the cost and managerial information to health professionals, was also deemed important.

It is clear from this chapter that significant challenges continue to face the health care sector. The implementation of NPM concepts appear to be particularly difficult in this sector, due to both the nature of the service which it provides, and also because accounting had not traditionally been used as a management tool. However, in a world of increasing accountability, this sector is being urged to subscribe to an environment of managerialism, cost efficiency, effectiveness and economy.

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*Further reading*

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