PN-ADC-845

Financial Analysis

For Marketers

Computer Systems

Toolbox

التحليل المالى للمسوقين الزراعيين

الدليل العملى باستخدام الحاسب الآلى

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Training Manual

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Agriculture-Led Export Businesses

Supporting Egypt's Processed Foods Export Industry

A USAID Funded Project – Implemented by Abt Associates, Inc.

Preamble

This toolbox is prepared in a style intended to provide basic, practical knowledge and techniques for processed foods and agribusiness marketers, untrained in the discipline of finance and accounting. It is not intended to give an all embracing discussion on the intricacies of the principles of accounting and finance but to provide sufficient knowledge for the marketer to be aware of the financial implications of decision making, and aid in the following activities of marketing:

- an assessment of how well marketing strategy is working,
- an evaluation of alternative marketing activities,
- the development of future marketing plans, and
- controlling marketing activities.

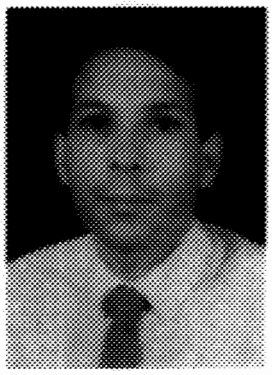
The text is kept to a minimum in order to put over the principles in a concise way but it includes both numerous worked examples in order to achieve maximum understanding and reinforcement.

The toolbox is primarily designed as a training aid for marketing or agribusiness lecturers or trainers. It can also be used as material for short courses for in service training of managers and as a self-learning aid.

This toolbox includes two parts; the first part deals with the basic concepts of the subject while the second part includes an Excel based software designed specifically for this toolbox and utilizes principles discussed in part one. The software includes templates and practical examples. Using the software and impeded templates makes financial analysis for decision making easier and faster.

We hope that this toolbox will encourage Egyptian food processors for export to take more informed decisions and intensive their use of computers in the decision making process.

Douglas Andrew
ALEP BCS/MIS Director



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May 2003

Financial Analysis

For Agribusiness Marketers

Computerized Systems
& Agribusiness Applications

Basic Concepts

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Preface

Approach and objectives

This book is written in a style intended to provide basic, practical knowledge and techniques for marketers, untrained in the discipline of finance and accounting. It is not intended to give an all embracing discussion on the intricacies of the principles of accounting and finance but to provide sufficient knowledge for the marketer to be aware of the financial implications of decision making, and aid in the following activities of marketing:

- an assessment of how well marketing strategy is working,
- an evaluation of alternative marketing activities,
- the development of future marketing plans, and
- controlling marketing activities.

The text is kept to a minimum in order to put over the principles in a concise way, but it includes both numerous worked and un-worked examples in order to achieve maximum understanding and reinforcement.

The text is primarily designed as a teaching aid for marketing or agribusiness lecturers or trainers and is aimed at undergraduate or diploma students studying agricultural marketing, agricultural economics, agribusiness, management or business studies and certain professional qualifications. It can also be used as material for short courses, as a refresher or basic text for postgraduates, for in service training of managers and as a self-learning aid.

The learning process

The learning process is assisted within the text through the provision of a number of learning aids. These are:

- Chapter objectives; Each chapter has specific objectives which prepare the learner for the chapter material and outline the learning outcomes.
- Figures and tables; Each chapter is illustrated with relevant figures and tables which illustrate, encapsulate or summarize the text.
- Examples; Each chapter contains examples which serve to illustrate the text and reinforce understanding of the principles.
- Exercises; Each chapter contains both worked and un-worked exercises intended to ensure the learner's understanding of both the concepts and the use of practical techniques involved in financial analysis.
- Key terms; Key terms are included at the end of each chapter and are intended to act as an aide-memoire.
- Index; A subject index is included at the end of the text to assist with quick reference.

Chapter 1 - Introduction to accounting for marketers

Chapter objectives

This chapter is intended to provide:

- An understanding of financial analysis in marketing
- An explanation of the various activities associated with marketing financial analysis
- A brief introduction to the various financial analysis methods.

Whilst it is not necessary to be a qualified accountant or bookkeeper, a basic understanding of what is involved in financial analysis is essential for anyone in marketing. It is too enticing, and often too easy, to use "blue skies" thinking in planning marketing activities. It is even easier to spend money without fully realizing the return one is getting for it. It is proven, therefore, on marketers, to be more disciplined and analytical in the way they go about planning, executing and evaluating marketing plans and strategy. One way of introducing more discipline into the process is by having a basic understanding of the financial implications of decision making, and how financial measures can be used to monitor and control marketing operations. The purpose of this text is to provide exactly that, and the first chapter deals basically with an introduction to the activities involved in financial analysis.

Structure of the chapter

The chapter introduces the way in which financial analysis can be used in marketing, and gives a brief overview of the areas in marketing where a knowledge of finance can be very useful, particularly in helping marketers gauge how well strategy is working, in evaluating marketing research alternatives, developing future plans and in marketing control.

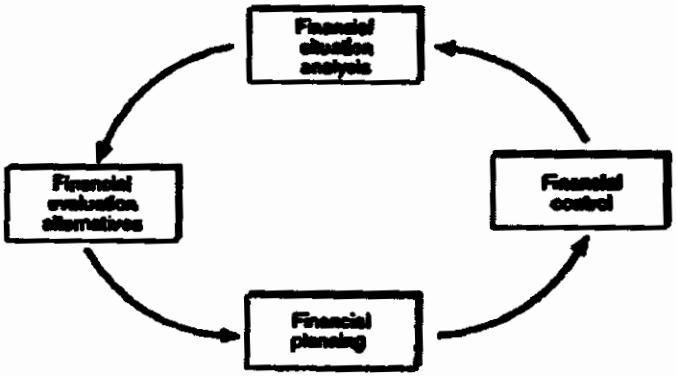
The marketing financial analysis circle

Financial analysis can be used to serve many purposes in an organization but in the area of marketing it has four main functions:

a) to gauge how well marketing strategy is working (situation analysis)
b) to evaluate marketing decision alternatives
c) to develop plans for the future
d) to control activities on a short term or-day to-day basis.

In effect these four functions comprise what can be called the "Marketing Financial Analysis Circle" (see figure 1.1)

Figure 1.1 The marketing-financial analysis circle



Activities associated with marketing financial analysis functions

For each of the four functional areas where financial analysis is useful in marketing, there are a number of associated activities:

a) Financial situation analysis (how well marketing strategy is working)
This involves the study of:

- the study of trends
- comparative analysis
- assessment of present financial strengths and limitations for the whole business, brand or component of the business, e.g. transportation.

b) Financial evaluation of alternatives

This involves the study of a number of factors like the market place, competitors etc., and is used for decisions whether to:

- introduce new products/delete mature products
- expand the sales force or do more advertising
- delete a market operation e.g. close a Dairy Board depot or increase the sales fleet
- move into a new market or markets
- build a new grain depot or silo.

c) Financial planning (projections concerning activities which marketing management has decided to undertake)

Financial planning is used for a number of activities like:

- the introduction of a new range of products
- the forecasting of sales and costs
- market liberalization.

d) Financial control (actual compared to planned results)

This activity is mainly centered around keeping plans on course.

Methods involved in marketing financial analysis

There are a variety of methods used in each of the four functional areas. Some of these include the following:

a) Financial situation analysis

- Ratio analysis
- Profit and contribution analysis
- Sales and cost analysis.

b) Financial evaluation of alternatives

- Sales and costs analysis
- Break even analysis
- Profit contribution, cash flow analysis, profit projections
- Return on investment
- Return on capital employed
- Sustainable growth rates.

c) Financial planning

- Sales and costs forecasts
- Budgets
- Proforma income statements.

d) Financial control

- Sales and costs forecasts
- Actual results compared to budgets (analysis of variance)
- Profit performance.

What is analyzed in marketing financial analysis

Two factors influence the choice of unit of analysis:

a) the purpose of the analysis
b) the cost of the information needed to perform the analysis.

Several possible units can be used in marketing financial analysis and cost or sales data can be used. These units are listed in table 1.1. which is by no means exhaustive. Units can be chosen which suit the particular situation or organisation.

Table 1.1 - Alternative units in financial analysis

Market	Product/service	Organization
Total Market	Industry	Company
Market segment (s)	Product mix	Segment/Division/Unit
Geographical areas	Product line	Marketing department
- demographics	Specific product	Sales unit
- product	- brand	Regions
- characteristics	- model	District/Branch
	- size	Office/Store
	- shape	Sales person

Basic financial analysis methods

These will be expanded on in later chapters, so this section serves as an introduction only.

Use of ratios

Ratios can be used to judge the organization's "liquidity", i.e. can it pay its bills, its "leverage", i.e. how is it financed and its "activities", i.e. the productivity and efficiency of the organization. Taking liquidity analysis only, this has a bearing on new product planning, marketing budgets and the marketing decisions. Liquidity analysis is drawn from the balance sheet, e.g.:

	$		$
Cash	250	Current	120
Accounts receivable	300	Short term debt	100
Stock	200	Long term debt	1,500
Total current assets	750	Total liabilities	1,720
Property and equipment	2,000	Net worth	1,430
Other assets	400		
Total assets	3,150	Total liabilities and net worth	3,150

Current and quick ratios

These are used to judge a firm's short term capacity to meet its financial responsibilities.

(i) Current ratio

$$\frac{\textit{Current asset}}{\textit{Current liabilities}} \text{ (Should be greater than 1)}$$

750/220=3.41

ii) Quick ratio

$$\frac{\textit{Current asset}}{\textit{Current liabilities}} \text{ (minus stock)}$$

550/220=2.50

Debt ratios

These are used to measure long term liquidity

$$\frac{\textit{Total debts}}{\textit{Net worth}}$$ (Current Liability+Short Term Debt+Long Term debt) should be >1

1,720/1,430=1.21

$$\frac{\textit{Long term debt}}{\textit{Total capitalisation}}$$ (Long Term Debt + Net Worth)

1,500/2,930=0.51

This ratio shows the extent of leverage (debt) in total capitalization.

Profit analysis

Breakeven analysis is a method used to estimate the number of units (volume) or sales value required to make neither profit nor losses. In other words, it is the point where costs of production and sales volume are equal.

Sales and cost information are used to calculate the breakeven point. Without getting into the argument as to what constitutes fixed or variable costs, fixed costs are defined as those which do not vary with output e.g. rent, rates, whereas variable costs do vary with increased or decreased output, e.g. labour, materials. Breakeven assumes fixed costs are constant, variable costs vary at a constant rate and there is only one selling price. However, with a higher or lower price, the breakeven point will be lower or higher respectively. Breakeven is calculated by the formula:

$$\text{BREAKEVEN} = \frac{\textit{FIXED COSTS}}{\textit{PRICE / UNIT} - \textit{VARIABLE COST / UNIT}}$$

By rearranging the formula breakeven costs or sales can be calculated. Note that profit level intentions should be added to the fixed costs, as this is a "charge" to the company. Also, if one wishes to recover all new investment (value) *immediately* it should be added to fixed cost.

Breakeven can be calculated by the formula or by graphical methods. Figure 1.2 shows an example of both.

Figure 1.2 Formula and graphical solution for breakeven analysis

i) Formula

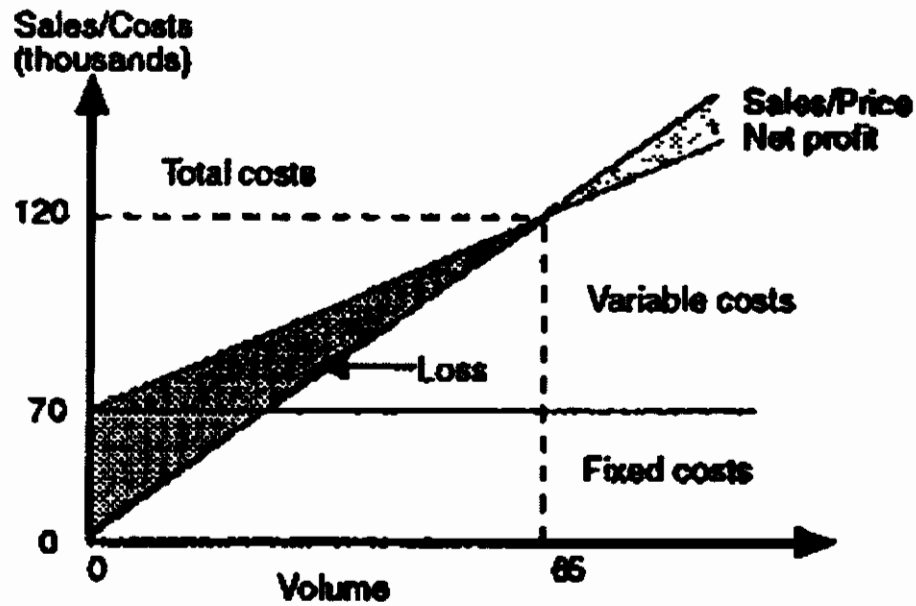
Price/Unit =	$ 1.846
Variable cost/Unit =	$ 0.767
Fixed costs =	$70.000

$$Breakeven = \frac{Fixed\ costs}{Price\ per\ unit - Variable\ cost\ per\ unit}$$

$$= \frac{70{,}000}{1.846 - 0.767}$$

= 65, 000 units (volume) or $120, 000

Figure 1.2 Graphical solution



Contribution analysis: When performance of products, market segments and other marketing units is being analyzed, an examination of the profit contribution generated by a unit is often very useful to management.

CONTRIBUTION = *SALES (REVENUE) - VARIABLE COSTS*

So, contribution represents the amount of money available to cover fixed costs and the excess available is net income.

For example, suppose a product is generating a positive contribution margin. If the product is dropped, the remaining products would have to cover fixed costs that are not directly traceable to it.

In the example below if X was eliminated, $50, 000 of product net income would be lost. If the product was retained the $50, 000 could be used to contribute to other fixed costs and/or net income (see figure 1.3.).

Gross and net profit margins: Contribution margin is useful for examining the financial performance of products, market segments and other marketing, planning and control units. However, marketing executives should be familiar with the calculation of gross and net profit margins, which is useful to gauge company and business unit financial performance and to budget for future operations. The profit

and loss statement is useful for reporting performance to stockholders and to compute taxes. Figure 1.4 gives an example

Figure 1.3 Illustrative contribution margin for product X (000's)

		$
SALES		500
LESS:	Variable manufacturing costs	200
	Other variable costs traceable to product X	100
EQUALS:	Contribution margin	200
LESS:	Fixed cost traceable to product X	150
EQUALS:	Product's net income	50

Note: *Chapter 5 provides further explanations of a) and b).*

Figure 1.4 Illustrative profit and loss statement

		$
SALES REVENUE		1,200,000
LESS	Cost of goods sold	800,000
EQUALS:	Gross profit margin	400,000
LESS:	Selling and admin. expenses	200,000
EQUALS:	Net profit before tax	200,000
LESS:	Tax	80,000
EQUALS:	Net profit	120,000

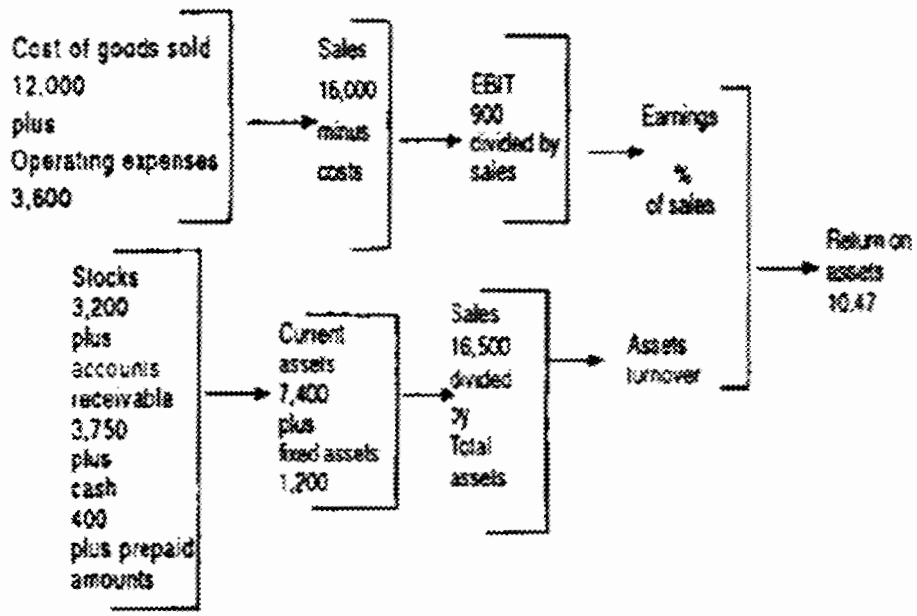
Consider the following sample data taken from *Rowe, Mason, Dickel and Westcott (1987)*

	$
Cost of goods sold	12,000
Operating expenses	3,600
Sales	16,500
Stocks	3,200
Accounts receivable	3,750
Cash	400
Prepaid expenses	50
Fixed assets	1,200

Financial analysis models

Many models, often computerized, have been developed to aid marketers see the effects on the "bottom line" of a change in an organization. One such programme is the Dupont Analysis The model allows executives to input data into blank boxes and by manipulating any figure find the resulting outcome. One of the advantages of computer based models is that one can work "backward" or "forward" through the model, setting desired levels of cost or outcomes and calculating the results.

Figure 1.5 Sample printout of the Dupont analysis



Other performance measures

Various other performance measures can be used; these include productivity measures, which, say, for a supermarket would be:

$$\frac{Sales}{Sq\ metre\ of\ space}$$

Other measures include inventory turnover:

$$\frac{Net\ Sales}{Inventory}$$

Budgeting and forecasting

These two activities are essential to marketing planning and are often done via pro forma statements.

a) **Marketing budgets**

Field sales expense, advertising expense, product development expense, market research expense, distribution expense (trade and administration), promotion expense (trade, consumer).

b) **Pro forma financial statement**

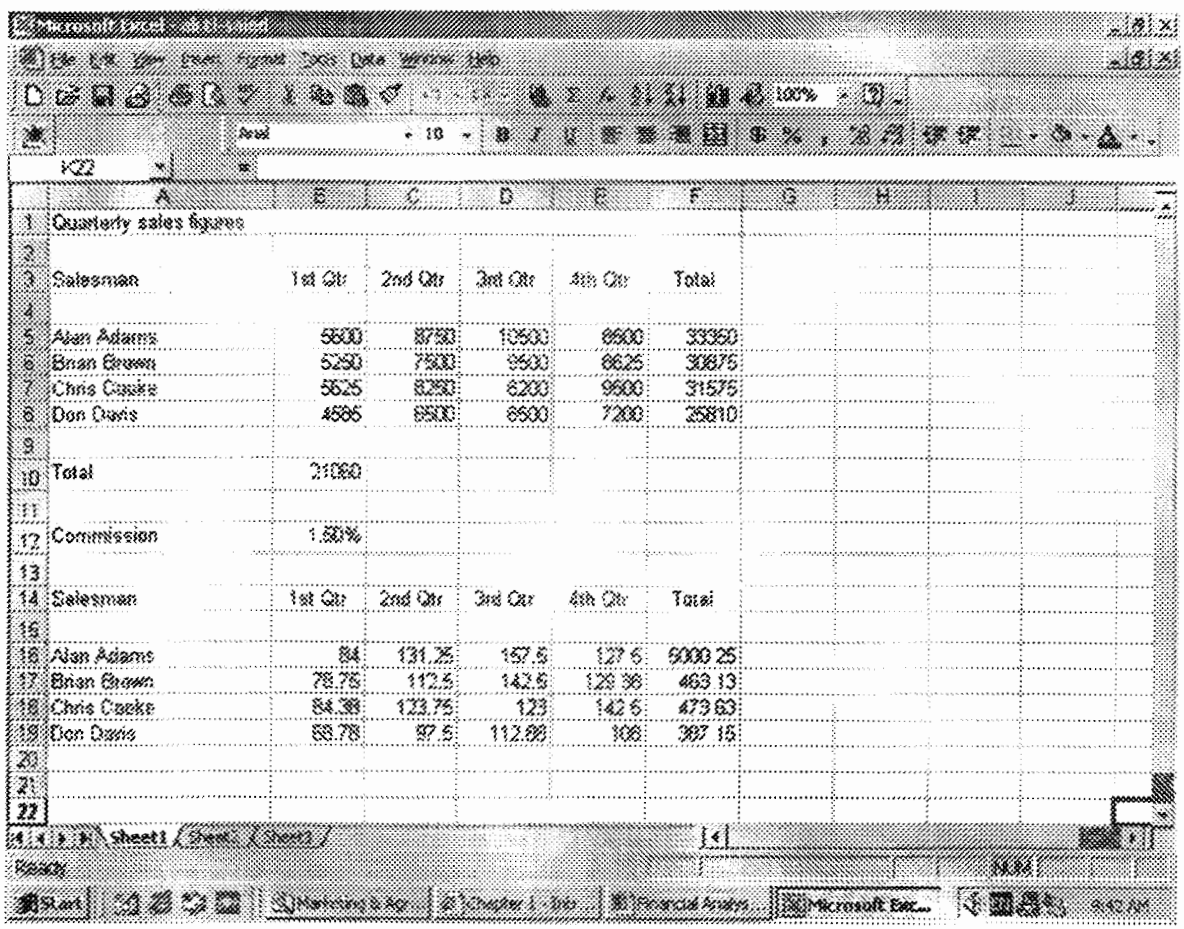
Annual profit and loss statement, next year pro forma/quarter, current year budget/quarter, last year actual/quarter, annual revision of 5 year pro forma profit and loss statement (expense detail for broad categories).

N.B. In all figures watch for inflation and information gaps (use approximation).

Spreadsheets

Spreadsheets are often used in budgeting and forecasting exercises. Spreadsheets use the memory of a computer as if it were a large piece of paper divided up into a matrix of cells. Into these cells may be entered numbers, text and formulae. The power of these systems is that the data held in any one cell can be made dependent on that held in other cells and changing a value in one cell can set (if wanted) a chain reaction of changes through other related cells. This means that a model can be built in which the effect of changing key parameters may be observed. A term often used to describe spreadsheets is "what if software". It can be used, for example, to evaluate the effect of changing the sales commission rate. Simply entering a new value in the commission rate cell will lead to the automatic re-calculation of all dependent cells. Figure 1.6 shows an example of a spreadsheet used in accounting.

Figure 1.6 Sample spreadsheet



	A	B	C	D	E	F
1	Quarterly sales figures					
2						
3	Salesman	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
4						
5	Alan Adams	5600	8750	10500	8400	33350
6	Brian Brown	5250	7500	9500	8625	30875
7	Chris Cooke	5625	8250	8200	9500	31575
8	Don Davis	4585	6500	6500	7200	25810
9						
10	Total	21060				
11						
12	Commission	1.50%				
13						
14	Salesman	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
15						
16	Alan Adams	84	131.25	157.5	127.5	500.25
17	Brian Brown	78.75	112.5	142.5	129.38	463.13
18	Chris Cooke	84.38	123.75	123	142.5	473.63
19	Don Davis	68.78	97.5	112.88	108	387.15
20						
21						
22						

Note: The formatting of the 'cells' to display numerical fields to two decimal places/values for commission in the lower half are found by multiplying the sales figures by 1.5%; totals are stored as the SUM (column or row); the borders showing column letters and row numbers may be omitted.

Spreadsheets are powerful personal decision support tools. In addition, programming facilities such as IF...THEN...ELSE greatly extend the control that may be built into the model.

Chapter 2 - Financial, managerial accounting and reporting

Chapter objectives

This chapter is intended to provide:

- An introduction to the basic principles of the accounting equation
- An introduction to, and the construction of, manufacturing, trading and profit and loss accounts and their use
- An understanding of the principles and construction of a balance sheet and its interpretation
- A detailed explanation of the interpretation of company accounts using ratio analyses and the uses of these.

The two principle statements which form a set of accounts are:-

a) *The profit and loss account* defined as a summary of a business's transactions for a given period.
b) *The balance sheet* defined as a statement of the financial position of the business at a given date (usually the end of that period).

Other less important statements are the *manufacturing account* and the *trading account*. It is absolutely essential to any marketer to understand what the profit and loss statement and balance sheet mean. Both documents are vital, not only to show the corporate health of the organization, but also as an indication to various shareholders of how well or badly the organization is performing, as proof to potential investors or lenders for the raising of capital and as a statutory record for taxation and other purposes.

Structure of the chapter

This chapter is structured in a logical way, building up from the basic tenets of financial analysis - the dual effect and the accounting equation. From this, the chapter looks at the construction of manufacturing, trading and profit and loss accounts and the drawing up of a balance sheet. Ratio analysis is a particularly powerful technique aimed at helping marketers to compare sets of figures over time and between companies. This is dealt with in considerable detail.

The basic principles

All aspects of accounts are governed by these two principles.

a) First principle: Dual effect

Every transaction has two effects, not one, e.g. if a Cerial Marketing Board (C.M.B.) purchases grain it has:

- more stock
- less cash.

If the Nile Company of Egypt sells frozen artichokes to a retailer, it has:

- less stock
- an amount owed by the customer if he does not pay immediately.

b) Second principle: The accounting equation

The second principle stems from the first. Every transaction has two effects; these two are equal and balance each other. Thus, at any given moment the net assets of a business are equal to the funds which the owner or proprietor has invested in the business.

Net Assets = Proprietor's funds

is the ultimate accounting equation. An explanation of the terms is as follows;

- *Net assets* are defined as a business's total assets less total liabilities.
- An *asset* is defined as something owned by a business, available for use in the business.
- A *liability* is defined as the amount owed by the business, i.e. an obligation to pay money at a future date.
- *Proprietor's funds* represents the total amount which the business owes to its owner or proprietor. This consists of:

Capital: (amount proprietor invested in the business) *plus* **Profits:** (funds generated by the business) *or minus* **Losses**: (funds lost by the business) *minus* **Drawings:** (amounts taken out of the business).

Use of the accounting equation to find profit

We normally arrive at a business's profit or loss by means of a profit and loss account, but where information about income and expenditure is lacking, the accounting equation can be a useful way of finding profit. If:

Net assets = Proprietor's funds

then an *increase in net assets = an increase in a proprietor's funds.*

Considering what causes an increase in the proprietor's funds, we can say that INCREASE IN NET ASSETS (from the beginning of a period to the end) is equal to:

New capital introduced + Profit - Drawings

during the same period. If three of these four amounts are known, the fourth can be calculated.

Manufacturing account

There are many firms, whether parastatal, sole trader, partnership or limited company, which manufacture the final product to be sold from raw materials, e.g. a fertilizer company uses phosphates, ammonia and so on to produce finished fertilizer pellets.

In this instance, a manufacturing account is required in order to arrive at the final cost of manufacture. The manufacturing organization will still need a trading and profit and loss account. The only major difference is that, in the trading account, the entry for purchases is replaced by the cost of manufacture. The cost of manufacture is calculated using a manufacturing account. Two important factors need to be taken into account:

a) Different types of cost

The costs needed to prepare a manufacturing account can be broken down into two main categories known as direct and indirect costs.

The main or direct costs are those of raw materials and labor, which together are known as the prime cost, although any expense which can be traced directly to any unit of production is also a direct cost. The indirect costs are those associated with production but cannot be traced directly to a particular production unit. These costs will include the general factory overheads such as light, heat and power, rent, rates, insurance, depreciation of production machinery, etc. Certain labour costs, such as supervision by foremen or factory managers, will also be indirect costs because they are not directly traceable to a production unit but are absorbed as a general overhead.

b) The effect of stocks

One complication in constructing the manufacturing account is to remember that there may be opening and closing stocks of raw materials and opening and closing values to attach to partly completed items (work in progress).

Figure 2.1 Pro forma manufacturing account

YEAR ENDED 2001			
Opening stock of raw materials		:Production cost o completed goods carrie down to trading account	
Purchases		:	
		x	xx
Less closing stock of raw materials		:	
Cost of raw materials consumed		:	
Direct manufacturing wages		:	
Prime cost		x	
Factory overheads:			
Rent and rates,	x		
light, heat and power	x		
Indirect wages	x		
Depreciation of Prod. machinery	x		
		x	
		x	
Opening work in progress		:	
		xx	
Less closing work in progress		:	
		xx	xx

Now attempt exercise 2.1 and 2.2.

These adjustments can be seen in the pro forma manufacturing account, which follows. (See figure 2.1.)

Exercise 2.1 A simple manufacturing account

The following are details of production costs of *Aroma Pvt Ltd* for the year ended 31 December 2001.

	:
1 January 2001, stock of raw materials	1,30
31 December 19X5, stock of raw materials	1,80
Purchase of raw materials	10,00
Manufacturing (direct) wages	17,00
Royalties	60
Indirect wages	9,00
Rent of factory (excluding administration and selling and distribution departments)	2,08
Factory rates	64
General indirect expenses	68
Depreciation of work machinery	1,05

Prepare a manufacturing account for the year ended 31 December 19X5.

Exercise 2.2 A manufacturing account with an adjustment of work-in-progress.

	$
January 2001 stock of raw materials	1,50
31 December 2001 stock of raw materials	2,75
1 January 2002 work in progress	86
31 December 2002 work in progress	94
For the year ended 31 December 19X4	
Wages: direct	6,45
indirect	4,08
Raw materials purchased	15,70
Power fuel	1,02
Direct expenses	66
Carriage inwards on raw materials	1,05
Depreciation of factory machinery	72
Insurance of factory buildings	34
General factory expenses	70

Trading account

The purpose of the trading account is to show the gross profit on the sale of goods. Gross profit is the difference between the sale proceeds of goods and what those goods cost the seller to buy, or cost of sales. The cost of sales for this purpose includes the amount which has been debited for them to the purchases account plus the cost of getting them to the place of sale, which is usually the seller's premises, i.e. the carriage inwards of those goods.

Preparing a trading account

The trading account is calculated by using a sequence of steps. It is essential that these steps are carried out in the order indicated.

a) The first step is to transfer the balance on the sales account to the trading account:

Dr: Sales A/c	Cr: Trading A/c.

b) Next, debit the trading account with the cost of goods sold, starting with the opening stock:

Dr: Trading A/c	Cr: Stock A/c.

The opening stock is obviously the same as the closing stock of the previous period; in the first year of trading, of course, there will be no opening stock.

c) The balance on the purchases account is then transferred to the trading account and added to the opening stock figure:

Dr: Trading A/c	Cr: Purchases A/c.

d) Transfer any balance on the carriage inwards account to the trading account:

Dr: Trading A/c	Cr: Carriage Inwards A/c.

Add the carriage to the total arrived at in c) above. This gives the total cost of goods available for sale.

e) Deduct the value of closing stock from the cost of goods available for sale. Any item deducted from the debit side of an account is, in effect, credited to the account. Deducting closing stock from the debit side of the trading account is therefore crediting it to that account. The corresponding double entry will therefore be to the debit of stock account:

Dr: Stock A/c	Cr: Trading A/c

(by deduction from the debit side).

We have now arrived at the cost of sales.

f) The balance on the trading account will be the difference between sales and cost of sales, i.e. gross profit, which is carried down to the profit and loss account.

Point to Note:

The debit to stock account for closing stock is the value of the current asset of closing stock which will be included in the balance sheet, as we shall see later. When the opening stock is credited to the stock account in the next period, it will balance off the stock account.

Net sales (turnover) and net purchases: Goods which have been returned by customers are represented by a debit balance on the sales return account. This must be transferred to the trading account, otherwise the sales and gross profit in that account will both be overstated.

Following the same reasoning that allows us to deduct closing stock on the debit side of the trading account, we may deduct the debit balance on the sales returns account from the sales credited in the trading account. In this way, we show the net sales for the year. Net sales are known as turnover. Similarly, we show the credit balance on the purchases returns account as a deduction from purchases in the trading account to show the net cost of purchases. Goods which have been returned to suppliers must not be included in the cost of sales.

Point to Note:

The order of items is most important. Sales returns must be deducted from sales; purchases returns must be deducted from purchases; carriage inwards, if any, must be debited in the account before closing stock is deducted. Figure 2.2 shows a pro forma trading account.

Figure 2.2 Pro forma trading account

Opening stock of finished goods		:Sales	xxc
Production cost of completed goods b/d (from manufacturing account)	:		
Closing stock of finished goods	xc		
Cost of sales	xc		
Gross profit c/d	xc		
	xc		xxc
		Gross profit B/d	xxc

N.B. A trading account is prepared very much like a manufacturing account but substituting the production cost of completed goods for the usual purchasing figure (see exercise 2.3: Preparation of trading account)

Appendix I shows a sample trading account for The Nile Marketing Board, Zimbabwe.

Now attempt exercise 2.3.

Exercise 2.3 Preparation of trading account

Prepare a trading account from the following balances included in the trial balance of *K. Smith* at 31 December 2001.

	Dr	Cr
	:	:
Sales		25,00
Purchases	16,00	
Sales returns	3,00	
Purchases returns		2,50
Stock at 1.1.19X8	3,00	
Carriage inwards	1,00	
Stock at 31/12/19X8	5,00	

The profit and loss account

Introduction: The remaining nominal accounts in the ledger represent non-trading income, gains and profits of the business in the case of credit balances, e.g. rent, discount and interest receivable. Debit balances represent expenses and losses of the business and are known as overheads, e.g. salaries and wages, rent and rates payable, lighting, heating, cleaning and sundry office expenses. These must now be transferred to the profit and loss account so that we can calculate the net profit of the business from all its activities.

The profit and loss (income) statement presents a summary of the revenues and costs for an organisation over a specific period of time. Such a statement is generally developed on a monthly, quarterly and yearly basis. The profit and loss statement enables a marketer to examine overall and specific revenues and costs over similar time periods and analyses the organisation's profitability. Monthly and quarterly statements enable the firm to monitor progress towards goals and revise performance standards if necessary.

When examining a profit and loss statement, it is important to recognise one difference between manufacturers and retailers. For manufacturers the cost of goods sold involves the cost of manufacturing products (raw materials, labour and overheads). For retailers, the cost of goods sold involves the cost of merchandise purchased for resale (purchase price plus freight charges).

The balance sheet shows that the profit for an accounting period increases proprietor's funds. The trading and profit and loss account shows, in detail, how that profit or loss has arisen. The profit and loss statement consists of these major components:-

- **Gross sales** - the total resources generated by the firm's products and services
- **Net sales** - the revenues received by the firm after subtracting returns and discounts (such as trade, quantity, cash)
- **Cost of goods sold** - the cost of merchandise sold by the manufacturer or retailer.
- **Gross margin** (profit) - the difference between sales and the cost of goods sold: consists of operating expenses plus net profits
- **Operating expenses** - the costs of running a business, including marketing
- **Net profit before taxes** - the profit earned after all costs have been deducted. Figure 2.3 shows a pro forma trading and profit and loss account.

Figure 2.3 Trading, profit and loss a/c for the year ended 31 Dec 19X0

	$	$	$
Sales			x
Less: cost of goods sold stock, at a cost on 1 January ('opening stock')		x	
Add: purchases of goods		x	
Less: stock, at a cost on 31 Dec ('closing stock')		(x)	
			x
Gross profit			xx
Sundry income:			
Discounts received	x		
Commission received	x		
Rent received	x		
	x		
	xx		
Less: administration expenses			
Rent	x		
Rates	x		
Lighting and heating	x		
Telephone	x		
Postage	x		
Insurance	x		
Stationery	x		
Office salaries	x		
Depreciation	x		
Accounting and audit fees	x		
Bank charges and interest	x		
Doubtful debts	x		
Distribution costs:		x	
Delivery costs	x		
Van running expenses	x		
Advertising	x		
Discount allowed	x		
		x	
			(x)
NET PROFIT			xxx

Explanations

It is essential that the difference between a trading and profit and loss account is clearly understood. The following provides an explanation.

- The trading account shows the gross profit generated by the business. This is done by comparing sales to the costs which generated those sales. A retailer, for example, will purchase various items from various suppliers, and add a profit margin. This will give him the selling price of the goods and this, minus the cost of goods sold, will be the gross profit.

Cost of goods sold is calculated by:

Opening Stock + Opening Purchases (for year or period) - Closing Stock (cost of goods unsold at the end of the same period).

This gives the cost of goods which were sold. Sales and cost of goods sold should relate to the same number of units.

- The profit and loss account shows items of income or expenditure which although earned or expended by the business are incidental to it and not part of the actual manufacturing, buying or selling of goods.

- In a complicated manufacturing industry and in service industries, different definitions of "goods", "net profit" and "cost of sales" may exist.

Capital and revenue expenditure

Only revenue expenditure (e.g. heating bills) is charged to the profit and loss account; capital expenditure (e.g. the purchase of a new plant) is not.

a) Revenue expenditure is expended on:

- acquiring assets for conversion into cash (resale goods)
- manufacturing, selling and distribution of goods and day-to-day administration of the business
- maintenance of fixed assets (e.g. repairs);

It is well to note that "cash" need not be paid or received to be accounted for. The amount of revenue expenditure charged against the profits for the year or period is the amount incurred whether cash has or has not been paid. This applies with sales as well. Even if cash for sales has not been received in the year or period under review, sales will be included in the trading account. This is the "accruals" concept.

b) Capital expenditure is expended on:

- start up of the business
- acquisition of fixed assets (not for resale)
- alterations or improvements of assets to improve their revenue earning capacity.

Capital expenditure is not charged to the profit and loss account as the benefits are spread over a considerable period of time.

Now attempt exercise 2.4.

Exercise 2.4 Trading and profit and loss account

Nigel Munyati and his friends opened a small scale horticultural "co-operative" in Concession, growing and retailing. The business started on 1 August 19X6.

The following is a summary of the transactions for the first year:

Capital introduced on 1 August 19X6	
- cash	20,00
- stocks	12,00
Cash paid to suppliers	28,00
Amounts owed to suppliers at 3 July 19X7	14,00
Received from customers in respect of sales	50,00
Amounts owed by customers at 31 July 19X7	10,00
Stock of goods at the end of the year	11,00
Rent	2,50
Rates	80
Water and light	50
Salesmen's salaries	4,00
Salesmen's commissions, not yet paid	60
Bank charges	12
Office wages	40
Telephone and postal charges	15
Advertising	1,00
Drawings during the year	4,00

You are required to prepare a trading and profit and loss account for the year ended 31 July 2001.

The balance sheet

Introduction: The balance sheet is a statement of the financial position of a business at a given date. It is, therefore, only a "snapshot" in time. When comparing business performance, therefore, a number of years and time periods may be more suitable. The balance sheet is the accounting equation but set out in a vertical form in order to be more readily, understood i.e. the accounting equation.

Assets - Liabilities = Capital + Profit - Drawings

expressed in the form of a balance sheet is as follows:-

	$
Assets	X
Less: liabilities	X
Net assets	X
Representing:	
Capital	X
Profit for the year	X
	X
Less: drawings	X
Proprietor's funds	X

This is a simplified form; in reality the assets and liabilities will be further sub-divided and analyzed to give more detailed information. Figure 2.4 shows a pro forma balance sheet.

Figure 2.4 Pro forma balance sheet

Balance sheet at 31 December 19X0

		C Cost	D Depreciation	Net value (C-D)
		$	$	$
A)	Fixed assets			
	Freehold factory	x	x	x
	Machinery	x	x	x
	Motor vehicles	x	x	x
		x	x	x
B)	Current assets			
	Stocks and work in progress		x	
	Debtors and prepayments		x	
	Cash at bank		x	
	Cash in hand		x	
			x	
C)	Current liabilities			
	Trade creditors	(x)		
	Accrued charges	(x)		
			(x)	
				x
D)	Net current assets			xx
E)	15% loan			(x)
				xxx
F)	Representing:			
	Capital at 1 January			x
	Profit for the year			x
				x
	Less: drawings			(x)
G)	Proprietor's fund			xxx

Explanations

As with trading and profit and loss accounts, the balance sheet has its own nomenclature. These are fixed accounts, current accounts, current liabilities and funds:

A) **Fixed assets**: assets acquired for use within the business with a view to earning profits, but not for resale. They are normally valued at cost less accumulated depreciation.

B) **Current assets**: assets acquired for conversion into cash in the ordinary course of business; they should not be valued at a figure greater than their net realisable value.

C) **Current liabilities**: amounts owed by the business, payable within one year.

D) **Net current assets**: funds of the business available for day-to-day transactions. This can also be called working capital.

E) **Loans**: funds provided for the business on a medium to long term basis by an individual or organisation other than the proprietor.

F) This total is the total of the business's net assets.

G) This total is the total of proprietor's funds, i.e. the extent of his investment in the business. Within these main headings the following items should be noted.

- **Fixed assets**

Depreciation is an amount charged in the accounts to write off the cost of an asset over its useful life.

- **Current assets**

Debtors are people who owe amounts to the business.

Prepayments are items paid before the balance sheet date but relating to a subsequent period.

- **Current liabilities**

Trade creditors are those suppliers to whom the business owes money.

Accrued charges are amounts owed by the business, but not yet paid, for other expenses at the date of the balance sheet.

Note:
Working capital. This is a term given to net current assets, or total current assets less total current liabilities, e.g.

	$
Current assets	7,600
Less current liabilities	1.800
Working capital	5,800

Working capital is important because it is the fund of ready resources that a business has in excess of the amount required to pay its current liabilities as they fall due. Working capital is important; lack of it leads to business failure.

Appendix i shows a sample balance sheet and a full set of accounts for The Nile Marketing Board of Zimbabwe.

Now attempt exercise 2.5.

Exercise 2.5 Balance sheet

Prepare a balance sheet for year ended 31 July 19X7 for *Nigel Munyati's* horticultural co-operative.

Capital introduced on 1 August 19X6	
- cash	20,00
- stocks	12,00
Cash paid to supplier	28,00
Amounts owed to suppliers at 31 July 19X7	14,00
Received from customers in respect of sales	50,00
Amounts owed by customers at 31 July 19X7	10,00
Stock of goods at the end of the year	11,00
Rent	2,50
Rates	80
Water and lights	50
Salesmen's salaries	4,00
Salesmen's commissions, not yet paid	60
Bank charges	12
Office wages	40
Telephone and postal charges	15
Advertising	1,00
Drawings during the year	4,00

Stocks and work-in-progress

Accounting for stocks: Almost every company carries stocks of some sort. In an agricultural business, these may be fertilisers, chemicals, produce, etc. Accounting for stocks presents a problem, because stocks in hand at the end of the financial year are regarded as current assets, whereas stocks used during the year form part of the company's costs. Hence, stocks (assets) appear in the balance sheet, and stocks (used) must be accounted for in the trading and profit and loss account.

Valuation of stocks: Valuing closing stocks has always been a problem and a source of disagreement. There are many methods of establishing the value of stocks. Three common alternatives are average cost, first in first out (Fifo) and last in first out (Lifo).

i) Average cost

Cost is calculated by taking the average price computed by dividing the total costs of production by the total number of units produced. This average price may be derived by means of a continuous update, a periodic calculation, or a moving period calculation. This method is often used to calculate the cost of low value items, e.g. in the manufacture of nails.

ii) First in first out (Fifo)

The calculation of the cost of stocks and work-in-progress is on the basis that the stocks in hand at the year end represent the latest purchases or production, as the items going into stock at the earliest date are assumed to leave first, e.g. a greengrocer will obviously wish to sell the oldest stocks first.

iii) Last in first out (Lifo)

The calculation of the cost of stocks and work-in-progress is on the basis that the stocks in hand represent the earliest purchases or production, as it is assumed that the latest stocks into store are the first to be taken out, e.g. a 'bin' system, where purchases are added to the top and sales will be removed from the top.

Consider the following example comparing the effect of valuing stock of 240 units:

FIFO trading account

			$	$
Sales (March)		$360 @ $3.00		1,080
Purchases	(01 February)	$200 @ $2.00		
	(10 February)	$200 @ $2.25		
	(15 February)	$200 @ $2.50	1,350	
Less:	Closing stock	(bought 15 Feb)		
	$200 @ $2.00	(bought 10 Feb)	590	
	$ 40 @ $2.25			760
				320

LIFO trading account

			$	$
Sales (March)		$360 @ $3.00		1,080
Purchases	(01 February)	$200 @ $2.00		
	(10 February)	$200 @ $2.25		
	(15 February)	$200 @ $2.50	1,350	
Less:	Closing stock	(bought 15 Feb)		
	$200 @ $2.00	(bought 10 Feb)	490	
	$ 40 @ $2.25			860
				220

Note: In both cases, there are 240 items in stock. Valuing stocks using the latest prices, the gross profit is $320, whereas using the earliest prices the figure is $220.

The lower of cost and net realizable value: The most fundamental accounting concept with regards to the valuation of stocks and work-in-progress is that they need to be stated at cost, or if lower, at net realisable value. Net realisable value is the amount at which it is expected that items of stock and work-in-progress could be sold after allowing for the costs of completion and disposal. If net realisable value is higher than cost, then cost is taken, as valuing stocks at a higher value would not be prudent, i.e. profit would have been taken into account before it is actually earned. It is important to check against the net realisable value to ensure that the current asset, stock, is not stated at a figure above that for which it could be realised at the balance sheet date.

Stock provision: If it is decided to reduce the value of certain items of stock from cost to net realisable value, e.g. obsolete, slow moving or unsaleable stocks, this is done by means of a provision.

Stock is reduced in value, and a charge is made against profits. The full amount is deducted from stock in the balance sheet, but only the decrease between the beginning and end of a period is shown in that period's trading and profit and loss account.

Now attempt exercise 2.6.

Exercise 2.6 Valuation of stocks

Kubi Dwili began business as a small scale peanut importer in July 19X6. Purchases of peanuts were made as follows:

		Price per ton	
		$	$
19X6	Tons		
01 July	60	20.00	1,200
15 August	40	24.00	960
30 September	45	26.00	1,170
12 October	30	35.00	1,050
29 November	25	38.00	950
11 December	30	50.00	1,500
	230		6,830

On 10 October, 100 tons of peanuts were sold and on 31 December 70 tons were sold. The total proceeds of the sale were $8,500.

You are required to calculate the value of closing stock and to prepare the trading account on the following bases:

a) first in first out
b) last in first out
c) average cost.

The interpretation of company accounts-ratio analysis

Why ratios: Ratios are the means of presenting information, in the form of a ratio or percentage, which enables a comparison to be made between one significant figure and another. Often the same ratios of like firms are used to compare the performance of one firm with another. A "one off" ratio is often useless - trends need to be established by company ratios over a number of years.

- The great volume of statistics made available in the annual accounts of companies must be simplified in some way. Present and potential investors can therefore quickly assess whether the company is a good investment or not.

- Financial ratio analysis is helpful in assessing an organisation's internal strengths and weaknesses. Potential suppliers will, for example, want to judge credit worthiness.

- Ratios by themselves provide no information; they simply indicate by exceptions where further study may improve company performance. Management can compare current performance with previous periods and competing companies.

Which areas are used for analysis?

Four key areas are generally used for analysis:

- profitability
- liquidity
- leverage (capital structure)
- activity or management effectiveness (efficiency).

a) Profitability

In most organisations profits are limited by the cost of production and by the marketability of the product. Therefore, "profit maximisation" entails the most efficient allocation of resources by management, and "profitability ratios" when compared to others in the industry will indicate how well management has performed this task.

Key questions to be identified in profitability analysis include:

- Does the company make a profit?
- Is the profit reasonable in relation to the capital employed in the business?
- Are the profits adequate to meet the returns required by the providers of capital, for the maintenance of the business and to provide for growth?
- How are sales and trading profit split among the major activities?
- To what extent are changes due to price change?
- To what extent does volume change?
- Does inter-company transfer pricing policy distort the analysis?
- Has the appropriate proportion of profit been taken in tax charged?
- What deferred taxation policy is being followed?
- Has the share of profit (or loss) attributable to minority interests in subsidiaries changed? If so, is it clear why?
- Are profits and losses on sales of fixed assets:
  - -treated as adjustments of depreciation charges?
  - -disclosed separately "above the line" in the profit and loss account?
  - -treated as "below the line" items in the profit and loss account?
  - -transferred directly to reserves?
- What has been included in Extraordinary Items?
- Should any of these items be regarded as part of the ordinary business of the company?
- Do any items tend to recur year after year?
- Is it clear which items have been transferred directly to reserves without going through the profit and loss account?
- Is such treatment appropriate in each case?

b) Liquidity

"Liquidity measures" are based on the notion that a business cannot operate if it is unable to pay its bills. A sufficient amount of cash and other short-term assets must be available when needed. On the other hand, because most short term assets do not produce any return, a strong liquidity position will be damaging to profits. Therefore, management must try to keep the firm's liquidity as low as possible whilst ensuring that short term obligations will be met. This means that industries with stable and predictable conditions will generally require smaller current ratios than will more volatile industries.

Key questions to be identified in liquidity analysis include:

- Has the business sufficient liquid resources to meet immediate demands from creditors?
- Has the business sufficient resources to meet the requirements of creditors due for payment in the next 12 months i.e. creditors payable within one year?
- Has the business sufficient resources to meet the demands of its fixed asset replacement programme and its commitments to providers of long-term capital falling due for repayment in say, the next five years?

c) **Leverage**

"Leverage ratios" show how a company's operations are financed. Too much equity in a firm often means the management is not taking advantage of the leverage available with long-term debt. On the other hand, outside financing will become more expensive as the debt-to-equity ratio increases. Thus, the leverage of an organisation has to be considered with respect both to its profitability and the volatility of the industry.

Key questions to be identified in leverage analysis include:

- What sort of capital has the company issued?
- Who owns the capital?
- What is the cost of capital in terms of interest or dividend?
- What proportions of the capital have a financed return (gearing or leverage)?
- Is the mix of capital optimum for the company?
- Is further capital available if required?
- Is total capital employed analysed among different classes of business?
- If so, can return on capital be calculated for each class?
- Has issued Ordinary share capital increased during the period?
- If so, why? e.g. Rights issue? Bonus (scrip) issue? Acquisition?
- Are "per share" figures calculated using appropriately weighted number of shares?
- Are prior years' figures comparable?
- What individual items have caused significant movements on Reserves?
- Do any of them really belong in the profit and loss account?
- Is any long term debt convertible into ordinary shares?
- On what terms?
- Calculate appropriate measures on "fully diluted
- basis
- Is any long term debt repayable within a short period?
- If so, should it be treated as a current liability?
- Are there significant borrowings in foreign currencies?
- Are they matched by foreign assets?
- How are exchange losses and gains thereon treated?
- Is there any preference capital?
- Is short term borrowing included in capital employed? Should it be?
- Is the treatment of pensions appropriate? Is information revealed?
- Would capitalising leases significantly affect long term debt and gearing ratios?

d) **Activity**

"Activity ratios" are used to measure the productivity and efficiency of a firm. When compared to the industry average, the fixed-asset turnover ratio, for example, will show

how well the company is using its productive capacity. Similarly, the inventory turnover ratio will indicate whether the company used too much inventory in generating sales and whether the company may be carrying obsolete inventory.

Key questions to be identified in activity analysis are:

- Does management control the costs of the business well?
- Which costs, if any, have changed significantly, thus reducing or improving apparent profitability?
- Does management control the investment in assets well?
- Are fixed assets sufficient for the current level of activity? Are they replaced on a regular basis and adequately maintained?
- Are the stock levels adequate for the level of activity, or excessive?
- Are debts collected promptly?
- Are creditors paid within a reasonable period of time?
- Are surplus cash resources invested to increase overall returns?
- How variable are the profits before interest and tax?
- How many times can the interest be paid from the available profit?
- How many times can the existing dividend be paid from the available profit?

e) Other

Other questions can be asked in interpreting final accounts. These may relate to long-term trends in the business or to fixed assets, e.g.

i) *Long-term trends in the business*

- Are profits increasing or decreasing?
- Is the size of the business growing faster or slower than inflation?
- How has past growth been financed?
- Are the levels of stocks, debtors and creditors consistent with the long-term growth of the business?
- Are dividends increasing?
- Have any radical changes occurred in the past, giving rise to major changes in the business?

ii) *Fixed assets*

- Where fixed assets are shown "at historical cost":
  - -How old are they? What is their estimated current value?
  - -How would revaluation affect the depreciation charge?
- Where fixed assets are shown "at valuation":
  - -When was the valuation made, and on what basis?
  - -How have values changed since that date?
  - -Might the assets be more valuable if used for other purposes?
- What method of depreciation is used for valuation?
- What asset lives are used? Are different lives used for Current Cost Accounting?
- Has adequate provision been made for technological obsolescence?
- Are any assets leased? What is their value?
- How much are the annual rentals? How long is the commitment?
- Is goodwill:
  - -Shown as an asset?
  - -Written off against reserves?
  - -Being amortized by charges against profit?

- How does the book value of goodwill compare with the estimated surplus of the current value of fixed assets over their net book value?
- Has the status of any investments changed during the period? Subsidiaries? Associated companies? Trade investments? Non-consolidated subsidiaries?
- Are investments in associated companies shown by the "cost" method or by the "equity" method?
- What is the difference between cost and market value of quoted investments? Is market value used if it is lower than cost?
- Are there any long-term debtors? How have they been treated in the balance sheet?

Methods used to evaluate organizational performance

To evaluate the performance of a company with respect to these ratios, three methods are used, namely industry comparisons, time series analysis and absolute standards.

a) **Industry comparisons**

Data are used, such as that provided by commercial firms like Dun and Bradstreet and Profit Impact of Marketing Strategies (PIMS), are used for comparing the company with others of about the same size, that serve the same market and have similar products. The danger is that when industry averages include companies with different products or markets, averages can be misleading.

b) **Time series analysis**

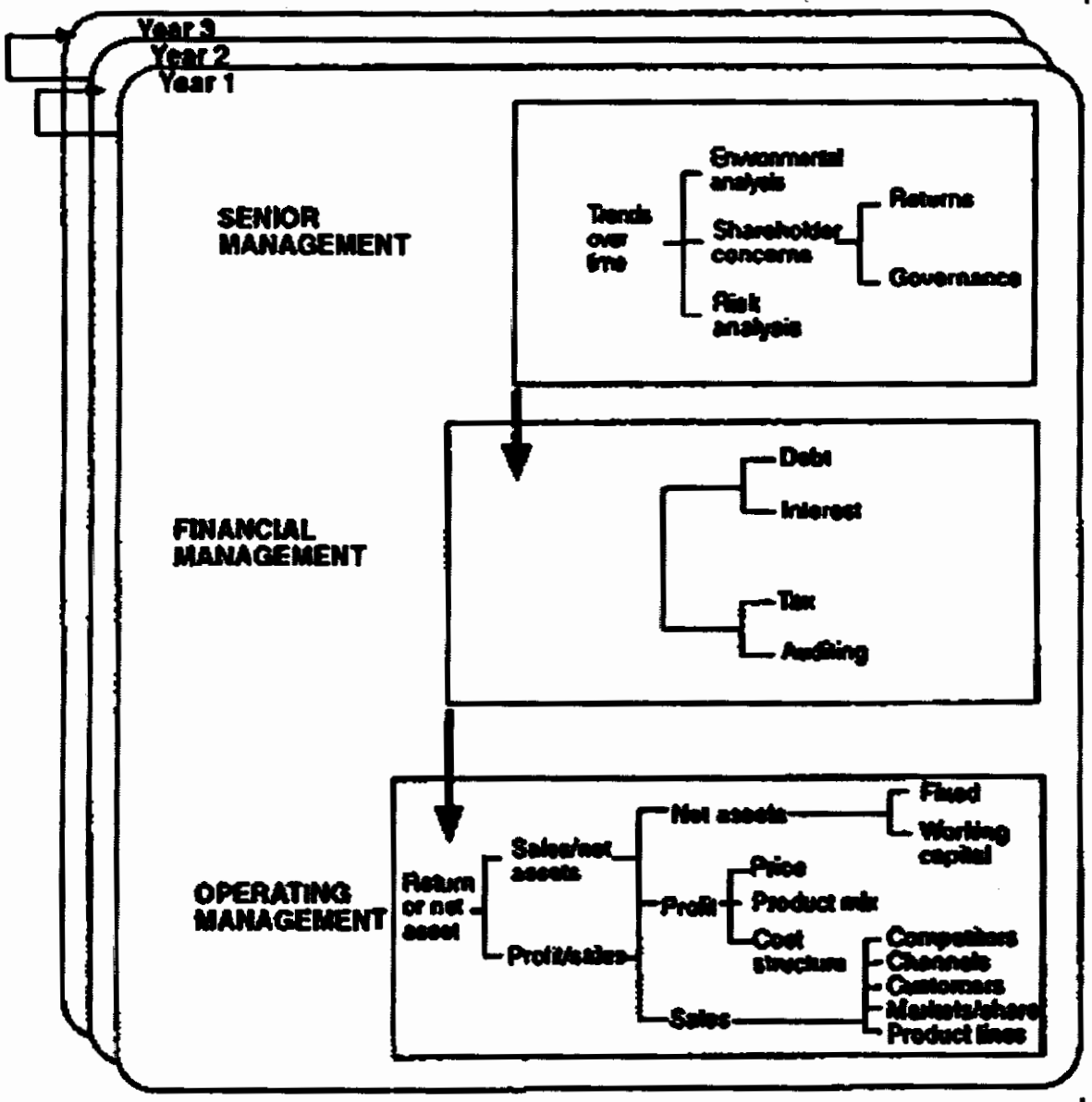
Ratios for several periods are used to determine whether significant changes have occurred. These time series can also be used to project the future financial performance of the company.

c) **Absolute standards**

Most organizations have some minimum requirements for corporate performance regulations of the particular industry, e.g. the long-term debt-to-equity ratio should not exceed one. A thorough financial analysis usually is a condition of these three approaches.

Figure 2.5 shows an example of how a time series analysis can be used to back financial and business objectives.

Figure 2.5 Framework for linking financial business objectives



The main types of ratio

1) Profitability

a) Gross profit margin or profit margin on sales:

$$\frac{Sales - Cost\ of\ goods\ sold}{Sales} \quad \text{or} \quad \frac{Pre-tax\ profit + Interest}{Sales}$$

b) Net profit margin:

$$\frac{Profit\ after\ tax}{Sales}$$

c) Return on assets:

$$\frac{\text{Pre-tax} + \text{Interest (long term)}}{\text{Issued capital} + \text{Reserves} + \text{Debt capital (long term) i.e. assets}}$$

d) Return on equity

$$\frac{\text{Profit after tax}}{\text{Total equity}}$$

Note that:

$$\frac{SALES}{NAV} X \frac{PROFIT + INTEREST}{SALES} = \frac{PROFIT + INTEREST}{NAV}$$

NAV = Net asset value i.e. Net asset turnover X profit margin = return on assets

2) Liquidity

a) Current ratio

$$\frac{\text{Current assets}}{\text{Current liabilities}}$$

b) Quick (liquidity or acid test ratio):

$$\frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

c) Defensive interval ratio:

$$\frac{\text{Liquid assets}}{\text{Daily operating expenses}}$$

d) Inventory to net working capital:

$$\frac{\text{Inventory}}{\text{Current assets} - \text{Current liabilities}}$$

3(i) Leverage (coverage ratios or gearing) - debt cover

a) Conventional leverage:

$$\frac{\text{Debentures and loans}}{\text{Total shareholders funds (net worth)}}$$

b) Murphy Prussman Gearing:

$$\frac{\text{Debenture} + \text{Loans} + \text{Bank overdrafts}}{\text{Total long term financing} + \text{Bank overdraft}}$$

c) U.S. measure of leverage:

$$\frac{\text{Debenture} + \text{Loans} + \text{Bank overdrafts}}{\text{Total assets}}$$

(ii) Leverage - interest cover

d) Interest coverage:

$$\frac{\text{Net profit before interest and tax}}{\text{Interest}}$$

e) Cumulative interest coverage:

$$\frac{\text{Net profit before interest and tax}}{\text{Cumulative interest}}$$

4) Activity (efficiency ratios)

a) Debtors turnover:

$$\frac{\text{Closing debtors}}{\text{Sales}}$$

b) Creditors turnover:

$$\frac{\text{Closing debtors}}{\text{Purchases}} \times 365$$

c) Inventory turnover:

$$\frac{\text{Cost of goods sold}}{0.5\ (\text{Opening and closing stock})}$$

d) Wages turnover:

$$\frac{\text{Sales}}{\text{Wages}}$$

e) Net asset turnover:

$$\frac{\text{Sales}}{\text{Net asset value}}$$

f) Profits per employee:

$$\frac{\text{Pre-tax profits}}{\text{Number of employees}}$$

Other useful ratios

1) Stock market ratios

a) Earnings per share:

$$\frac{\text{Profit after tax}}{\text{Number of ordinary shares in issue}}$$

b) Price earnings ratio:

$$\frac{\text{Market price per share}}{\text{Earnings per share}}$$

c) Dividend yield (net):

$$\frac{\text{Dividend per share (net)}}{\text{Market price per share}}$$

d) Dividend cover:

$$\frac{\text{Earnings per share}}{\text{Dividend per share}}$$

Financial measures of business unit performance

If an organization is made up of multiple divisions or Strategic Business Units (SBU's), then the following measures can be computed, provided that balance sheet and income statement data are available at the divisional or SBU level. These analyses enable corporate management to assess the performance of divisions, SBU's and/or their management.

a) Return on sales (ROS)

ROS is computed by dividing net income (NI), or profit (P) before or after interest and taxes, by total revenue:

$$\text{ROS} = \frac{\text{Net Income (or Profit) \$}}{\text{Sales \$}} \times 100$$

Some argue that interest expenses and tax should not be considered as they are outside the SBU manager's control. However, interest may be added to show managers that invested funds are not a free resource. This, however, understates the true cost of capital employed, because the interest is a charge for only the debt portion of capital.

b) Return on investment (ROI), return on net assets (RONA) and return on equity (ROE)

$$\text{ROI} = \frac{\textit{Net Income (or Profit)\$}}{\textit{Total assets\$}} \times 100$$

$$\text{RONA} = \frac{\textit{Net Income (or Profit)\$}}{\textit{Net assets \$}} \times 100$$

Note: NET ASSETS = TOTAL ASSETS- TOTAL LIABILITIES

$$\text{RONA} = \frac{\textit{NI (or P)\$}}{\textit{Owner's equity}} \times 100$$

$$= \frac{\textit{NI (or P)\$}}{\textit{(Total assets - All liabilities)}} \times 100$$

Note: Owner's equity = total assets - total liabilities

In using any of these measures to assess an SBU manager's ability to use assets efficiently, account should be taken of whether cash is centrally controlled or headquarters determines both credit and payment policies. If the latter, then cash receivables or payables or both should be omitted from the investment base.

c) Cash flow (CF)

Cash flow is not the same as net income (NI) or profit (P). It differs in two ways:

i) Cash flow includes depreciation, as this is a bookkeeping transaction, and tax, because tax is a cash cost. Thus,

CF = NI (or P) after tax and depreciation

ii) Cash flow is affected by balance sheet changes, e.g. increase in accounts receivable or additions to fixed assets (FA), e.g. plant and equipment and changes in working capital (WC).

CF = Net Income (or Profit) after tax *plus* Depreciation *minus* changes in FA and *minus* changes in WC

Note: If no tax is paid or if tax is deferred, use Net Income (or Profit) before tax.

The changes in (Δ) are calculated by the company's balance sheet entries for two consecutive periods.

Working Capital =

Δ Cash *plus or minus*
Δ Stock *plus or minus*

Δ Accounts receivable *plus or minus*
Δ Accounts payable (and other short-term liabilities)

Example:

Balance sheet

	2001	2002
	$(000's)	$(000's)
Profit	400	380
Plus		
Depreciation	120	125
Cash flow from operations	520	505
Less		
Increase in Working capital	(380)	(420)
Increase in Fixed Assets	(90)	(105)
Net cash generated or (Used)	50	(20)

d) Sustainable growth rate (SGR)

This is a measure of the ability of the business to grow within the constraints of its current financial policies. What is required is a balance sheet for the SBU which includes a justified assignment of the proportion of the total corporate short-run liabilities and long-run debt.

Once accomplished, the maximum sustainable growth rate (a measure of the ability of the business to fund the new assets needed to support increased sales) is estimated by:

$$\mathbf{SGR} = \frac{p[(1-d)(1+L)]}{t - p[(1-d)(1+L)]}$$

where:

p = profit margin after taxes
d = dividend payout ratio (for a business unit this is computed from the corporate overhead charge plus any dividend paid to corporate?)
L = debt to equity ratio
t = ratio of assets (physical plant and equipment plus working capital) to sales.

The growth rate is expressed in nominal terms. Real SGR is reduced by 2.2% for every 5% of inflation for two reasons:

i) Depreciation charges based on historical costs overstate taxable income because they fail to fully recover the economic value of depreciating assets.
ii) Working capital increase solely due to inflation requires financing.

If the actual growth rate exceeds SGR, then the organisation can consider a number of strategic actions which affect the "productivity" side of the quest for increased profits ("productivity" as opposed to "volume" strategies to increase profits). These are:

i) reduce investment intensity (cut stocks and/or receivables)
ii) reduce dividends
iii) obtain injections of "equity" from the corporate body
iv) increase debt.

Now attempt exercise 2.7.

Exercise 2.7 Ratio analysis

Nigel Munyati's horticultural business continued to flourish. Six years later his condensed financial accounts for the last three years are summarised below (N.B. he introduced fresh capital into the business):

Profit and Loss account for the year to 31 March	1999		2000		2001	
			$(000's)			
Sales (all on credit)		415		645		885
Less: Cost of goods sold:						
Opening stock	35		40		65	
Purchases	340		565		805	
	375		605		870	
Less; Closing stock	40	335	65	540	115	755
Gross profit		80		105		130
Less: Expenses	40		50		60	
Loan interest	-	40	-	50	10	70
Net Profit		40		55		60

Balance Sheet as at 31 March	1999		2000		2001	
			($ 000's)			
Fixed assets		89		93		101
Current assets						
Stocks	40		65		115	
Trade debtors	52		108		250	
Cash at Bank	12	104	6	179	-	365
		193		272		466
Financed by:						
Capital		100		120		146
Add. Net profit for the year	40		55		60	
Less: Drawings	24	16	35	20	38	22
(all on 31 March)		116		140		168
Loan		-		-		110
Current liabilities						
Creditors	77		132		178	
Bank overdraft	-	77	-	132	10	188
		174		272		466

Compute the following ratios for 1999, 2000 and 2001.

a) gross profit on sales
b) gross profit on cost of goods sold
c) stock turnover
d) return on capital employed
e) current ratio
f) liquidity (or quick) ratio
g) debtor collection period

h) working capital
i) ratio of current assets to total assets
j) ratio of cash to current liabilities

Comment briefly on the results of the business over the last three years.

Key terms

Activity

ratio
Average cost
Balance sheet
Capital expenditure
Cost of goods sold
Credit balances
Current liabilities
Debit balances
Direct and indirect costs
Dual effect
First-In-first-out
Fixed and current assets
Gross margin
Gross sales
Last-in-first-out
Leverage
Liquidity ratios
ess

Loans
Manufacturing account
Net profit
Net sales
Net sales and net purchases
Opening and closing stock
Overheads
Profit
Profitability ratios
Profit and loss account
Ratio analysis
Revenue expenditure
Trading account
The accounting equation
Working capital
Work-in-progr

Chapter 3 - Cash flow accounting

Chapter objectives

This chapter is intended to provide an explanation of:

- The aim, use and construction of cash flow statements
- The meaning and calculation of the source and application of funds statement and their importance to business
- A discussion on credit and types of loans available to businesses
- An explanation of the cost of funds and capital
- The importance and calculation of ownership costs, including depreciation, interest, repair, taxes and insurance.

It can be argued that 'profit' does not always give a useful or meaningful picture of a company's operations. Readers of a company's financial statements might even be misled by a reported profit figure.

Shareholders might believe that if a company makes a profit after tax of say $100,000, then this is the amount which it could afford to pay as a dividend. Unless the company has sufficient cash available to stay in business and also to pay a dividend, the shareholders' expectations would be wrong. Survival of a business depends not only on profits but perhaps more on its ability to pay its debts when they fall due. Such payments might include 'profit and loss' items such as material purchases, wages, interest and taxation etc, but also capital payments for new fixed assets and the repayment of loan capital when this falls due (e.g. on the redemption of debentures).

Structure of the chapter

"Cash flow" is one of the most vital elements in the survival of a business. It can be positive, or negative, which is obviously a most undesirable situation. The chapter develops the concept of cash flow and then shows how the funds can be used in the business. Funds are not only generated internally; they may be externally generated, and so the chapter finishes with a discussion of externally generated funds.

Aim of a cash flow statement

The aim of a cash flow statement should be to assist users:

- to assess the company's ability to generate positive cash flows in the future
- to assess its ability to meet its obligations to service loans, pay dividends etc
- to assess the reasons for differences between reported and related cash flows
- to assess the effect on its finances of major transactions in the year.

The statement therefore shows changes in cash and cash equivalents rather than working capital.

Indirect method cash flow statement

Figure 3.1 shows a pro forma cash flow statement.

Figure 3.1 Pro forma cash flow statement

Cash Flow Statement For The Year Ended 31 December 2001		
	$	$
Net cash inflow from operating activities	X	
Returns on investments and servicing of finance		
Interest received	X	
Interest paid	(X)	
Dividends paid	(X)	
Net cash inflow/ (outflow) from returns on investments and servicing of finance		X
Taxation		
Corporation tax paid	(X)	
Tax paid		(X)
Investing activities		
Payments to acquire intangible fixed assets	(X)	
Payments to acquire tangible fixed assets	(X)	
Receipts from sales of tangible fixed assets	X	
Net cash inflow/ (outflow) from investing activities	X or	(X)
Net cash inflow before financing		X
Financing		
Issue of ordinary capital	X	
Repurchase of debenture loan	(X)	
Expenses paid in connection with share issues	(X)	
Net cash inflow/ (outflow) from financing	X or	(X)
Increase/ (Decrease) in cash and cash equivalents		X

NOTES ON THE CASH FLOW STATEMENT

1. *Reconciliation of operating profit to net cash inflow from operating activities*

		$
Operating profit		X
Depreciation charges		X
Loss on sale of tangible fixed assets		X
Increase/(decrease) in stocks	(X)	
Increase/(decrease) in debtors	(X)	
Increase/(decrease) in creditors		X
Net cash inflow from operating activities		X

2. *Analysis of changes in cash and cash equivalents during the year*

Balance at 1 January 2001	X
Net cash inflow	X
Balance at 31 December 2001	X

3. *Analysis of the balances of cash and cash equivalents as shown in the balance sheet*

	19X4	19X3	Change in year
	$	$	$
Cash at bank and in hand	X	X	(X)
Short term investments	X	X	X
Bank overdrafts	(X)	(X)	(X)
	X	X	X

4. *Analysis of changes in finance during the year*

	Share capital	Debenture loan
	$	$
Balance at 1 January 2001	X	X
Cash inflow/(outflow) from financing	X	(X)
Profit on repurchase of debenture loan for less than its book value	-	(X)
Balance at 31 December 2001	X	X

Note: Any transactions which do not result in a cash flow should not be reported in the statement. Movements within cash or cash equivalents should not be reported.

Explanations

It is often difficult to conceptualise just what is "cash" and what are "cash equivalents". Cash need not be physical money; it can take other forms:

a) Cash in hand and deposits repayable on demand with any bank or financial institution.

b) Cash equivalents: Short term, highly liquid investments that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value.

c) Operating activities: Principal revenue-producing activities of the company and other activities that are not investing or financing activities. The reconciliation between the operating profit reported in the profit and loss account and the net cash flow from operating activities must show the movements in stocks, debtors and creditors related to operating activities.

d) Returns on investments and servicing of finance. Cash inflows from these sources includes:

i) interest received, also any related tax recovered, and
ii) dividends received.

Cash outflows from these sources includes:

i) interest paid
ii) dividends paid
iii) interest element of finance lease payments.

e) Taxation: These cash flows will be those to and from the tax authorities in relation to the company's revenue and capital profits, i.e. corporation tax.

f) Investing activities: the acquisition and disposal of long term assets and other investments not included in cash equivalents.

Cash receipts include:

i) receipts from sales or disposals of fixed assets (or current asset investments)
ii) receipts from sales of investments in subsidiary undertakings net of any cash or cash equivalents transferred as part of the sale
iii) receipts from sales of investments in other entities
iv) receipts from repayment or sales of loans made to other entities.

Cash payments include;

i) payments to acquire fixed assets
ii) payments to acquire investments in subsidiary net of balances of cash and cash equivalents acquired
iii) payments to acquire investments in other entities
iv) loans made and payments to acquire debt of other entities.

g) Financing: activities that result in changes in the size and composition of the equity capital and borrowings of the enterprise.

Financing cash inflows include:

i) receipts from issuing shares or other equity instruments
ii) receipts from issuing debentures, loans, notes and bonds and so on.

Financing cash outflows include:

i) repayments of amounts borrowed
ii) the capital element of finance lease rental payments
iii) payments to re-acquire or redeem the entity's shares.

Now attempt exercise 3.1.

Exercise 3.1 Cash flow statement

Set out below are the accounts for *TPK Pvt Ltd* as at 31 December 2000 and 2001.

PROFIT AND LOSS ACCOUNTS FOR THE YEARS TO 31 DECEMBER	2000	2001
	Z$'000	Z$'000
Operating profit	9,400	20,640
Interest paid	-	(280)
Interest received	100	40
Profit before taxation	9,500	20,400
Taxation	(3,200)	(5,200)
Profit after taxation	6,300	15,200
Dividends		
Preference (paid)	(100)	(100)
Ordinary: interim (paid)	1,000)	(2,000)
final (proposed)	(3,000)	(6,000)
Retained profit for the year	2,200	7,100
BALANCE SHEETS AS AT 31 DECEMBER		
Fixed Assets		
Plant, machinery and equipment at cost	17,600	23,900
Less: accumulated depreciation	9,500	10,750
	8,100	13,150
Current Assets		
Stocks	5,000	15,000
Trade debtors	8,600	26,700
Prepayments	300	400
Cash at bank and in hand	600	-
	14,500	42,100
Current liabilities		
Bank overdraft	-	16,200
Trade creditors	6,000	10,000
Accruals	800	1,000
Taxation	3,200	5,200
Dividends	3,200	6,000
	3,000	38,400
	9,600	16,850
Share capital		
Ordinary shares of $1 each	5,000	5,000
10% preference shares of $1 each	1,000	1,000
Profit and loss account	3,000	10,100
	9,000	16,100
Loans		
15% debenture stock	600	750
	9,600	16,850

Prepare a cash flow statement for the year to 31 December 2001.

Statements of source and application of funds

Although cash flow statements have now superseded statements of source and application of funds, funds flow statements may not disappear entirely. Some

businesses or industries will continue to find fund flow statements useful and informative. For this reason, it is necessary to examine funds flow statements.

Funds statement on a cash basis

Funds statements on a cash basis can be prepared by classifying and/or consolidating:

a) net balance sheet changes that occur between two points in time into changes that increase cash and changes that decrease cash

b) from the Income statement and the surplus (profit and loss) statement, the factors that increase cash and the factors that decrease cash and

c) this information in a sources and uses of funds statement form.

Step (a) involves comparing two relevant Balance sheets side by side and then computing the changes in the various accounts.

Sources of funds that increase cash

Sources of funds which increase cash are as follows:

- a net decrease in any asset other than cash or fixed assets
- a gross decrease in fixed assets
- a net increase in any liability
- proceeds from the sale of preferred or common stock
- funds provided by operations (which usually are not expressed directly in the income statement).

To determine funds provided by operations, we have to add back depreciation to net income after taxes. In other words, suppose we have:

Net income after taxes of a company, being	= $750,000
and depreciation (non-cash expense), being	= $100,500
	850,500

Then, the funds provided by operations of such a company will be obtained by adding the values of the two above items, i.e. $850,500. Thus, the net income of a company usually understates the value of funds provided by operations by the value of the depreciation - in this case by $100,500.

But then, depreciation is not a source of funds, since funds are generated only from operations. Thus, if a company sustains an operating loss before depreciation, funds are not provided regardless of the magnitude of the depreciation charges.

Application of funds of a company usually include:

- a *net increase* in any asset other than cash or fixed assets
- a *gross increase* in fixed assets
- a *net decrease* in any liability

- a retirement or purchase of stock and
- the payment of cash dividends.

To avoid double counting, we usually compute gross changes in fixed assets by adding depreciation for the period to net fixed assets at the ending financial statement date and subtract from the resulting amount the net fixed assets at the beginning financial statement date. The residual represents the gross change in fixed assets for the period. If the residual is positive, it represents a use of funds; if it is negative, it represents a source of funds.

Once all sources and applications of funds are computed, they may be arranged in statement form so that we can analyse them better.

Now attempt exercises 3.2 and 3.3

Exercise 3.2 Source and application of funds I

Given below are some different sources and applications of funds finance items purposely scattered for an Agribusiness Company K for the year ended 31 December 19X8.

1) Identify them as sources and applications of funds, and arrange them in a proper manner with the Sources of funds on the left and the Applications on the right of a tabulated statement for the said period.

2) Comment briefly on some of the uses of the tabulated statement.

	$
Increase in cash position =	12,000
Decrease in debtors =	8,000
Increase in long term debt =	2,500
Increase in stocks =	26,500
Increase in tax prepayments =	2,000
Net profit =	35,000
Increase in other accruals =	3,000
Additions to fixed assets =	4,500
Cash dividends =	15,000
Increase in bank loans =	20,000
Increase in prepaid expenses =	2,500
Increase in investments =	9,000
Increase in creditors =	5,000
Decrease in accrued taxes =	8,000
Depreciation =	6,000

Note: The above figures are based on the balance sheet and income statement of Company K, which are not shown in this exercise.

Exercise 3.3 Sources and applications of funds II

Using the data and information in the annual reports (especially the balance sheet and income statements) of Cerial Marketing Board provided for 1993 and 1992:

a) compute and identify the sources and applications of funds of the parastatal for the years 1992 and 1993 and

b) arrange them into a sources and applications of funds statement for 1993.

Funds use and credit planning

Funds (or capital) is a collective term applied to the assortment of productive inputs that have been produced. Funds may be broadly categorised into operating (or working) capital (difference between current assets and current liabilities), and ownership (or investment) capital.

Operating capital in a company or firm usually refers to production inputs that are normally used up within a production year. On the other hand, investment capital (or funds) refers to durable resources like machines and buildings in which money invested is tied up for several years. Funds are generally quantified in monetary value terms.

Funds use, especially borrowed capital, is usually influenced by many factors, namely: the alternative demands for it; the availability of credit as and when needed; the time and interest rate payable on it; the types of loans that might be needed to generate it; and the cost of funds and business ownership cost. Thus, careful credit planning is essential in the successful operations of any company.

In general, this requires the application of what, in strategic company management, has come to be known as the strategic four-factor model called "SORS". The letters that make up SORS stand for:-

- Strategic planning (S)
- Organisational planning (O)
- Resource requirements (R)
- Strategic control (S).

Figure 3.2 summarises the simplified matrix of interacting factors and component parts that make up 'SORS'. In general terms, SORS is influenced or determined by four major factors: the external environment, the internal environment, organisational culture and resource (especially funds) availability. These four factors interact to create four inter-related components which normally determine the success or failure of any given company. These are:

a) competitive environment
b) strategic thrust
c) product/market dynamics
d) competitive cost position and restructuring.

A proper and pragmatic manipulation of these four component parts requires:

- assessing the external environment
- understanding the internal environment
- adopting a leadership strategy
- strategically planning the finances of the company.

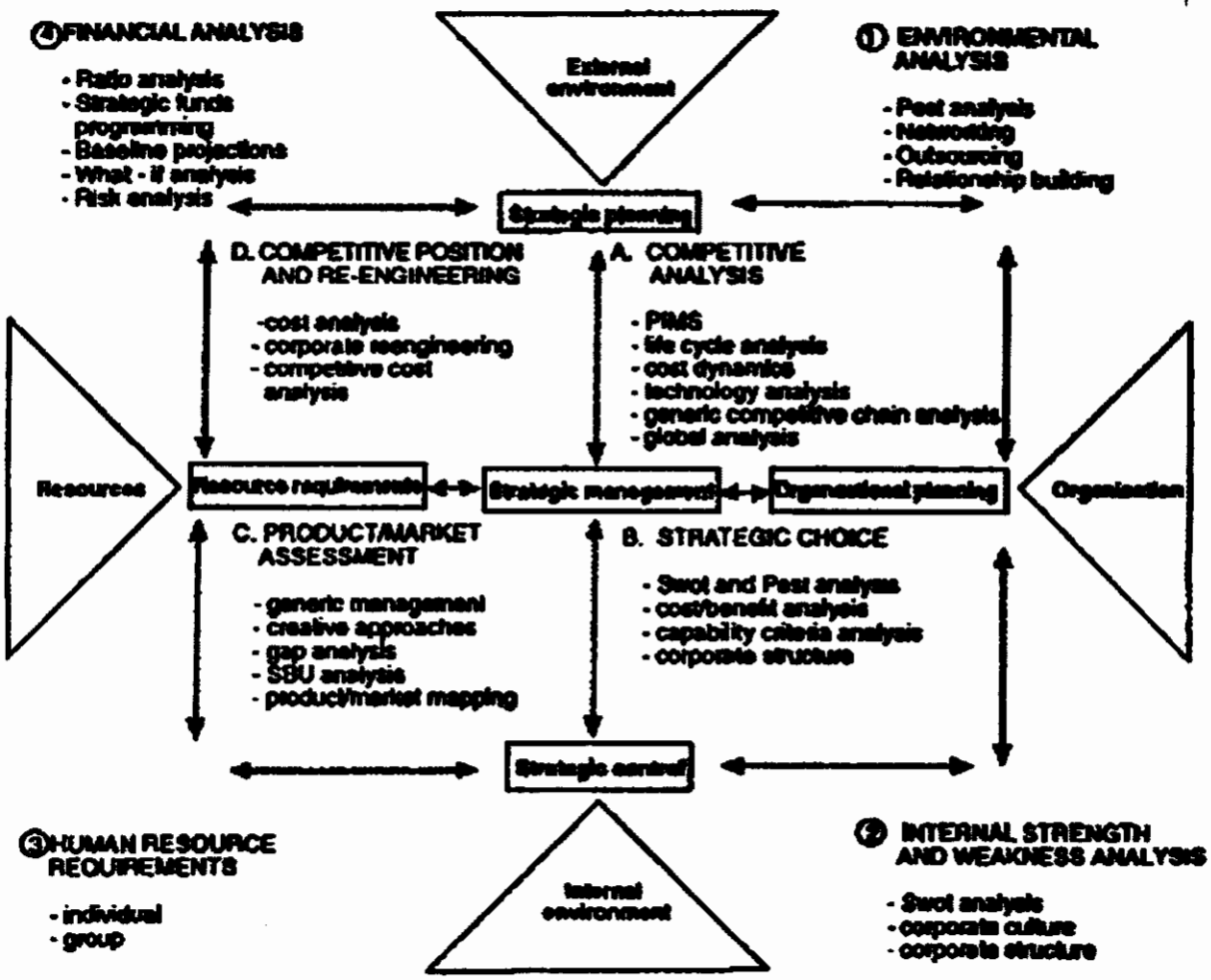
The purpose of this text is not to cover all the components summarised in figure 3.1. Instead, the major concern is to have a proper understanding of financial analysis for strategic planning. This, in strategic management, requires a sound financial analysis backed by strategic funds programming, baseline projections (or budgeting), what-if (decision tree) analysis, and risk analysis. This book attempts to cover all these areas.

Alternative uses of funds

Dealing with alternatives is what management is all about. Some of the tools for evaluating alternatives (e.g. partial budgets, cash flow budgets and financial statements), are covered in this text.

It is assumed that most people are already familiar with the analysis that usually leads to major capital use decisions in various companies. However, highlighted are some of these points throughout the book, since company backgrounds differ and what is considered "major capital use decisions" varies with the size of businesses. For instance, a $50,000 expenditure may be major to one company and of little significance to another.

Figure 3.2 The strategic four-factor model



Almost everyone is familiar with the substantial capital or funds demand in all forms of business. Obviously, this does not all have to be owned capital. Evaluation of

successful businesses has found that many of them operate with 50 percent or more rented or borrowed capital. The pressure on businesses to grow is likely to continue, and these businesses are likely to grow faster than will be permitted by each reinvesting its own annual savings from net income alone. Thus, because demand for credit will continue to expand, careful credit planning and credit use decisions are of paramount importance to marketing companies in any country.

Credit and types of loans

Credit is the capacity to borrow. It is the right to incur debt for goods and/or services and repay the debt over some specified future time period. Credit provision to a company means that the business is allowed the use of a productive good while it is being paid for.

Other than the fact that funds generated within a business are usually inadequate to meet expanding production and other activities, credit is often used in order to:

- increase the returns on equity capital
- allow more efficient labor utilization
- increase income.

The process of using borrowed, leased or "joint venture" resources from someone else is called leverage. Using the leverage provided by someone else's capital helps the user business go farther than it otherwise would. For instance, a company that puts up $1,000 and borrows an additional $4,000 is using 80% leverage. The objective is to increase total net income and the return on a company's own equity capital.

Borrowed funds are generally referred to as loans. There are various ways of classifying loans, namely:

- *in payment terms,* e.g. instalment versus single payment
- *in period-of-payment terms,* e.g. short-term versus intermediate-term or long-term
- *in the manner of its security terms,* e.g. secured versus unsecured
- *in interest payment terms,* e.g. simple interest versus add-on, versus discount, versus balloon.

On the basis of the above classification, there are twelve common types of loans, namely: short-term loans, intermediate-term loans, long-term loans, unsecured loans, secured loans, instalment loans, single payment loans, simple-interest loans, add-on interest loans, discount or front-end loans, balloon loans and amortised loans.

Short-term loans are credit that is usually paid back in one year or less. Short term loans are usually used in financing the purchase of operating inputs, wages for hired labour, machinery and equipment, and/or family living expenses. Usually lenders expect short-term loans to be repaid after their purposes have been served, e.g. after the expected production output has been sold.

Loans for operating production inputs e.g. cotton for the Cotton Company of Zimbabwe (COTCO) and beef for the Cold Storage Company of Zimbabwe (CSC), are assumed to be self-liquidating. In other words, although the inputs are used up in the production, the added returns from their use will repay the money borrowed to

purchase the inputs, plus interest. Astute managers are also expected to have figured in a risk premium and a return to labour management. On the other hand, loans for investment capital items like machinery are not likely to be self-liquidating in the short term. Loans for family living expenses are not at all self-liquidating and must come out of net cash income after all cash obligations are paid.

Intermediate-term (IT) loans are credit extended for several years, usually one to five years. This type of credit is normally used for purchases of buildings, equipment and other production inputs that require longer than one year to generate sufficient returns to repay the loan.

Long-term loans are those loans for which repayment exceeds five to seven years and may extend to 40 years. This type of credit is usually extended on assets (such as land) which have a long productive life in the business. Some land improvement programmes like land levelling, reforestation, land clearing and drainage-way construction are usually financed with long-term credit.

Unsecured loans are credit given out by lenders on no other basis than a promise by the borrower to repay. The borrower does not have to put up collateral and the lender relies on credit reputation. Unsecured loans usually carry a higher interest rate than secured loans and may be difficult or impossible to arrange for businesses with a poor credit record.

Secured loans are those loans that involve a pledge of some or all of a business's assets. The lender requires security as protection for its depositors against the risks involved in the use planned for the borrowed funds. The borrower may be able to bargain for better terms by putting up collateral, which is a way of backing one's promise to repay.

Instalment loans are those loans in which the borrower or credit customer repays a set amount each period (week, month, year) until the borrowed amount is cleared. Instalment credit is similar to charge account credit, but usually involves a formal legal contract for a predetermined period with specific payments. With this plan, the borrower usually knows precisely how much will be paid and when.

Single payment loans are those loans in which the borrower pays no principal until the amount is due. Because the company must eventually pay the debt in full, it is important to have the self-discipline and professional integrity to set aside money to be able to do so. This type of loan is sometimes called the "lump sum" loan, and is generally repaid in less than a year.

Simple interest loans are those loans in which interest is paid on the unpaid loan balance. Thus, the borrower is required to pay interest only on the actual amount of money outstanding and only for the actual time the money is used (e.g. 30 days, 90 days, 4 months and 2 days, 12 years and one month).

Add-on interest loans are credit in which the borrower pays interest on the full amount of the loan for the entire loan period. Interest is charged on the face amount of the loan at the time it is made and then "added on". The resulting sum of the principal and interest is then divided equally by the number of payments to be made. The company is thus paying interest on the face value of the note although it has use of only a part of the initial balance once principal payments begin. This type of loan is sometimes called the "flat rate" loan and usually results in an interest rate higher than the one specified.

Discount or front-end loans are loans in which the interest is calculated and then subtracted from the principal first. For example, a $5,000 discount loan at 10% for one year would result in the borrower only receiving $4,500 to start with, and the $5,000 debt would be paid back, as specified, by the end of a year.

On a discount loan, the lender discounts or deducts the interest in advance. Thus, the effective interest rates on discount loans are usually much higher than (in fact, more than double) the specified interest rates.

Balloon loans are loans that normally require only interest payments each period, until the final payment, when all principal is due at once. They are sometimes referred to as the "last payment due", and have a concept that is the same as the single payment loan, but the due date for repaying principal may be five years or more in the future rather than the customary 90 days or 6 months for the single payment loan.

In some cases a principal payment is made each time interest is paid, but because the principal payments do not amortise (pay off) the loan, a large sum is due at the loan maturity date.

Amortised loans are a partial payment plan where part of the loan principal and interest on the unpaid principal are repaid each year. The standard plan of amortisation, used in many intermediate and long-term loans, calls for equal payments each period, with a larger proportion of each succeeding payment representing principal and a small amount representing interest.

The repayment schedule for a 10 year standard amortised loan of $10,000 at 7% is presented in table 3.1.

The constant annual payment feature of the amortised loan is similar to the "add on" loan described above, but involves less interest because it is paid only on the outstanding loan balance, as with simple interest. Amortisation tables are used to determine the regular payment for an amortised loan. The $1,424.00 annual payment for the 10 year loan was determined by using the amortisation factor (AF) of 0.1424 and multiplying that by $10,000, the face value of the loan. The proper procedure for deriving a schedule as in table 3.1 is to:

a) first read off the amortisation factor from an amortisation table for a given interest rate against the given year the loan is expected to last
b) calculate the total payment at the end of each year
c) then, on a year-by-year basis, calculate the annual interest payable on the balance of the principal
d) obtain the annual principal payment by subtracting the calculated annual interest from the total end-of-year payment.

Repeat the procedure for each of the years involved. Now attempt exercise 3.4.

Table 3.2 Amortization of a $10,000 loan in 10 years by equal annual installments @ 7% interest

Year	Unpaid principal at beginning of year ($)	Payment at the end of the year		
		Interest ($)	Principal ($)	Total ($)
1	10,000.00	700.00	724.00	1,424.00
2	9,276.00	649.30	774.70	1,424.00
3	8,501.30	595.10	828.90	1,424.00
4	7,672.40	537.10	886.90	1,424.00
5	6,785.50	475.00	949.00	1,424.00
6	5,836.50	408.60	1,015.40	1,424.00
7	4,821.10	337.50	1,086.50	1,424.00
8	3,734.60	261.40	1,162.60	1,424.00
9	2,572.00	180.00	1,244.00	1,424.00
10	1,328.00	93.00	1,331.00	1,424.00
Total		4,240.00	10,000.00	14,240.00

Exercise 3.4 Amortized loan

Suppose a new machine is being financed by the Dairiboard of Zimbabwe Ltd with an 18 year $25,000 loan at a 9% interest rate. Obtain an amortisation schedule to show how the Dairiboard of Zimbabwe Ltd will pay off the resulting amortised loan. (Hint: the AF is 0.1142).

Cost of funds

The cost of funds (capital) is crucial to investment analysis. Usually, the present value measures of an investment's economic worth depend on the use of an appropriate discount rate (or rate of return). The most appropriate rate is the firm's cost of capital. This rate, when determined, provides a yardstick for testing the acceptability of any investment; those that have a high probability of achieving a rate of return in excess of the firm's cost of capital are acceptable.

A firm's cost of capital may be estimated through:

a) the use of the interest rate attainable by "investing" in lending institutions (deposits or securities) before taxes as an estimate of opportunity cost of capital and

b) the determination of the weighted average after-tax cost of capital, which reflects the cost of all forms of capital the firm uses. The two basic sources of capital are borrowed funds from lending institutions and ownership or internal capital representing profits reinvested in the business.

To estimate the weighted average cost of capital, one needs to determine:

a) the present cost of borrowed or leased funds from each source
b) an average cost of internal capital as reflected by the percentage of equity in business and risks being taken and
c) an adjustment for income tax effect.

Cost of borrowed capital

Lenders' interest rates vary by type of lender. And since many of these lenders' rates are keyed to money market conditions, predicting costs of borrowed capital through time is imprecise. Less difficulty exists when borrowers have considerable long-term borrowings at fixed rates. Normally, a rough idea of the average cost of borrowed capital for a firm is obtained by dividing the total interest paid by the company by the capital borrowed by the same company.

Cost of ownership (Equity) capital

Cost of ownership capital is more difficult to determine than that of borrowed capital. Theoretically, one knows that the cost of ownership capital is the opportunity cost of placing the owner's funds elsewhere in comparable risk situations. Generally, the guide for selecting an appropriate ownership cost of capital is to use the condition that the cost of equity or ownership capital should be equal to or greater than the cost of borrowed capital.

Average cost of capital

Using a balance sheet or other information, one can estimate the percentage of the sources of capital in a business. Assuming that a company has a 50% equity (or will average about half borrowed and half owned capital over the investment period) the average cost of capital is estimated as follows:

Table 3.2 Average cost of capital

Sources of capital	(1) % of Capital	(2) % of cost	Weighted cost (1) x (2)
Equity capital borrowed	50	0.10	5.00
Bank	40	0.09	3.60
Insurance company	10	0.08	0.80
TOTAL			9.40

Business ownership costs

There are five ownership costs that every company incurs, namely: depreciation costs, interest costs, repair costs taxes, and insurance costs. They are commonly referred to as the "DIRTI 5".

a) Depreciation

This is a procedure for allocating the used up value of durable assets over the period they are owned by the business or until they are salvaged. By depreciating an asset, an allowance is made for the deterioration in the asset's value as a result of use (wear and tear), age and obsolescence. Generally, property is depreciable if it is used in business or to earn income;, wears out, decays, gets used up or becomes obsolete, and has a determinable useful life of more than one year. The proportion of the original cost to be depreciated in any one year is largely a matter of judgment and financial management. Normally, the depreciation allowance taken in any given year should reflect the actual decline in value of the asset - whether it is designed to influence income taxes or the undepreciated value of an asset reflecting the resale value of the asset.

There are four main and acceptable methods of calculating depreciation, namely:

- the accelerated cost recovery system (ACRS) method
- the straight line method
- the declining balance method
- the sum of the years-digits method.

The accelerated cost recovery system method is a relatively new method of calculating depreciation for tangible property. It came into use effectively in 1981. As a method ACRS generally gives much faster write off than other methods because it has tax savings as its primary objective. It usually gives little consideration to actual year-to-year change in value. Thus, for accounting purposes, other methods are more appropriate.

For tax purposes, property is classified as follows:-

i) *3 year property* - automobiles and light-duty trucks used for business purposes and certain special tools, and depreciable property with a midpoint life of 4 years or less.
ii) *5 year property* - most farm equipment, grain bins, single purpose structures and fences, breeding beef and dairy cattle, office equipment and office furniture.
iii) *10 year property*- includes depreciable property with an expected life between 10 and 12.4 years.
iv) *15 year property* - buildings.

The straight line method computes depreciation, Ds, as follows:

$$D_s = \frac{OC - SV}{L}$$

where:
OC = Original cost or basis
SV = Salvage value
L = expected useful life of the asset in the business.

Declining balance method calculates depreciation as:-

$$D_d = RV \times R$$

where:
RV = undepreciated value of the asset at the start of the accounting period such that, in year 1, RV = OC, and in succeeding years,
$RV_i = [RV_{i-1} - D_{d,i-1}] \times R$ (with salvage value not being deducted from original value before computing depreciation),
R = the depreciation rate, which may be up to twice the rate of decline, 1/L, allowed under straight line method.

Sum of the year-digits method estimates the depreciation of an asset as follows:-

$$D_y = \frac{RV(OC - SV)}{S}$$

where:

RY = estimated years of useful life remaining
S = sum of the numbers representing years of useful life (i.e. for an asset with 5 years useful life, S would be 1+2+3+4+5 = 15).

b) **Interest costs (rates)** are incurred by a company when owned or borrowed funds are invested in durable assets, because such money is tied up and cannot be used for other purposes. On borrowed money, there will be a regular interest payment, a standing obligation which must be met regardless of the level of use of the asset purchased with the borrowed money. Also, an interest charge should be calculated on equity capital. In this case, the charge would be an opportunity interest cost. An annual charge should be made because the money invested has alternative productive uses, which may range from earning interest on a savings account to increasing production.

c) **Repairs costs** are principally variable costs incurred on assets because of the level of use of the assets through wear and tear. Some durable assets, however, deteriorate with time even though they are not used. Fences, buildings and some moving parts on machinery and equipment are prime examples, although they deteriorate even more rapidly with use.

d) **Taxes** are fixed costs that are usually incurred on machinery, buildings and some other durable assets. Taxes are usually not related to the level of use or productive services provided. Thus, any investment analysis that ignores the annual tax obligation associated with the proposed investment will be incomplete.

e) **Insurance costs** are also fixed costs that are incurred when a financed asset is purchased and has to be protected against fire, weather, theft, etc. Usually, lenders require that a financed asset be insured as a meant of security for the loan. Some operators, particularly those with low equity, also insure some of their more valuable assets because of the strain the loss of those assets would place on the financial condition of the business. In this country, the major insurance companies are Old Mutual Insurance and General Accident Insurance, Minet Insurance, Prudential Insurance, etc. Now attempt exercise 3.5.

Key terms

Average cost

of capital
Business ownership costs
Cash
Cash equivalents
Cash flow statement
Cash payments
Cost of borrowed capital
Cost of equity capital
Depreciation
DIRTI 5
Financing
Funds use
Insurance costs
Interest rates
Investing activities
Operating activities
Pro forma cash flow statement
Repair costs
Returns on investment and servicing of finance
SORS
Source and application of funds
Strategic four-factor model
Taxation
Taxes

Chapter 4 - Budgetary control

Chapter objectives

This chapter is intended to provide:

- An indication and explanation of the importance of budgetary control in marketing as a key marketing control technique
- An overview of the advantages and disadvantages of budgeting
- An introduction to the methods for preparing budgets
- An appreciation of the uses of budgets.

There are two types of control, namely budgetary and financial. This chapter concentrates on budgetary control only. This is because financial control was covered in detail in chapters one and two. Budgetary control is defined by the Institute of Cost and Management Accountants (CIMA) as:

> "The establishment of budgets relating the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results, either to secure by individual action the objective of that policy, or to provide a basis for its revision".

Structure of the chapter

Of all business activities, budgeting is one of the most important and, therefore, requires detailed attention. The chapter looks at the concept of responsibility centres, and the advantages and disadvantages of budgetary control. It then goes on to look at the detail of budget construction and the use to which budgets can be put. Like all management tools, the chapter highlights the need for detailed information, if the technique is to be used to its fullest advantage.

Budgetary control methods

a) Budget:

- A formal statement of the financial resources set aside for carrying out specific activities in a given period of time.
- It helps to co-ordinate the activities of the organisation.

An example would be an advertising budget or sales force budget.

b) Budgetary control:

- A control technique whereby actual results are compared with budgets.
- Any differences (variances) are made the responsibility of key individuals who can either exercise control action or revise the original budgets.

Budgetary control and responsibility centres;

These enable managers to monitor organizational functions.

A responsibility center can be defined as any functional unit headed by a manager who is responsible for the activities of that unit.

There are four types of responsibility centers:

a) *Revenue centers*

Organizational units in which outputs are measured in monetary terms but are not directly compared to input costs.

b) *Expense centers*

Units where inputs are measured in monetary terms but outputs are not.

c) *Profit centers*

Where performance is measured by the difference between revenues (outputs) and expenditure (inputs). Inter-departmental sales are often made using "transfer prices".

d) *Investment centres*

Where outputs are compared with the assets employed in producing them, i.e. ROI.

Advantages of budgeting and budgetary control

There are a number of advantages to budgeting and budgetary control:

- Compels management to think about the future, which is probably the most important feature of a budgetary planning and control system. Forces management to look ahead, to set out detailed plans for achieving the targets for each department, operation and (ideally) each manager, to anticipate and give the organisation purpose and direction.
- Promotes coordination and communication.
- Clearly defines areas of responsibility. Requires managers of budget centres to be made responsible for the achievement of budget targets for the operations under their personal control.
- Provides a basis for performance appraisal (variance analysis). A budget is basically a yardstick against which actual performance is measured and assessed. Control is provided by comparisons of actual results against budget plan. Departures from budget can then be investigated and the reasons for the differences can be divided into controllable and non-controllable factors.
- Enables remedial action to be taken as variances emerge.
- Motivates employees by participating in the setting of budgets.
- Improves the allocation of scarce resources.
- Economises management time by using the management by exception principle.

Problems in budgeting

Whilst budgets may be an essential part of any marketing activity they do have a number of disadvantages, particularly in perception terms.

- Budgets can be seen as pressure devices imposed by management, thus resulting in:
  - a) bad labour relations
  - b) inaccurate record-keeping.
- Departmental conflict arises due to:
  - a) disputes over resource allocation
  - b) departments blaming each other if targets are not attained.
- It is difficult to reconcile personal/individual and corporate goals.
- Waste may arise as managers adopt the view, "we had better spend it or we will lose it". This is often coupled with "empire building" in order to enhance the prestige of a department.

Responsibility versus controlling, i.e. some costs are under the influence of more than one person, e.g. power costs.

- Managers may overestimate costs so that they will not be blamed in the future should they overspend.

Characteristics of a budget

A good budget is characterized by the following:

- Participation: involve as many people as possible in drawing up a budget.
- Comprehensiveness: embrace the whole organization.
- Standards: base it on established standards of performance.
- Flexibility: allow for changing circumstances.
- Feedback: constantly monitor performance.
- Analysis of costs and revenues: this can be done on the basis of product lines, departments or cost centers.

Budget organization and administration:

In organizing and administering a budget system the following characteristics may apply:

a) *Budget centres:* Units responsible for the preparation of budgets. A budget centre may encompass several cost centres.

b) *Budget committee:* This may consist of senior members of the organisation, e.g. departmental heads and executives (with the managing director as chairman). Every part of the organisation should be represented on the committee, so there should be a representative from sales, production, marketing and so on. Functions of the budget committee include:

- Coordination of the preparation of budgets, including the issue of a manual
- Issuing of timetables for preparation of budgets
- Provision of information to assist budget preparations
- Comparison of actual results with budget and investigation of variances.

c) *Budget Officer:* Controls the budget administration The job involves:

- liaising between the budget committee and managers responsible for budget preparation
- dealing with budgetary control problems
- ensuring that deadlines are met
- educating people about budgetary control.

d) *Budget manual:*

This document:

- charts the organisation
- details the budget procedures
- contains account codes for items of expenditure and revenue
- timetables the process
- clearly defines the responsibility of persons involved in the budgeting system.

Budget preparation

Firstly, determine the principal budget factor. This is also known as the key budget factor or limiting budget factor and is the factor, which will limit the activities of an undertaking. This limits output, e.g. sales, material or labour.

a) Sales budget: this involves a realistic sales forecast. This is prepared in units of each product and also in sales value. Methods of sales forecasting include:

- sales force opinions
- market research
- statistical methods (correlation analysis and examination of trends)
- mathematical models.

In using these techniques consider:

- company's pricing policy
- general economic and political conditions
- changes in the population
- competition
- consumers' income and tastes
- advertising and other sales promotion techniques
- after sales service
- credit terms offered.

b) Production budget: expressed in quantitative terms only and is geared to the sales budget. The production manager's duties include:

- analysis of plant utilisation
- work-in-progress budgets.

If requirements exceed capacity he may:

- subcontract
- plan for overtime

- introduce shift work
- hire or buy additional machinery
- The materials purchases budget's both quantitative and financial.

c) Raw materials and purchasing budget:

- The materials usage budget is in quantities.
- The materials purchases budget is both quantitative and financial.

Factors influencing a) and b) include:

- production requirements
- planning stock levels
- storage space
- trends of material prices.

d) Labour budget: is both quantitative and financial. This is influenced by:

- production requirements
- man-hours available
- grades of labour required
- wage rates (union agreements)
- the need for incentives.

e) Cash budget: a cash plan for a defined period of time. It summarises monthly receipts and payments. Hence, it highlights monthly surpluses and deficits of actual cash. Its main uses are:

- to maintain control over a firm's cash requirements, e.g. stock and debtors
- to enable a firm to take precautionary measures and arrange in advance for investment and loan facilities whenever cash surpluses or deficits arises
- to show the feasibility of management's plans in cash terms
- to illustrate the financial impact of changes in management policy, e.g. change of credit terms offered to customers.

Receipts of cash may come from one of the following:

- cash sales
- payments by debtors
- the sale of fixed assets
- the issue of new shares
- the receipt of interest and dividends from investments.

Payments of cash may be for one or more of the following:

- purchase of stocks
- payments of wages or other expenses
- purchase of capital items
- payment of interest, dividends or taxation.

Steps in preparing a cash budget

i) Step 1: set out a pro forma cash budget month by month. Below is a suggested layout.

	Month 1	Month 2	Month 3
	$	$	$
Cash receipts			
Receipts from debtors			
Sales of capital items			
Loans received			
Proceeds from share issues			
Any other cash receipts			
Cash payments			
Payments to creditors			
Wages and salaries			
Loan repayments			
Capital expenditure			
Taxation			
Dividends			
Any other cash expenditure			
Receipts less payments			
Opening cash balance b/f	W	X	Y
Closing cash balance c/f	X	Y	Z

ii) Step 2: sort out cash receipts from debtors
iii) Step 3: other income
iv) Step 4: sort out cash payments to suppliers
v) Step 5: establish other cash payments in the month

Figure 4.1 shows the composition of a master budget analysis.

Figure 4.1 Composition of a master budget

OPERATING BUDGET	FINANCIAL BUDGET
consists of:-	consists of
Budget P/L acc: get:	Cash budget
Production budget	Balance sheet
Materials budget	Funds statement
Labour budget	
Admin. budget	
Stocks budget	

f) Other budgets:

These include budgets for:

- administration
- research and development
- selling and distribution expenses
- capital expenditures
- working capital (debtors and creditors).

The master budget (figure 4.1) illustrates this. Now attempt exercise 4.1.

Exercise 4.1 Budgeting I

Draw up a cash budget for *D. Sithole* showing the balance at the end of each month, from the following information provided by her for the six months ended 31 December 19X2.

a) Opening Cash $ 1,200.

	2001										2002	
Sales at $20 per unit	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
	260	200	320	290	400	300	350	400	390	400	280	250

Cash is received for sales after 3 months following the sales.

c) Production in units:	240	270	300	320	350	370	380	340	310	280	250

d) Raw materials cost $5/unit. Of this 80% is paid in the month of production and 20% after production.
e) Direct labour costs of $8/unit are payable in the month of production.
f) Variable expenses are $2/unit. Of this 50% is paid in the same month as production and 50% in the month following production.
g) Fixed expenses are $400/month payable each month.
h) Machinery costing $2,000 to be paid for in October 19X2.
i) Will receive a legacy of $ 2,500 in December 19X2.
j) Drawings to be $300/month.

An example

A sugar cane farm in the Lowveld district may devise an operating budget as follows:

- Cultivation
- Irrigation
- Field maintenance
- Harvesting
- Transportation.

With each operation, there will be costs for labour, materials and machinery usage. Therefore, for e.g. harvesting, these may include four resources, namely:

- Labour:

  -cutting
  -sundry

- Tractors
- Cane trailers
- Implements and sundries.

Having identified cost centres, the next step will be to make a quantitative calculation of the resources to be used, and to further break this down to shorter periods, say, one month or three months. The length of period chosen is important in that the shorter it is, the greater the control that can be exercised by the budget but the greater the expense in preparation of the budget and reporting of any variances.

The quantitative budget for harvesting may be calculated as shown in figure 4.2.

Figure 4.2 Quantitative harvesting budget

Harvesting	1st quarter	2nd quarter	3rd quarter	4th quarter
Labour				
Cutting	nil	9,000 tonnes	16,000 tonnes	10,000 tonnes
Sundry	nil	300 man days	450 man days	450 man days
Tractors	nil	630 hours	1,100 hours	700 hours
Cane trailers	nil	9,000 tonnes	16,000 tonnes	10,000 tonnes
Imp, & sundries	nil	9,000 tonnes	16,000 tonnes	10,000 tonnes

Each item is measured in different quantitative units - tonnes of cane, man days etc.- and depends on individual judgement of which is the best unit to use.

Once the budget in quantitative terms has been prepared, unit costs can then be allocated to the individual items to arrive at a budget for harvesting in financial terms as shown in table 4.2.

Charge out costs

In table 4.2 tractors have a unit cost of $7.50 per hour - machines like tractors have a whole range of costs like fuel and oil, repairs and maintenance, driver, licence, road tax and insurance and depreciation. Some of the costs are fixed, e.g. depreciation and insurance, whereas some vary directly with use of the tractor, e.g. fuel and oil. Other costs such as repairs are unpredictable and may be very high or low - an estimated figure based on past experience.

Figure 4.3 Harvesting cost budget

Item harvesting	Unit cost	1st quarter	2nd quarter	3rd quarter	4th quarter	Total
Labor						
Cutting	$0.75 per tonne	-	6,750	12,000	7,500	26,250
Sundry	$2.50 per day	-	750	1,125	1,125	3,000
Tractors	$7.50 per hour	-	4,725	8,250	5,250	18,225
Cane Trailers	$0.15 per tonne	-	1,350	2,400	1,500	5,250
Imp. & sundries	$0.25 per tonne	-	2,250	4,000	2,500	8,750
		-	$15,825	$27,775	$17,875	$61,475

So, overall operating cost of the tractor for the year may be budgeted as shown in figure 4.4.

If the tractor is used for more than 1,000 hours then there will be an over-recovery on its operational costs and if used for less than 1,000 hours there will be under-recovery, i.e. in the first instance making an internal 'profit' and in the second a 'loss'.

Figure 4.4 Tractor costs

		Unit rate	Cost per annum (1,000 hours)
		($)	($)
Fixed costs	Depreciation	2,000.00	2,000.00
	Licence and insurance	200.00	200.00
	Driver	100.00 per month	1,200.00
	Repairs	600.00 per annum	600.00
Variable costs	Fuel and oil	2.00 per hour	2,000.00
	Maintenance	3.00 per 200 hours	1,500.00
			7,500.00
	No. of hours used		1,000.00
	Cost per hour		7.50

Master budget

The master budget for the sugar cane farm may be as shown in figure 4.5. The budget represents an overall objective for the farm for the whole year ahead, expressed in financial terms.

Table 4.5 Operating budget for sugar cane farm 19X4

	1st quarter	2nd quarter	3rd quarter	4th quarter	Total $
Revenue from cane		130,000	250,000	120,000	500,000
Less: Costs					
Cultivation	37,261	48,268	42,368	55,416	183,313
Irrigation	7,278	15,297	18,473	11,329	52,377
Field maintenance	4,826	12,923	15,991	7,262	41,002
Harvesting	-	15,825	27,775	17,875	61,475
Transportation	-	14,100	24,750	15,750	54,600
	49,365	106,413	129,357	107,632	392,767
Add: Opening valuation	85,800	135,165	112,240	94,260	85,800
	135,165	241,578	241,597	201,892	478,567
Less: Closing valuation	135,165	112,240	94,260	90,290	90,290
Net crop cost	-	129,338	147,337	111,602	388,277
Gross surplus	-	66,200	102,663	8,398	111,723
Less: Overheads	5,876	7,361	7,486	5,321	26,044
Net profit(less)	(5,876)	(6,699)	95,177	3,077	85,679

Once the operating budget has been prepared, two further budgets can be done, namely:

i. Balance sheet at the end of the year.
ii. Cash flow budget which shows the amount of cash necessary to support the operating budget. It is of great importance that the business has sufficient funds to support the planned operational budget.

Reporting back

During the year the management accountant will prepare statements, as quickly as possible after each operating period, in our example, each quarter, setting out the actual operating costs against the budgeted costs. This statement will calculate the difference between the 'budgeted' and the 'actual' cost, which is called the 'variance'.

There are many ways in which management accounts can be prepared. To continue with our example of harvesting on the sugar cane farm, management accounts at the end of the third quarter can be presented as shown in figure 4.6.

Figure 4.6 Management accounts - actual costs against budget costs Management accounts for sugar cane farm 3rd quarter 19X4

	3rd quarter			Year to date		
	Actual	Budget	Variance	Actual	Budget	Variance
Item Harvesting						
Labour						
- Cutting	12,200	12,000	(200)	19,060	18,750	(310)
- Sundry	742	1,125	383	1,584	1,875	291
Tractors	9,375	8,250	(1,125)	13,500	12,975	(525)
Cane trailers	1,678	2,400	722	2,505	3,750	1,245
Imp & sundries	4,270	4,000	(270)	6,513	6,250	(263)
	28,265	27,775	(490)	43,162	43,600	438

Here, actual harvesting costs for the 3rd quarter are $28,265 against a budget of $27,775 indicating an increase of $490 whilst the cumulative figure for the year to date shows an overall saving of $438. It appears that actual costs are less than budgeted costs, so the harvesting operations are proceeding within the budget set and satisfactory. However, a further look may reveal that this may not be the case. The budget was based on a cane tonnage cut of 16,000 tonnes in the 3rd quarter and a cumulative tonnage of 25,000. If these tonnages have been achieved then the statement will be satisfactory. If the actual production was much higher than budgeted then these costs represent a very considerable saving, even though only a marginal saving is shown by the variance. Similarly, if the actual tonnage was significantly less than budgeted, then what is indicated as a marginal saving in the variance may, in fact, be a considerable overspending.

Price and quantity variances

Just to state that there is a variance on a particular item of expenditure does not really mean a lot. Most costs are composed of two elements - the quantity used and the price per unit. A variance between the actual cost of an item and its budgeted cost may be due to one or both of these factors. Apparent similarity between budgeted and actual costs may hide significant compensating variances between price and usage.

For example, say it is budgeted to take 300 man days at $3.00 per man day - giving a total budgeted cost of $900.00. The actual cost on completion was $875.00, showing a saving of $25.00. Further investigations may reveal that the job took 250 man days at a daily rate of $3.50 - a favourable usage variance but a very unfavourable price variance. Management may therefore need to investigate some significant variances revealed by further analysis, which a comparison of the total costs would not have revealed. Price and usage variances for major items of expense are discussed below.

Labour

The difference between actual labour costs and budgeted or standard labour costs is known as direct wages variance. This variance may arise due to a difference in the amount of labour used or the price per unit of labour, i.e. the wage rate. The direct wages variance can be split into:

i) Wage rate variance: the wage rate was higher or lower than budgeted, e.g. using more unskilled labor, or working overtime at a higher rate.

ii) Labor efficiency variance: arises when the actual time spent on a particular job is higher or lower than the standard labor hours specified, e.g. breakdown of a machine.

Materials

The variance for materials cost could also be split into price and usage elements:

i) Material price variance: arises when the actual unit price is greater or lower than budgeted. Could be due to inflation, discounts, alternative suppliers etc.

ii) Material quantity variance: arises when the actual amount of material used is greater or lower than the amount specified in the budget, e.g. a budgeted fertiliser at 350 kg per hectare may be increased or decreased when the actual fertiliser is applied, giving rise to a usage variance.

Overheads

Again, overhead variance can be split into:

i) Overhead volume variance: where overheads are taken into the cost centres, a production higher or lower than budgeted will cause an over-or under-absorption of overheads.

ii) Overhead expenditure variance: where the actual overhead expenditure is higher or lower than that budgeted for the level of output actually produced.

Calculation of price and usage variances

The price and usage variance are calculated as follows:

Price variance = (budgeted price - actual price) X actual quantity
Usage variance = (budgeted quantity - actual quantity) X budgeted price

Now attempt exercise 4.2.

Exercise 4.2 Computation of labour variances

It was budgeted that it would take 200 man days at $10.00 per day to complete the task costing $2,000.00 when the actual cost was $1,875.00, being 150 man days at $12.50 per day. Calculate:

i) Price variance
ii) Usage variance

Comment briefly on the results of your calculation.

Management action and cost control

Producing information in management accounting form is expensive in terms of the time and effort involved. It will be very wasteful if the information once produced is not put into effective use.

There are five parts to an effective cost control system. These are:

a) preparation of budgets
b) communicating and agreeing budgets with all concerned
c) having an accounting system that will record all actual costs
d) preparing statements that will compare actual costs with budgets, showing any variances and disclosing the reasons for them, and
e) taking any appropriate action based on the analysis of the variances in d) above.

Action(s) that can be taken when a significant variance has been revealed will depend on the nature of the variance itself. Some variances can be identified to a specific department and it is within that department's control to take corrective action. Other variances might prove to be much more difficult, and sometimes impossible, to control.

Variances revealed are historic. They show what happened last month or last quarter and no amount of analysis and discussion can alter that. However, they can be used to influence managerial action in future periods.

Zero base budgeting (ZBB)

After a budgeting system has been in operation for some time, there is a tendency for next year's budget to be justified by reference to the actual levels being achieved at present. In fact this is part of the financial analysis discussed so far, but the proper analysis process takes into account all the changes which should affect the future activities of the company. Even using such an analytical base, some businesses find that historical comparisons, and particularly the current level of constraints on resources, can inhibit really innovative changes in budgets. This can cause a severe handicap for the business because the budget should be the first year of the long range plan. Thus, if changes are not started in the budget period, it will be difficult for the business to make the progress necessary to achieve longer term objectives.

One way of breaking out of this cyclical budgeting problem is to go back to basics and develop the budget from an assumption of no existing resources (that is, a zero base). This means all resources will have to be justified and the chosen way of achieving any specified objectives will have to be compared with the alternatives. For example, in the sales area, the current existing field sales force will be ignored, and the optimum way of achieving the sales objectives in that particular market for the particular goods or services should be developed. This might not include any field sales force, or a different-sized team, and the company then has to plan how to implement this new strategy.

The obvious problem of this zero-base budgeting process is the massive amount of managerial time needed to carry out the exercise. Hence, some companies carry out the full process every five years, but in that year the business can almost grind to a halt. Thus, an alternative way is to look in depth at one area of the business each year on a rolling basis, so that each sector does a zero base budget every five years or so.

Key terms

Budgeting
Budgetary control
Budget preparation
Management action and cost control
budgeting
Master budget
Price and quantity variance
Responsibility centres
Zero based

Chapter 5 - Information for decision making

Chapter objectives

This chapter is intended to provide:

- An overview of the elements required for manager to make informed decisions among alternative courses of action
- An explanation of the relevant costs for decision making purposes
- The construction of Cost-Volume-Profit analyses and Breakeven charts and their usefulness in decision making
- The factors affecting the economic choice of whether to make components in-house or buy from outside
- How to make decisions on shutdown, additions or deletions to product lines or ranges, important to marketing managers.

The need for a decision arises in business because a manager is faced with a problem and alternative courses of action are available. In deciding which option to choose he will need all the information which is relevant to his decision; and he must have some criterion on the basis of which he can choose the best alternative. Some of the factors affecting the decision may not be expressed in monetary value. Hence, the manager will have to make 'qualitative' judgements, e.g. in deciding which of two personnel should be promoted to a managerial position. A 'quantitative' decision, on the other hand, is possible when the various factors, and relationships between them, are measurable. This chapter will concentrate on quantitative decisions based on data expressed in monetary value and relating to costs and revenues as measured by the management accountant.

Structure of the chapter

Often "information" is interpreted by marketers as being "external" market based information. However, "internal" sources are just as important, none more so than financial information. The chapter looks at the relevant elements of cost for decision making, then looks at the various techniques including breakeven analysis. Other important business decisions are whether to source components internally or have them brought in from outside, and whether to continue with operations if they appear uneconomic. The chapter examines the techniques useful in helping to make decisions in these areas.

Elements of a decision

A quantitative decision problem involves six parts:

a) **An objective that can be quantified** Sometimes referred to as 'choice criterion' or 'objective function', e.g. maximisation of profit or minimisation of total costs.

b) **Constraints** Many decision problems have one or more constraints, e.g. limited raw materials, labour, etc. It is therefore common to find an objective that will maximise profits subject to defined constraints.

c) **A range of alternative courses of action** under consideration. For example, in order to minimise costs of a manufacturing operation, the available alternatives may be:

i) to continue manufacturing as at present
ii) to change the manufacturing method
iii) to sub-contract the work to a third party.

d) **Forecasting** of the incremental costs and benefits of each alternative course of action.

e) **Application** of the decision criteria or objective function, e.g. the calculation of expected profit or contribution, and the ranking of alternatives.

f) **Choice** of preferred alternatives.

Relevant costs for decision making

The costs which should be used for decision making are often referred to as "relevant costs". CIMA defines relevant costs as 'costs appropriate to aiding the making of specific management decisions'.

To affect a decision a cost must be:

a) Future: Past costs are irrelevant, as we cannot affect them by current decisions and they are common to all alternatives that we may choose.
b) Incremental: ' Meaning, expenditure which will be incurred or avoided as a result of making a decision. Any costs which would be incurred whether or not the decision is made are not said to be incremental to the decision.
c) Cash flow: Expenses such as depreciation are not cash flows and are therefore not relevant. Similarly, the book value of existing equipment is irrelevant, but the disposal value is relevant.

Other terms:

d) Common costs: Costs which will be identical for all alternatives are irrelevant, e.g. rent or rates on a factory would be incurred whatever products are produced.
e) Sunk costs: Another name for past costs, which are always irrelevant, e.g. dedicated fixed assets, development costs already incurred.
f) Committed costs: A future cash outflow that will be incurred anyway, whatever decision is taken now, e.g. contracts already entered into which cannot be altered.

Opportunity cost

Relevant costs may also be expressed as opportunity costs. An opportunity cost is the benefit foregone by choosing one opportunity instead of the next best alternative.

Example

A company is considering publishing a limited edition book bound in a special leather. It has in stock the leather bought some years ago for $1,000. To buy an equivalent quantity now would cost $2,000. The company has no plans to use the leather for other purposes, although it has considered the possibilities:

a) of using it to cover desk furnishings, in replacement for other material which could cost $900
b) b) of selling it if a buyer could be found (the proceeds are unlikely to exceed $800).

In calculating the likely profit from the proposed book before deciding to go ahead with the project, the leather would *not* be costed at $1,000. The cost was incurred in the past for some reason which is no longer relevant. The leather exists and could be used on the book without incurring any specific cost in doing so. In using the leather on the book, however, the company will lose the opportunities of either disposing of it for $800 or of using it to save an outlay of $900 on desk furnishings.

The better of these alternatives, from the point of view of benefiting from the leather, is the latter. "Lost opportunity" cost of $900 will therefore be included in the cost of the book for decision making purposes.

The relevant costs for decision purposes will be the sum of:

i) 'avoidable outlay costs', i.e. those costs which will be incurred only if the book project is approved, and will be avoided if it is not
ii) ii) the opportunity cost of the leather (not represented by any outlay cost in connection to the project).

This total is a true representation of 'economic cost'.

Now attempt exercise 5.1.

Exercise 5.1 Relevant costs and opportunity costs

Zimglass Industries Ltd. has been approached by a customer who would like a special job to be done for him, and is willing to pay $60,000 for it. The job would require the following materials.

Material	Total units required	Units already ir stock	Book value of units in stock $/unit	Realisable value $/unit	Replacement cost $/unit
A	1000	0	-	-	16.00
B	1000	600	12.00	12.50	15.00
C	1000	700	13.00	12.50	14.00
D	200	200	14.00	16.00	19.00

a) Material B is used regularly by Zimglass Industries Ltd, and if units of B are required for this job, they would need to be replaced to meet other production demands.

b) Materials C and D are in stock due to previous over-buying, and they have restricted use. No other use could be found for material C, but the units of material D could be used in another job as a substitute for 300 units of

material E, which currently costs $15 per unit (of which the company has no units in stock at the moment).

Calculate the relevant costs of material for deciding whether or not to accept the contract. You must carefully and clearly explain the reasons for your treatment of each material.

The assumptions in relevant costing

Some of the assumptions made in relevant costing are as follows:

a) Cost behaviour patterns are known, e.g. if a department closes down, the attributable fixed cost savings would be known.
b) The amount of fixed costs, unit variable costs, sales price and sales demand are known with certainty.
c) The objective of decision making in the short run is to maximise 'satisfaction', which is often known as 'short-term profit'.
d) The information on which a decision is based is complete and reliable.

Cost-volume-profit (CVP) analysis

CVP analysis involves the analysis of how total costs, total revenues and total profits are related to sales volume, and is therefore concerned with predicting the effects of changes in costs and sales volume on profit. It is also known as 'breakeven analysis'.

The technique used carefully may be helpful in the following situations:

a) Budget planning. The volume of sales required to make a profit (breakeven point) and the 'safety margin' for profits in the budget can be measured.
b) Pricing and sales volume decisions.
c) Sales mix decisions, to determine in what proportions each product should be sold.
d) Decisions that will affect the cost structure and production capacity of the company.

The basic principles of CVP analysis

CVP analysis is based on the assumption of a linear total cost function (constant unit variable cost and constant fixed costs) and so is an application of marginal costing principles.

The principles of marginal costing can be summarized as follows:

a) Period fixed costs are a constant amount, therefore if one extra unit of product is made and sold, total costs will only rise by the variable cost (the *marginal cost*) of production and sales for that unit.
b) Also, total costs will fall by the variable cost per unit for each reduction by one unit in the level of activity.
c) The additional profit earned by making and selling one extra unit is the extra revenue from its sales minus its variable costs, i.e. the contribution per unit.
d) As the volume of activity increases, there will be an increase in total profits (or a reduction in losses) equal to the total revenue minus the total extra variable costs. This is the extra contribution from the extra output and sales.

e) The total profit in a period is the total revenue minus the total variable cost of goods sold, minus the fixed costs of the period.

Revenue	X
Variable cost of sales	(X)
CONTRIBUTION	X
Fixed Costs	(X)
PROFIT	X

Example: breakeven charts and P/V charts

Sabre Products Ltd. makes and sells a single product. The variable cost is $3/unit and the variable cost of selling is $1/unit. Fixed costs total $6,000 and the unit sales price is $6.

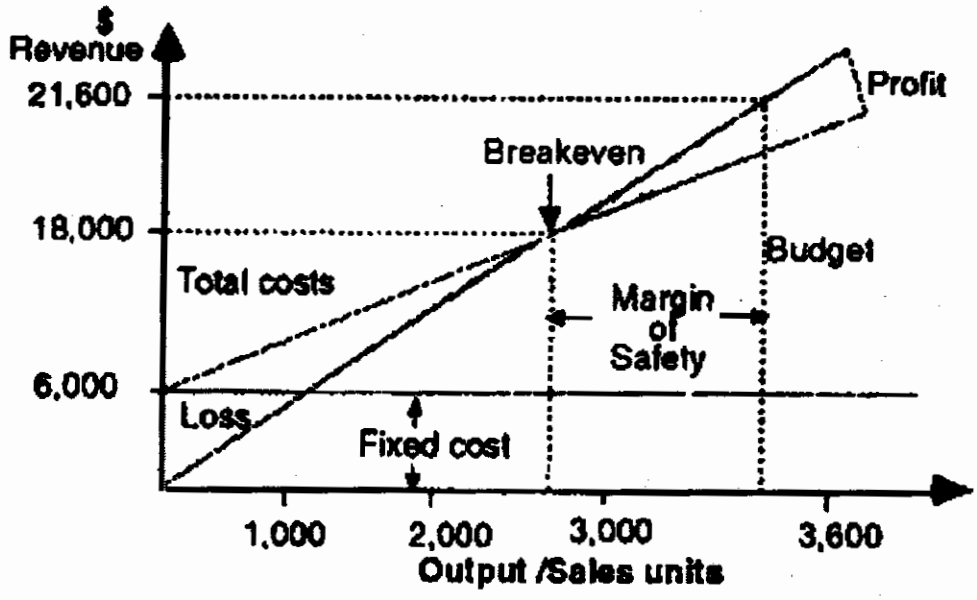
Sabre Products Ltd. budgets to make and sell 3,600 units in the next year.

Draw a breakeven chart, and a P/V graph, each showing the expected amount of output and sales required to breakeven, and the safety margin in the budget.

Solution:

A breakeven chart records the amount of fixed costs, variable costs, total costs and total revenue at all volumes of sales, and at a given sales price as follows:

Figure 5.1 Breakeven chart



The 'breakeven point' is where revenues and total costs are exactly the same, so there is no profit or loss. It may be expressed in terms of units of sale or in terms of sales revenue. Reading from the graph, the breakeven point is 3,000 units of sale and $18,000 in sales revenue.

The 'margin of safety' is the amount which actual output/sales may fall short of the budget without a loss being made, often expressed as a percentage of the budgeted sales volume. It is a rough measure of the risk that Sabre Products might make a loss if

it fails to achieve its budget. In our example, the margin of safety is calculated as follows:

	Units
Budgeted sales	3,600
Breakeven point	3,000
Margin of safety (MOS)	600

As a percentage of budgeted sales; the

$$MOS = \frac{600}{3,600}$$

= 16.67%.

A high margin of safety shows a good expectation of profits, even if the budget is not achieved.

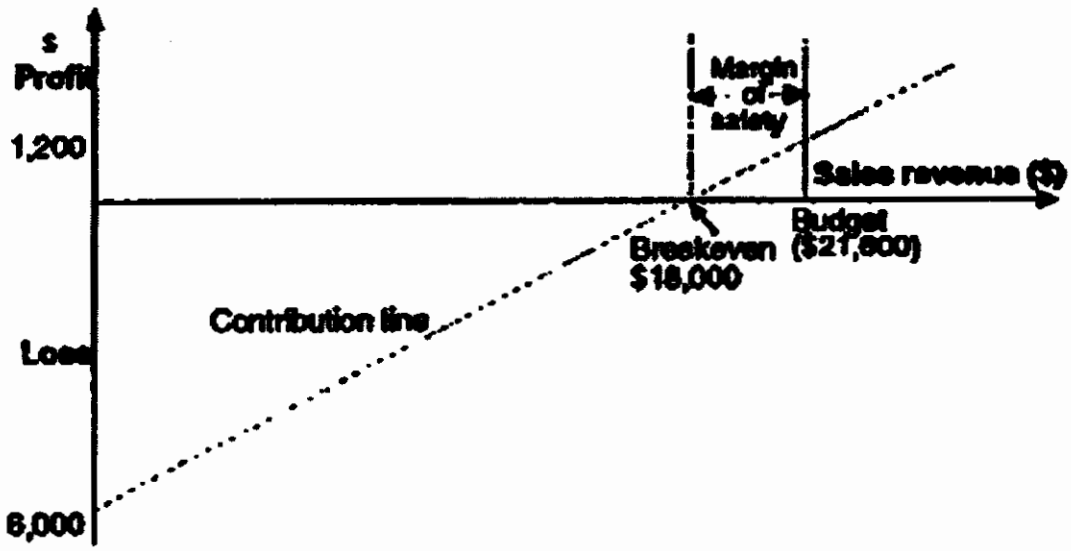
The Profit/Volume (P/V) graph

The P/V graph is similar to the breakeven chart, and records the profit or loss at each level of sales, at a given sales price. It is a straight line graph, drawn by recording the following:

i) the loss at zero sales, which is the full amount of fixed costs
ii) the profit/(loss) at the budgeted sales level.

The two points are then joined up. In our example above, the PA/graph would look like this:

Figure 5.2 The profit/volume (P/V) graph



The breakeven point may be read from the graph as $18,000 in sales revenue, and the margin of safety is $3,600 in sales revenue or 16.67% budgeted sales revenue.

The arithmetic of CVP analysis

a) To calculate the breakeven point the following formula applies:

$$S = V + F \text{ at the breakeven point,}$$

where:

S = sales revenue
V = variable costs
F = fixed costs (so that V + F = total costs).

Therefore:

$$(S - V) = F$$

At the breakeven point, total contribution (S - V) equals the amount of fixed costs (F).

b) To calculate the amount of sales needed to achieve a target profit the following formula applies:

$$S = V + F + P$$

Therefore,

$$(S - V) = (F + P)$$

To earn a target profit, the total contribution (S - V) must be sufficient to cover fixed costs plus the amount of profit required (F + P).

Now attempt exercise 5.2.

Exercise 5.2 Arithmetic of CVP analysis

Ndlovu Ltd. manufactures a single product, which has a variable cost of sale of $8/unit and a sales price of $12/unit. Budgeted fixed costs are $24,000.

Required:

Calculate the volume of sales that would be required to achieve the following:

a) Breakeven
b) Earn a profit of at least $6,000.

The contribution/sales ratio (C/S ratio)

The C/S ratio shows how much contribution is earned per $1 of sales revenue earned. Since costs and sales revenues are linear functions, the C/S ratio is constant at all levels of output and sales. It is used sometimes as a measure of performance or profitability, and in CVP analysis to calculate the sales required to breakeven or earn a

target profit or the expected total contribution at a given volume of sales and with a given C/S ratio.

As an alternative method of calculation, the breakeven point in sales revenue is calculated as follows:

$$\frac{\textit{Required contribution}}{C/S\,ratio} = \frac{\textit{Fixed costs}}{C/S\,ratio}$$

Similarly, the sales volume needed to achieve a target profit is calculated as follows:

$$\frac{\textit{Required contribution}}{C/S\,ratio} = \frac{\textit{Fixed costs} + \textit{profit}}{C/S\,ratio}$$

In exercise 5.2, the C/S ratio is

$$\frac{\$4}{\$12} \text{ or } 33\tfrac{1}{3}\%$$

a) The breakeven point is therefore

$$\frac{\text{Required contribution}}{C/S\,ratio} = \frac{\$24{,}000}{33\tfrac{1}{3}\%}$$

Required sales to breakeven

= $72,000 or divided by $12 = 6,000 units

b) To achieve a target profit of $6,000 the required sales are calculated as;

$$\frac{\text{Required contribution}}{C/S\,ratio} = \frac{\$30{,}000}{33\tfrac{1}{3}\%}$$

= $90,000
or divided by 12
= 7,500 units

Make or buy decisions

A company is often faced with the decision as to whether it should manufacture a component or buy it outside.

Suppose for example, that *Masanzu Ltd.* make four components, W, X, Y and Z, with expected costs for the coming year as follows:

	W	X	Y	Z
Production (units)	1,000	2,000	4,000	3,000
Unit marginal costs	$	$	$	$
Direct materials	4	5	2	4
Direct labour	8	9	4	6
Variable production overheads	2	3	1	2
	14	17	7	12

Direct fixed costs/annum and committed fixed costs are as follows:

Incurred as a direct consequence of making W	1,000
Incurred as a direct consequence of making X	5,000
Incurred as a direct consequence of making Y	6,000
Incurred as a direct consequence of making Z	8,000
Other committed fixed costs	30,000
	50,000

A subcontractor has offered to supply units W, X, Y and Z for $12, $21, $10 and $14 respectively.

Decide whether *Masanzu* Ltd. should make or buy the components.

Solution and discussion

a) The relevant costs are the differential costs between making and buying. They consist of differences in unit variable costs plus differences in directly attributable fixed costs. Subcontracting will result in some savings on fixed cost.

	W	X	Y	Z
	$	$	$	$
Unit variable cost of making	14	17	7	12
Unit variable cost of buying	12	21	10	14
	(2)	-4	2	2
Annual requirements in units	1,000	2,000	4,000	3,000
Extra variable cost of buying per annum	(2,000)	8,000	12,000	6,000
Fixed cost saved by buying	1,000	5,000	6,000	8,000
Extra total cost of buying	(3,000)	3,000	6,000	(2,000)

b) The company would save $3,000/annum by sub-contracting component W, and $2,000/annum by sub-contracting component Z.

c) In this example, relevant costs are the variable costs of in-house manufacture, the variable costs of sub-contracted units, and the saving in fixed costs.

d) Other important considerations are as follows:

i) If components W and Z are sub-contracted, the company will have spare capacity. How should that spare capacity be profitably used? Are there hidden benefits to be obtained from sub-contracting? Will there be resentment from the workforce?

ii) Would the sub-contractor be reliable with delivery times, and is the quality the same as those manufactured internally?
iii) Does the company wish to be flexible and maintain better control over operations by making everything itself?
iv) Are the estimates of fixed costs savings reliable? In the case of product W, buying is clearly cheaper than making in-house. However, for product Z, the decision to buy rather than make would only be financially attractive if the fixed cost savings of $8,000 could be delivered by management. In practice, this may not materialise.

Now attempt exercise 5.3.

Exercise 5.3 Make or buy

The Pip, a component used by *Goya Manufacturing Ltd.*, is incorporated into a number of its completed products. The Pip is purchased from a supplier at $2.50 per component and some 20,000 are used annually in production.

The price of $2.50 is considered to be competitive, and the supplier has maintained good quality service over the last five years. The production engineering department at Goya Manufacturing Ltd. has submitted a proposal to manufacture the Pip in-house. The variable cost per unit produced is estimated at $1.20 and additional annual fixed costs that would be incurred if the Pip were manufactured are estimated at $20,800.

a) Determine whether Goya Manufacturing Ltd. should continue to purchase the Pip or manufacture it in-house.

b) Indicate the level of production required that would make Goya Manufacturing Ltd. decide in favour of manufacturing the Pip itself.

Shutdown problems

Shutdown problems involve the following types of decisions:

a) Whether or not to close down a factory, department, product line or other activity, either because it is making losses or because it is too expensive to run.
b) If the decision is to shut down, whether the closure should be permanent or temporary. Shutdown decisions often involve long term considerations, and capital expenditures and revenues.
c) A shutdown should result in savings in annual operating costs for a number of years in the future.
d) Closure results in release of some fixed assets for sale. Some assets might have a small scrap value, but others, e.g. property, might have a substantial sale value.
e) Employees affected by the closure must be made redundant or relocated, perhaps even offered early retirement. There will be lump sums payments involved which must be taken into consideration. For example, suppose closure of a regional office results in annual savings of $100,000, fixed assets sold off for $2 million, but redundancy payments would be $3 million. The shutdown decision would involve an assessment of the net capital cost of closure ($1 million) against the annual benefits ($100,000 per annum).

It is possible for shutdown problems to be simplified into short run decisions, by making one of the following assumptions

a) Fixed asset sales and redundancy costs would be negligible.
b) Income from fixed asset sales would match redundancy costs and so these items would be self-cancelling.

In these circumstances the financial aspects of shutdown decisions would be based on short run relevant costs.

Now attempt exercise 5.4.

Exercise 5.4 Adding or deleting products

Brass Ltd. manufactures three products, Swans, Ducks and Chicks. The present net annual income from each item is as follows:

	Swans	Ducks	Chicks	Total
	$	$	$	$
Sales	50,000	40,000	60,000	150,000
Variable costs	30,000	25,000	35,000	90,000
Contribution	20,000	15,000	25,000	60,000
Fixed costs	17,000	18,000	20,000	55,000
Profit/(loss)	3,000	(3,000)	5,000	5,000

Brass Ltd. is concerned about its poor profit performance, and is considering whether or not to cease selling Ducks. It is felt that selling prices cannot be increased or lowered without adversely affecting net income. $5,000 of the fixed costs of Ducks are direct fixed costs which would be saved if production ceased. All other fixed costs will remain the same.

a) Advise Brass Ltd. whether or not to cease production of Ducks.
b) Suppose, however, it were possible to use the resources realised by stopping production of Ducks, and switch to produce a new item, Eagles, which would sell for $50,000 and incur variable costs of $30,000 and extra fixed costs of $6,000. What will the new decision be?

Key terms

Breakeven analysis
Contribution/sales ratio
Cost-volume-profit analysis
Decision making
Make or buy decisions
Opportunity costs
Profit-volume charts
Relevant costs
Shutdown

Chapter 6 - Investment decisions - Capital budgeting

Chapter objectives

This chapter is intended to provide:

- An understanding of the importance of capital budgeting in marketing decision making
- An explanation of the different types of investment project
- An introduction to the economic evaluation of investment proposals
- The importance of the concept and calculation of net present value and internal rate of return in decision making
- The advantages and disadvantages of the payback method as a technique for initial screening of two or more competing projects.

Capital budgeting is vital in marketing decisions. Decisions on investment, which take time to mature, have to be based on the returns which that investment will make. Unless the project is for social reasons only, if the investment is unprofitable in the long run, it is unwise to invest in it now.

Often, it would be good to know what the present value of the future investment is, or how long it will take to mature (give returns). It could be much more profitable putting the planned investment money in the bank and earning interest, or investing in an alternative project.

Typical investment decisions include the decision to build another grain silo, cotton gin or cold store or invest in a new distribution depot. At a lower level, marketers may wish to evaluate whether to spend more on advertising or increase the sales force, although it is difficult to measure the sales to advertising ratio.

Structure of the chapter

Capital budgeting is very obviously a vital activity in business. Vast sums of money can be easily wasted if the investment turns out to be wrong or uneconomic. The subject matter is difficult to grasp by nature of the topic covered and also because of the mathematical content involved. However, it seeks to build on the concept of the future value of money which may be spent now. It does this by examining the techniques of net present value, internal rate of return and annuities. The timing of cash flows are important in new investment decisions and so the chapter looks at this "payback" concept. One problem which plagues developing countries is "inflation rates" which can, in some cases, exceed 100% per annum. The chapter ends by showing how marketers can take this in to account.

Capital budgeting versus current expenditures

A capital investment project can be distinguished from current expenditures by two features:

a) such projects are relatively large
b) a significant period of time (more than one year) elapses between the investment outlay and the receipt of the benefits..

As a result, most medium-sized and large organisations have developed special procedures and methods for dealing with these decisions. A systematic approach to capital budgeting implies:

a) the formulation of long-term goals
b) the creative search for and identification of new investment opportunities
c) classification of projects and recognition of economically and/or statistically dependent proposals
d) the estimation and forecasting of current and future cash flows
e) a suitable administrative framework capable of transferring the required information to the decision level
f) the controlling of expenditures and careful monitoring of crucial aspects of project execution
g) a set of decision rules which can differentiate acceptable from unacceptable alternatives is required.

The last point (g) is crucial and this is the subject of later sections of the chapter.

The classification of investment projects

a) By project size

Small projects may be approved by departmental managers. More careful analysis and Board of Directors' approval is needed for large projects of, say, half a million dollars or more.

b) By type of benefit to the firm

- an increase in cash flow
- a decrease in risk
- an indirect benefit (showers for workers, etc).

c) By degree of dependence

- mutually exclusive projects (can execute project A or B, but not both)
- complementary projects: taking project A increases the cash flow of project B.
- substitute projects: taking project A decreases the cash flow of project B.

d) By degree of statistical dependence

- Positive dependence
- Negative dependence
- Statistical independence.

e) By type of cash flow

- Conventional cash flow: only one change in the cash flow sign

e.g. -/++++ or +/---, etc

- Non-conventional cash flows: more than one change in the cash flow sign,

e.g. +/-/+++ or -/+/-/++++, etc.

The economic evaluation of investment proposals

The analysis stipulates a decision rule for:

I) accepting or
II) rejecting

investment projects

The time value of money

Recall that the interaction of lenders with borrowers sets an equilibrium rate of interest. Borrowing is only worthwhile if the return on the loan exceeds the cost of the borrowed funds. Lending is only worthwhile if the return is at least equal to that which can be obtained from alternative opportunities in the same risk class.

The interest rate received by the lender is made up of:

i) The time value of money: the receipt of money is preferred sooner rather than later. Money can be used to earn more money. The earlier the money is received, the greater the potential for increasing wealth. Thus, to forego the use of money, you must get some compensation.

ii) The risk of the capital sum not being repaid. This uncertainty requires a premium as a hedge against the risk, hence the return must be commensurate with the risk being undertaken.

iii) Inflation: money may lose its purchasing power over time. The lender must be compensated for the declining spending/purchasing power of money. If the lender receives no compensation, he/she will be worse off when the loan is repaid than at the time of lending the money.

a) Future values/compound interest

Future value (FV) is the value in dollars at some point in the future of one or more investments.

FV consists of:

i) the original sum of money invested, and
ii) the return in the form of interest.

The general formula for computing Future Value is as follows:

$$FV_n = V_o (1 + r)^n$$

where

V_o is the initial sum invested
r is the interest rate
n is the number of periods for which the investment is to receive interest.

Thus we can compute the future value of what V_o will accumulate to in n years when it is compounded annually at the same rate of r by using the above formula.

Now attempt exercise 6.1.

Exercise 6.1 Future values/compound interest

i) What is the future value of $10 invested at 10% at the end of 1 year?
ii) What is the future value of $10 invested at 10% at the end of 5 years?

We can derive the Present Value (PV) by using the formula:

$$FV_n = V_o (I + r)^n$$

By denoting V_o by PV we obtain:

$$FV_n = PV (I + r)^n$$

by dividing both sides of the formula by $(I + r)^n$ we derive:

$$PV = \frac{FV_n}{(I+r)^n}$$

Rationale for the formula:

As you will see from the following exercise, given the alternative of earning 10% on his money, an individual (or firm) should never offer (invest) more than $10.00 to obtain $11.00 with certainty at the end of the year.

Now attempt exercise 6.2

Exercise 6.2 Present value

i) What is the present value of $11.00 at the end of one year?
ii) What is the PV of $16.10 at the end of 5 years?

b) Net present value (NPV)

The NPV method is used for evaluating the desirability of investments or projects.

$$NPV = \frac{C_1}{I+r} + \frac{C_2}{(I+r)^2} + \frac{C_3}{(I+r)^3} + \ldots + \frac{C_2 \ldots I_e}{(I+r)^n}$$

$$NPV = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t} - I_o$$

where:

C_t = the net cash receipt at the end of year t
I_o = the initial investment outlay
r = the discount rate/the required minimum rate of return on investment
n = the project/investment's duration in years.

The discount factor r can be calculated using:

$$q(t,i) = \frac{1}{(1+i)^t}$$

Examples:

$$q(1,10\%) = \frac{1}{1.1} = 0.9091$$

$$q(2,10\%) = \frac{1}{(1.1)^2} = 0.8264$$

$$q(3,10\%) = \frac{1}{(1.1)^3} = 0.7513$$

N.B. At this point the tutor should introduce the net present value tables from any recognised published source. Do that now.

Decision rule:

If NPV is positive (+): *accept the project*
If NPV is negative(-): *reject the project*

Now attempt exercise 6.3.

Exercise 6.3 Net present value

A firm intends to invest $1,000 in a project that generated net receipts of $800, $900 and $600 in the first, second and third years respectively. Should the firm go ahead with the project?

Attempt the calculation without reference to net present value tables first.

c) Annuities

N.B. Introduce students to annuity tables from any recognized published source.

A set of cash flows that are equal in each and every period is called an annuity.

Example:

Year	Cash Flow ($)
0	-800
1	400
2	400
3	400

PV = $400(0.9091) + $400(0.8264) + $400(0.7513)
= $363.64 + $330.56 + $300.52
= $994.72
NPV = $994.72 - $800.00
= $194.72

Alternatively,

PV of an annuity = $400 (PVFAt.i) (3,0,10)
= $400 (0.9091 + 0.8264 + 0.7513)
= $400 x 2.4868
= $994.72
NPV = $994.72 - $800.00
= $194.72

d) Perpetuities

A perpetuity is an annuity with an infinite life. It is an equal sum of money to be paid in each period forever.

$$\text{PV of a perpetuity} = \frac{C}{r}$$

where:

C is the sum to be received per period
r is the discount rate or interest rate

Example:

You are promised a perpetuity of $700 per year at a rate of interest of 15% per annum. What price (PV) should you be willing to pay for this income?

$$PV = \frac{\$700}{0.15}$$
= $4,666.67

A perpetuity with growth:

Suppose that the $700 annual income most recently received is expected to grow by a rate G of 5% per year (compounded) forever. How much would this income be worth when discounted at 15%?

Solution:

Subtract the growth rate from the discount rate and treat the first period's cash flow as a perpetuity.

$$PV = \frac{C(1+G)}{R-G}$$
$$= \frac{\$700(1+0.05)}{0.15-0.05}$$
$$= \frac{\$700(1.05)}{0.10}$$
$$= \$735/0.10$$
$$= \underline{\$7,350}$$

e) The internal rate of return (IRR)

Refer students to the tables in any recognized published source.

- The IRR is the discount rate at which the NPV for a project equals zero. This rate means that the present value of the cash inflows for the project would equal the present value of its outflows.
- The IRR is the break-even discount rate.
- The IRR is found by trial and error.

$$\sum_{t=1}^{n} \frac{C_t}{(1+r)^t} - I_o = 0 \quad \textit{where } r = IRR$$

IRR of an annuity:

$$Q(n,r) = \frac{I_o}{C}$$

where:

Q (n,r) is the discount factor
I_o is the initial outlay
C is the uniform annual receipt ($C_1 = C_2 = ... = C_n$).

Example:

What is the IRR of an equal annual income of $20 per annum which accrues for 7 years and costs $120?

$$Q(7,r) = \frac{\$120}{20}$$
$$= 6$$

From the tables = 4%

Economic rationale for IRR:

If IRR exceeds cost of capital, project is worthwhile, i.e. it is profitable to undertake.
Now attempt exercise 6.4

Exercise 6.4 Internal rate of return

Find the IRR of this project for a firm with a 20% cost of capital:

YEAR	CASH FLOW
	$
0	-10,000
1	8,000
2	6,000

a) Try 20%
b) Try 27%
c) Try 29%

Net present value vs internal rate of return

Independent vs dependent projects

NPV and IRR methods are closely related because:

i) both are time-adjusted measures of profitability, and
ii) their mathematical formulas are almost identical.

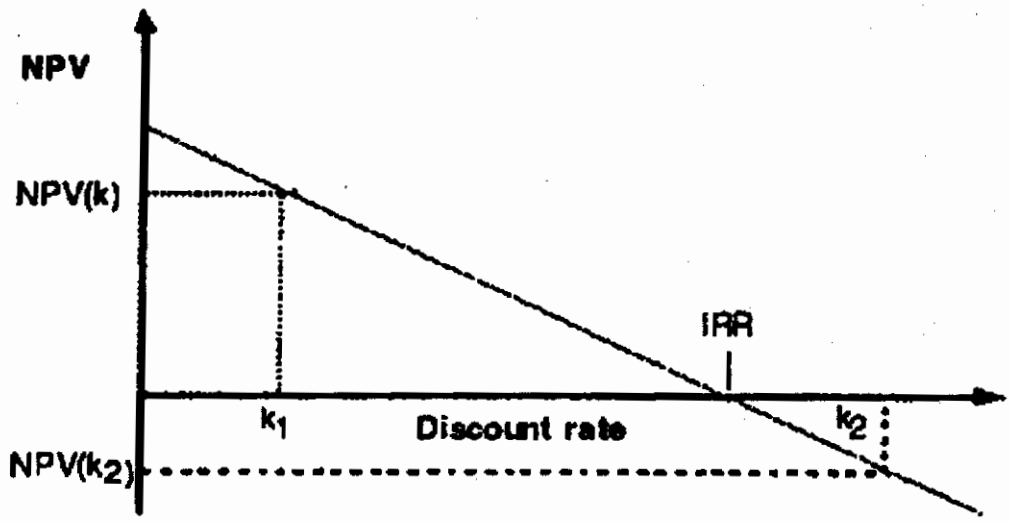
So, which method leads to an optimal decision: IRR or NPV?

a) NPV vs IRR: Independent projects

Independent project: Selecting one project does not preclude the choosing of the other.

With conventional cash flows (-|+|+) no conflict in decision arises; in this case both NPV and IRR lead to the same accept/reject decisions.

Figure 6.1 NPV vs IRR Independent projects



If cash flows are discounted at k_1, NPV is positive and IRR > k_1: accept project.

If cash flows are discounted at k_2, NPV is negative and IRR < k_2: reject the project.

Mathematical proof: for a project to be acceptable, the NPV must be positive, i.e.

$$\sum_{t=1}^{n} \frac{C_t}{(1+k)^t} - I_o > 0 \text{ or } \sum_{t=1}^{n} \frac{C_t}{(1+k)^t} - I_o > I_o$$

Similarly for the same project to be acceptable:

$$\sum_{t=1}^{n} \frac{C_t}{(1+R)^t} = I_o$$

where R is the IRR.

Since the numerators C_t are identical and positive in both instances:

- implicitly/intuitively R must be greater than k (R > k);
- If NPV = 0 then R = k: the company is indifferent to such a project;
- Hence, IRR and NPV lead to the same decision in this case.

b) NPV vs IRR: Dependent projects

NPV clashes with IRR where mutually exclusive projects exist.

Example:

Agritex is considering building either a one-storey (Project A) or five-storey (Project B) block of offices on a prime site. The following information is available:

	Initial Investment Outlay	Net Inflow at the Year End
Project A	-9,500	11,500
Project B	-15,000	18,000

Assume k = 10%, which project should Agritex undertake?

$$NPV_A = \frac{\$11,500}{1.1} - \$9,500$$

$$= \underline{\$954.55}$$

$$NPV_B = \frac{\$18,000}{1.1} - \$15,000$$

$$= \underline{\$1,363.64}$$

Both projects are of one-year duration:

$$IRR_A: \frac{\$11,500}{1+R_A} = \$9,500$$

$$\$11,500 = \$9,500\ (1 + R_A)$$

$$\frac{\$11,500}{\$9,500} = 1 + R_A$$

$$R_A = \frac{\$11,500}{\$9,500} - 1$$

= 1.21-1

therefore IRR_A = 21%

$$\frac{\$18,000}{1+R_B} = \$15,000$$

IRR_B:

$18,000 = $15,000(1 + R_B)

$$R_B = \frac{\$18,000}{\$15,000} - 1$$

= 1.2-1

therefore IRR_B = 20%

Decision:

Assuming that k = 10%, both projects are acceptable because:

NPV_A and NPV_B are both positive

IRR_A > k AND IRR_B > k

Which project is a "better option" for Agritex?

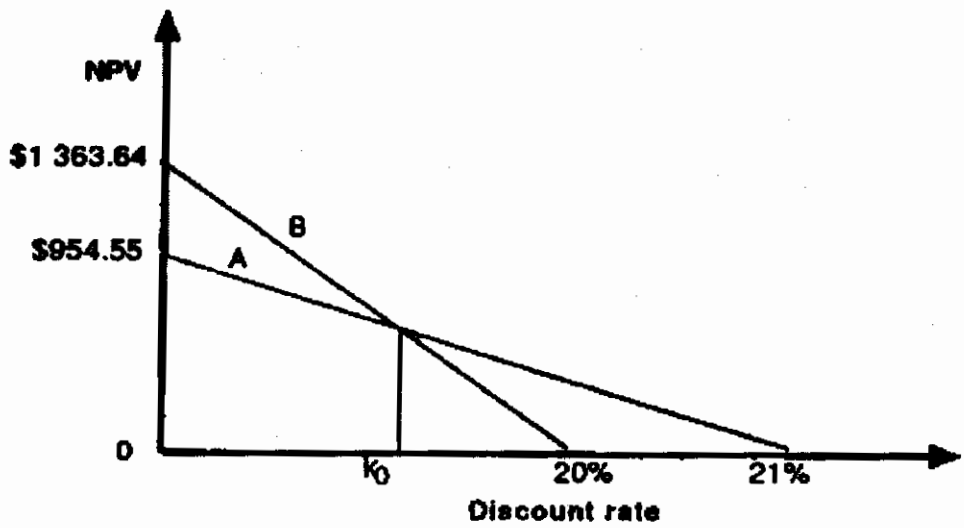
If we use the NPV method:

NPV_B ($1,363.64) > NPV_A ($954.55): Agritex should choose Project B.

If we use the IRR method:

IRR_A (21%) > IRR_B (20%): Agritex should choose Project A. See figure 6.2.

Figure 6.2 NPV vs IRR: Dependent projects



Up to a discount rate of k_o: project B is superior to project A, therefore project B is preferred to project A.

Beyond the point k_o: project A is superior to project B, therefore project A is preferred to project B

The two methods do not rank the projects the same.

Differences in the scale of investment

NPV and IRR may give conflicting decisions where projects differ in their scale of investment. Example:

Years	0	1	2	3
Project A	-2,500	1,500	1,500	1,500
Project B	-14,000	7,000	7,000	7,000

Assume k= 10%.

NPV_A = $1,500 x PVFA at 10% for 3 years
= $1,500 x 2.487 = $3,730.50 - $2,500.00 = = <u>$1,230.50.</u>

NPV_B == $7,000 x PVFA at 10% for 3 years
= $7,000 x 2.487 = $17,409 - $14,000 = <u>$3,409.00.</u>

$$IRR_A = \frac{I_o}{C_t} = \frac{\$2,500}{\$1,500} = 1.67.$$

Therefore IRR_A = 36% (from the tables)

$$IRR_B = \frac{I_o}{C_t} = \frac{\$14,000}{\$7,000} = 2.0$$

Therefore IRR_B = <u>21%</u>

Decision:

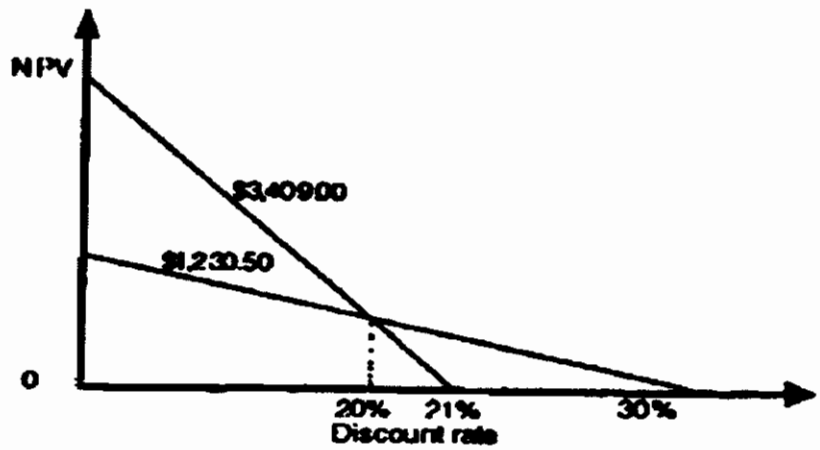
Conflicting, as:

- NPV prefers B to A
- IRR prefers A to B

	NPV	IRR
Project A	$ 3,730.50	36%
Project B	$17,400.00	21%

See figure 6.3.

Figure 6.3 Scale of Investments



To show why:

i) the NPV prefers B, the larger project, for a discount rate below 20%

ii) the NPV is superior to the IRR

a) Use the incremental cash flow approach, "B minus A" approach
b) Choosing project B is tantamount to choosing a hypothetical project "B minus A".

	0	1	2	3
Project B	- 14,000	7,000	7,000	7,000
Project A	- 2,500	1,500	1,500	1,500
"B minus A"	- 11,500	5,500	5,500	5,500

$$IRR_{\text{"B Minus A"}} = \frac{\$11,500}{\$5,500} = 2.09 = \underline{20\%}$$

c) Choosing B is equivalent to: A + (B - A) = B

d) Choosing the bigger project B means choosing the smaller project A plus an additional outlay of $11,500 of which $5,500 will be realised each year for the next 3 years.

e) The $IRR_{\text{"B minus A"}}$ on the incremental cash flow is 20%.

f) Given k of 10%, this is a profitable opportunity, therefore must be accepted.

g) But, if k were greater than the IRR (20%) on the incremental CF, then reject project.

h) At the point of intersection,

$NPV_A = NPV_B$ or $NPV_A - NPV_B = 0$, i.e. indifferent to projects A and B.

i) If k = 20% (IRR of "B - A") the company should accept project A.

- This justifies the use of NPV criterion.

Advantage of NPV:

- It ensures that the firm reaches an optimal scale of investment.

Disadvantage of IRR:

- It expresses the return in a percentage form rather than in terms of absolute dollar returns, e.g. the IRR will prefer 500% of $1 to 20% return on $100. However, most companies set their goals in absolute terms and not in % terms, e.g. target sales figure of $2.5 million.

The timing of the cash flow

The IRR may give conflicting decisions where the timing of cash flows varies between the 2 projects.

Note that initial outlay I_0 is the same.

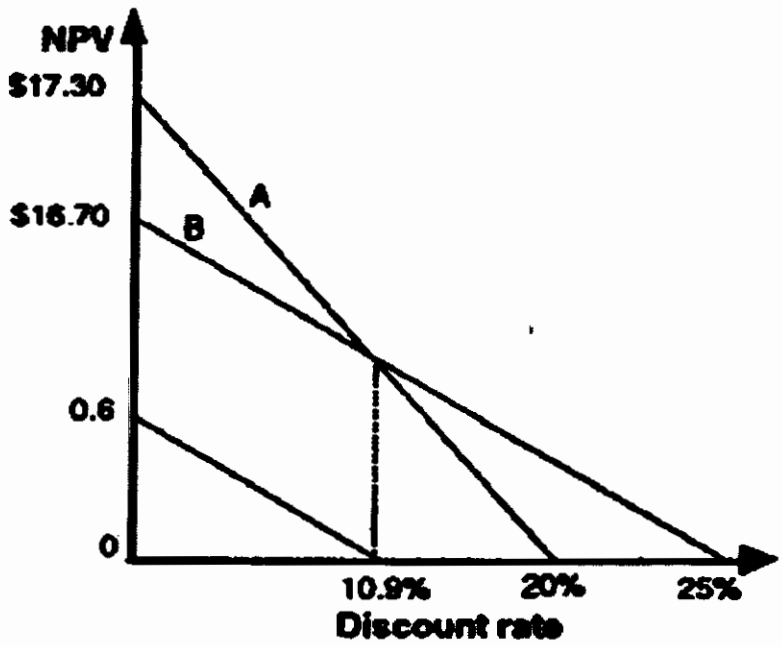
	0	1	2
Project A	- 100	20	125.00
Project B	- 100	100	31.25
"A minus B"	0	- 80	88.15

Assume k = 10%

	NPV	IRR
Project A	17.3	20.0%
Project B	16.7	25.0%
"A minus B"	0.6	10.9%

IRR prefers B to A even though both projects have identical initial outlays. So, the decision is to accept A, that is B + (A - B) = A. See figure 6.4.

Figure 6.4 Timing of the cash flow



The horizon problem

NPV and IRR rankings are contradictory. Project A earns $120 at the end of the first year while project B earns $174 at the end of the fourth year.

	0	1	2	3	4
Project A	-100	120	-	-	-
Project B	-100	-	-	-	174

Assume k = 10%

	NPV	IRR
Project A	9	20%
Project B	19	15%

Decision:

NPV prefers B to A
IRR prefers A to B.

The profitability index - PI

This is a variant of the NPV method.

$$PI = \frac{PV}{I_o}$$

Decision rule:

PI > 1; accept the project
PI < 1; reject the project

If NPV = 0, we have:

$NPV = PV - I_o = 0$
$PV = I_o$

Dividing both sides by I_o we get:

$$\frac{PV}{I_o} > 1$$

PI of 1.2 means that the project's profitability is 20%. Example:

	PV of CF	I_o	PI
Project A	100	50	2.0
Project B	1,500	1,000	1.5

Decision:

Choose option B because it maximises the firm's profitability by $1,500.

Disadvantage of PI:

Like IRR it is a percentage and therefore ignores the scale of investment.

The payback period (PP)

The CIMA defines payback as 'the time it takes the cash inflows from a capital investment project to equal the cash outflows, usually expressed in years'. When deciding between two or more competing projects, the usual decision is to accept the one with the shortest payback.

Payback is often used as a "first screening method". By this, we mean that when a capital investment project is being considered, the first question to ask is: 'How long will it take to pay back its cost?' The company might have a target payback, and so it would reject a capital project unless its payback period were less than a certain number of years.

Example 1:

Years	0	1	2	3	4	5
Project A	1,000,000	250,000	250,000	250,000	250,000	250,000

For a project with equal annual receipts:

$$PP = \frac{I_o}{C_t} = \frac{\$1,000,000}{\$250,000} = \underline{4 \text{ years}}$$

Example 2:

Years	0	1	2	3	4
Project B	- 10,000	5,000	2,500	4,000	1,000

Payback period lies between year 2 and year 3. Sum of money recovered by the end of the second year

= $7,500, i.e. ($5,000 + $2,500)

Sum of money to be recovered by end of 3rd year

= $10,000 - $7,500 = <u>$2,500</u>

$$\text{Payback period} = \left(2 + \frac{\$2,500}{\$4,000}\right) \text{years}$$

= <u>2.625 years</u>

Disadvantages of the payback method:

- It ignores the timing of cash flows within the payback period, the cash flows after the end of payback period and therefore the total project return.
- It ignores the time value of money. This means that it does not take into account the fact that $1 today is worth more than $1 in one year's time. An investor who has $1 today can either consume it immediately or alternatively can invest it at the prevailing interest rate, say 30%, to get a return of $1.30 in a year's time.
- It is unable to distinguish between projects with the same payback period.
- It may lead to excessive investment in short-term projects.

Advantages of the payback method:

- Payback can be important: long payback means capital tied up and high investment risk. The method also has the advantage that it involves a quick, simple calculation and an easily understood concept.

The accounting rate of return - (ARR)

The ARR method (also called the return on capital employed (ROCE) or the return on investment (ROI) method) of appraising a capital project is to estimate the accounting rate of return that the project should yield. If it exceeds a target rate of return, the project will be undertaken.

$$\text{ARR on total investment} = \frac{\text{Net Annual Profit}}{\text{Investment Outlay}} \; or \left[Rt + \frac{(C - D)}{I_o} \right]$$

Note that net annual profit excludes depreciation.

Example:

A project has an initial outlay of $1 million and generates net receipts of $250,000 for 10 years.

Assuming straight-line depreciation of $100,000 per year:

$$\text{the RR on total investment} = \frac{\$250{,}000 - \$100{,}000}{1{,}000{,}000} = \underline{15\%}$$

$$\text{ARR on total investment} = \frac{\text{Net Annual Profit}}{\text{Investment Outlay}/2} \; or \left[R_a + \frac{(C - D)}{I_o / 2} \right]$$

$$= \frac{\$250{,}000 - \$100{,}000}{\$1{,}000{,}000 \div 2} = \frac{\$150{,}000}{\$500{,}000} = \underline{30\%}$$

Disadvantages:

- It does not take account of the timing of the profits from an investment.
- It implicitly assumes stable cash receipts over time.
- It is based on accounting profits and not cash flows. Accounting profits are subject to a number of different accounting treatments.
- It is a relative measure rather than an absolute measure and hence takes no account of the size of the investment.
- It takes no account of the length of the project.
- it ignores the time value of money.

The payback and ARR methods in practice

Despite the limitations of the payback method, it is the method most widely used in practice. There are a number of reasons for this:

- It is a particularly useful approach for ranking projects where a firm faces liquidity constraints and requires fast repayment of investments.

- It is appropriate in situations where risky investments are made in uncertain markets that are subject to fast design and product changes or where future cash flows are particularly difficult to predict.
- The method is often used in conjunction with NPV or IRR method and acts as a first screening device to identify projects which are worthy of further investigation.
- it is easily understood by all levels of management.
- It provides an important summary method: how quickly will the initial investment be recouped?

Now attempt exercise 6.5.

Exercise 6.5 Payback and ARR

Delta Corporation is considering two capital expenditure proposals. Both proposals are for similar products and both are expected to operate for four years. Only one proposal can be accepted.

The following information is available:

	Profit/(loss)	
	Proposal A	Proposal B
	$	$
Initial investment	46,000	46,000
Year 1	6,500	4,500
Year 2	3,500	2,500
Year 3	13,500	4,500
Year 4	Loss 1,500	Profit 14,500
Estimated scrap value at the end of Year 4	4,000	4,000

Depreciation is charged on the straight line basis. Problem:

a) Calculate the following for both proposals:

i) the payback period to one decimal place
ii) the average rate of return on initial investment, to one decimal place.

Allowing for inflation

So far, the effect of inflation has not been considered on the appraisal of capital investment proposals. Inflation is particularly important in developing countries as the rate of inflation tends to be rather high. As inflation rate increases, so will the minimum return required by an investor. For example, one might be happy with a return of 10% with zero inflation, but if inflation was 20%, one would expect a much greater return.

Example:

Keymer Farm is considering investing in a project with the following cash flows:

TIME	ACTUAL CASH FLOWS Z$
0	(100,000)
1	90,000
2	80,000
3	70,000

Keymer Farm requires a minimum return of 40% under the present conditions. Inflation is currently running at 30% a year, and this is expected to continue indefinitely. Should Keymer Farm go ahead with the project?

Let us take a look at Keymer Farm's required rate of return. If it invested $10,000 for one year on 1 January, then on 31 December it would require a minimum return of $4,000. With the initial investment of $10,000, the total value of the investment by 31 December must increase to $14,000. During the year, the purchasing value of the dollar would fall due to inflation. We can restate the amount received on 31 December in terms of the purchasing power of the dollar at 1 January as follows:

Amount received on 31 December in terms of the value of the dollar at 1 January:

$$= \frac{\$14,000}{(1.30)^1} = \underline{\$10,769}$$

In terms of the value of the dollar at 1 January, Keymer Farm would make a profit of $769 which represents a rate of return of 7.69% in "today's money" terms. This is known as the real rate of return. The required rate of 40% is a money rate of return (sometimes known as a nominal rate of return). The money rate measures the return in terms of the dollar, which is falling in value. The real rate measures the return in constant price level terms.

The two rates of return and the inflation rate are linked by the equation:

(1 + money rate) = (1 + real rate) x (1 + inflation rate)

where all the rates are expressed as proportions.

In the example,

$$(1 + 0.40) = (1 + 0.0769) \times (1 + 0.3) = \underline{1.40}$$

So, which rate is used in discounting? As a rule of thumb:

a) If the cash flows are expressed in terms of actual dollars that will be received or paid in the future, the money rate for discounting should be used.

b) If the cash flows are expressed in terms of the value of the dollar at time 0 (i.e. in constant price level terms), the real rate of discounting should be used.

In Keymer Farm's case, the cash flows are expressed in terms of the actual dollars that will be received or paid at the relevant dates. Therefore, we should discount them using the money rate of return.

TIME	CASH FLOW	DISCOUNT FACTOR	PV
	$	40%	$
0	(150,000)	1.000	(100,000)
1	90,000	0.714	64,260
2	80,000	0.510	40,800
3	70,000	0.364	25,480
			30,540

The project has a positive net present value of $30,540, so Keymer Farm should go ahead with the project.

The future cash flows can be re-expressed in terms of the value of the dollar at time 0 as follows, given inflation at 30% a year:

TIME	ACTUAL CASH FLOW	CASH FLOW AT TIME 0 PRICE LEVEL	
	$		$
0	(100,000)	(100,000)	
1	90,000	$90{,}000 \times \frac{1}{(1.30)^1} =$	69,231
2	80,000	$80{,}000 \times \frac{1}{(1.30)^2} =$	47,337
3	70,000	$70{,}000 \times \frac{1}{(1.30)^3} =$	31,862

The cash flows expressed in terms of the value of the dollar at time 0 can now be discounted using the real value of 7.69%.

TIME	CASH FLOW	DISCOUNT FACTOR	PV
	$	7.69%	$
0	(100,000)	1.000	(100,000)
1	69,231	$\frac{1}{(1.0769)^1}$	64,246
2	47,337	$\frac{1}{(1.0769)^2}$	40,804
3	31,862	$\frac{1}{(1.0769)^3}$	25,490
			30,540

The NPV is the same as before.

Expectations of inflation and the effects of inflation

When a manager evaluates a project, or when a shareholder evaluates his/her investments, he/she can only guess what the rate of inflation will be. These guesses will probably be wrong, at least to some extent, as it is extremely difficult to forecast the rate of inflation accurately. The only way in which uncertainty about inflation can be allowed for in project evaluation is by risk and uncertainty analysis.

Inflation may be *general,* that is, affecting prices of all kinds, or *specific* to particular prices. Generalised inflation has the following effects:

a) Inflation will mean higher costs and higher selling prices. It is difficult to predict the effect of higher selling prices on demand. A company that raises its prices by 30%, because the general rate of inflation is 30%, might suffer a serious fall in demand.
b) Inflation, as it affects financing needs, is also going to affect gearing, and so the cost of capital.
c) Since fixed assets and stocks will increase in money value, the same quantities of assets must be financed by increasing amounts of capital. If the future rate of inflation can be predicted with some degree of accuracy, management can work out how much extra finance the company will need and take steps to obtain it, e.g. by increasing retention of earnings, or borrowing.

However, if the future rate of inflation cannot be predicted with a certain amount of accuracy, then management should estimate what it will be and make plans to obtain the extra finance accordingly. Provisions should also be made to have access to 'contingency funds' should the rate of inflation exceed expectations, e.g. a higher bank overdraft facility might be arranged should the need arise.

Many different proposals have been made for accounting for inflation. Two systems known as "Current purchasing power" (CPP) and "Current cost accounting" (CCA) have been suggested.

CPP is a system of accounting which makes adjustments to income and capital values to allow for the general rate of price inflation.

CCA is a system which takes account of specific price inflation (i.e. changes in the prices of specific assets or groups of assets), but not of general price inflation. It involves adjusting accounts to reflect the current values of assets owned and used.

At present, there is very little measure of agreement as to the best approach to the problem of 'accounting for inflation'. Both these approaches are still being debated by the accountancy bodies.

Now attempt exercise 6.6.

Exercise 6.6 Inflation

TA Holdings is considering whether to invest in a new product with a product life of four years. The cost of the fixed asset investment would be $3,000,000 in total, with $1,500,000 payable at once and the rest after one year. A further investment of $600,000 in working capital would be required.

The management of TA Holdings expect all their investments to justify themselves financially within four years, after which the fixed asset is expected to be sold for $600,000.

The new venture will incur fixed costs of $1,040,000 in the first year, including depreciation of $400,000. These costs, excluding depreciation, are expected to rise by 10% each year because of inflation. The unit selling price and unit variable cost are $24 and $12 respectively in the first year and expected yearly increases because of inflation are 8% and 14% respectively. Annual sales are estimated to be 175,000 units.

TA Holdings money cost of capital is 28%.

Is the product worth investing in?

Key terms

Accounting rate of return
Annuities
Capital budgeting
Cash flow
Classification of investment projects
Compound interest
Current cost accounting (CCA)
Current purchasing power (CPP)
Dependent projects
Independent projects
Inflation
Interest rate
Internal rate of return
Investment decision
Net present value
Payback period
Perpetuity
Present value
Rates of return
The time value of money

Chapter 7 - Sources of finance

Chapter objectives

This chapter is intended to provide:

- An introduction to the different sources of finance available to management, both internal and external
- An overview of the advantages and disadvantages of the different sources of funds
- An understanding of the factors governing the choice between different sources of funds.

Sourcing money may be done for a variety of reasons. Traditional areas of need may be for capital asset acquirement - new machinery or the construction of a new building or depot. The development of new products can be enormously costly and here again capital may be required. Normally, such developments are financed internally, whereas capital for the acquisition of machinery may come from external sources. In this day and age of tight liquidity, many organizations have to look for short-term capital in the way of overdraft or loans in order to provide a cash flow cushion. Interest rates can vary from organization to organization and also according to purpose.

Structure of the chapter

This final chapter starts by looking at the various forms of "shares" as a means to raise new capital and retained earnings as another source. However, whilst these may be "traditional" ways of raising funds, they are by no means the only ones. There are many more sources available to companies who do not wish to become "public" by means of share issues. These alternatives include bank borrowing, government assistance, venture capital and franchising. All have their own advantages and disadvantages and degrees of risk attached.

Sources of funds

A company might raise new funds from the following sources:

- The capital markets:

  i) new share issues, for example, by companies acquiring a stock market listing for the first time

  ii) rights issues

- Loan stock
- Retained earnings
- Bank borrowing
- Government sources
- Business expansion scheme funds
- Venture capital
- Franchising.

Ordinary (equity) shares

Ordinary shares are issued to the owners of a company. They have a nominal or 'face' value, typically of $1 or 50 cents. The market value of a quoted company's shares bears no relationship to their nominal value, except that when ordinary shares are issued for cash, the issue price must be equal to or be more than the nominal value of the shares.

Deferred ordinary shares

are a form of ordinary shares, which are entitled to a dividend only after a certain date or if profits rise above a certain amount. Voting rights might also differ from those attached to other ordinary shares.

Ordinary shareholders put funds into their company:

a) by paying for a new issue of shares
b) through retained profits.

Simply retaining profits, instead of paying them out in the form of dividends, offers an important, simple low-cost source of finance, although this method may not provide enough funds, for example, if the firm is seeking to grow.

A new issue of shares might be made in a variety of different circumstances:

a) The company might want to raise more cash. If it issues ordinary shares for cash, should the shares be issued pro rata to existing shareholders, so that control or ownership of the company is not affected? If, for example, a company with 200,000 ordinary shares in issue decides to issue 50,000 new shares to raise cash, should it offer the new shares to existing shareholders, or should it sell them to new shareholders instead?

   i) If a company sells the new shares to existing shareholders in proportion to their existing shareholding in the company, we have a *rights issue*. In the example above, the 50,000 shares would be issued as a one-in-four rights issue, by offering shareholders one new share for every four shares they currently hold.

   ii) If the number of new shares being issued is small compared to the number of shares already in issue, it might be decided instead to sell them to new shareholders, since ownership of the company would only be minimally affected.

b) The company might want to issue shares partly to raise cash, but more importantly to float' its shares on a stick exchange.

c) The company might issue new shares to the shareholders of another company, in order to take it over.

New shares issues

A company seeking to obtain additional equity funds may be:

a) an unquoted company wishing to obtain a Stock Exchange quotation

b) an unquoted company wishing to issue new shares, but without obtaining a Stock Exchange quotation

c) a company which is already listed on the Stock Exchange wishing to issue additional new shares.

The methods by which an unquoted company can obtain a quotation on the stock market are:

a) an offer for sale
b) a prospectus issue
c) a placing
d) an introduction.

Offers for sale:

An offer for sale is a means of selling the shares of a company to the public.

a) An unquoted company may issue shares, and then sell them on the Stock Exchange, to raise cash for the company. All the shares in the company, not just the new ones, would then become marketable.

b) Shareholders in an unquoted company may sell some of their existing shares to the general public. When this occurs, the company is not raising any new funds, but just providing a wider market for its existing shares (all of which would become marketable), and giving existing shareholders the chance to cash in some or all of their investment in their company.

When companies 'go public' for the first time, a 'large' issue will probably take the form of an offer for sale. A smaller issue is more likely to be a placing, since the amount to be raised can be obtained more cheaply if the issuing house or other sponsoring firm approaches selected institutional investors privately.

Rights issues

A rights issue provides a way of raising new share capital by means of an offer to existing shareholders, inviting them to subscribe cash for new shares in proportion to their existing holdings.

For example, a rights issue on a one-for-four basis at 280c per share would mean that a company is inviting its existing shareholders to subscribe for one new share for every four shares they hold, at a price of 280c per new share.

A company making a rights issue must set a price which is low enough to secure the acceptance of shareholders, who are being asked to provide extra funds, but not too low, so as to avoid excessive dilution of the earnings per share.

Preference shares

Preference shares have a fixed percentage dividend before any dividend is paid to the ordinary shareholders. As with ordinary shares a preference dividend can only be

paid if sufficient distributable profits are available, although with 'cumulative' preference shares the right to an unpaid dividend is carried forward to later years. The arrears of dividend on cumulative preference shares must be paid before any dividend is paid to the ordinary shareholders.

From the company's point of view, preference shares are advantageous in that:

- Dividends do not have to be paid in a year in which profits are poor, while this is not the case with interest payments on long term debt (loans or debentures).
- Since they do not carry voting rights, preference shares avoid diluting the control of existing shareholders while an issue of equity shares would not.
- Unless they are redeemable, issuing preference shares will lower the company's gearing. Redeemable preference shares are normally treated as debt when gearing is calculated.
- The issue of preference shares does not restrict the company's borrowing power, at least in the sense that preference share capital is not secured against assets in the business.
- The non-payment of dividend does not give the preference shareholders the right to appoint a receiver, a right which is normally given to debenture holders.

However, dividend payments on preference shares are not tax deductible in the way that interest payments on debt are. Furthermore, for preference shares to be attractive to investors, the level of payment needs to be higher than for interest on debt to compensate for the additional risks.

For the investor, preference shares are less attractive than loan stock because:

- they cannot be secured on the company's assets
- the dividend yield traditionally offered on preference dividends has been much too low to provide an attractive investment compared with the interest yields on loan stock in view of the additional risk involved.

Loan stock

Loan stock is long-term debt capital raised by a company for which interest is paid, usually half yearly and at a fixed rate. Holders of loan stock are therefore long-term creditors of the company.

Loan stock has a nominal value, which is the debt owed by the company, and interest is paid at a stated "coupon yield" on this amount. For example, if a company issues 10% loan stocky the coupon yield will be 10% of the nominal value of the stock, so that $100 of stock will receive $10 interest each year. The rate quoted is the gross rate, before tax.

Debentures are a form of loan stock, legally defined as the written acknowledgement of a debt incurred by a company, normally containing provisions about the payment of interest and the eventual repayment of capital.

Debentures with a floating rate of interest

These are debentures for which the coupon rate of interest can be changed by the issuer, in accordance with changes in market rates of interest. They may be attractive to both lenders and borrowers when interest rates are volatile.

Security

Loan stock and debentures will often be *secured.* Security may take the form of either a *fixed charge* or a *floating charge.*

a) **Fixed charge;** Security would be related to a specific asset or group of assets, typically land and buildings. The company would be unable to dispose of the asset without providing a substitute asset for security, or without the lender's consent.

b) **Floating charge;** With a floating charge on certain assets of the company (for example, stocks and debtors), the lender's security in the event of a default payment is whatever assets of the appropriate class the company then owns (provided that another lender does not have a prior charge on the assets). The company would be able, however, to dispose of its assets as it chose until a default took place. In the event of a default, the lender would probably appoint a receiver to run the company rather than lay claim to a particular asset.

The redemption of loan stock

Loan stock and debentures are usually redeemable. They are issued for a term of ten years or more, and perhaps 25 to 30 years. At the end of this period, they will "mature" and become redeemable (at par or possibly at a value above par).

Most redeemable stocks have an earliest and latest redemption date. For example, 18% Debenture Stock 2007/09 is redeemable, at any time between the earliest specified date (in 2007) and the latest date (in 2009). The issuing company can choose the date. The decision by a company when to redeem a debt will depend on:

a) how much cash is available to the company to repay the debt
b) the nominal rate of interest on the debt. If the debentures pay 18% nominal interest and the current rate of interest is lower, say 10%, the company may try to raise a new loan at 10% to redeem the debt which costs 18%. On the other hand, if current interest rates are 20%, the company is unlikely to redeem the debt until the latest date possible, because the debentures would be a cheap source of funds.

There is no guarantee that a company will be able to raise a new loan to pay off a maturing debt, and one item to look for in a company's balance sheet is the redemption date of current loans, to establish how much new finance is likely to be needed by the company, and when.

Mortgages are a specific type of secured loan. Companies place the title deeds of freehold or long leasehold property as security with an insurance company or mortgage broker and receive cash on loan, usually repayable over a specified period. Most organisations owning property which is unencumbered by any charge should be able to obtain a mortgage up to two thirds of the value of the property.

As far as companies are concerned, debt capital is a potentially attractive source of finance because interest charges reduce the profits chargeable to corporation tax.

Retained earnings

For any company, the amount of earnings retained within the business has a direct impact on the amount of dividends. Profit re-invested as retained earnings is profit that could have been paid as a dividend. The major reasons for using retained earnings to finance new investments, rather than to pay higher dividends and then raise new equity for the new investments, are as follows:

a) The management of many companies believes that retained earnings are funds which do not cost anything, although this is not true. However, it is true that the use of retained earnings as a source of funds does not lead to a payment of cash.

b) The dividend policy of the company is in practice determined by the directors. From their standpoint, retained earnings are an attractive source of finance because investment projects can be undertaken without involving either the shareholders or any outsiders.

c) The use of retained earnings as opposed to new shares or debentures avoids issue costs.

d) The use of retained earnings avoids the possibility of a change in control resulting from an issue of new shares.

Another factor that may be of importance is the financial and taxation position of the company's shareholders. If, for example, because of taxation considerations, they would rather make a capital profit (which will only be taxed when shares are sold) than receive current income, then finance through retained earnings would be preferred to other methods.

A company must restrict its self-financing through retained profits because shareholders should be paid a reasonable dividend, in line with realistic expectations, even if the directors would rather keep the funds for re-investing. At the same time, a company that is looking for extra funds will not be expected by investors (such as banks) to pay generous dividends, nor over-generous salaries to owner-directors.

Bank lending

Borrowings from banks are an important source of finance to companies. Bank lending is still mainly short term, although medium-term lending is quite common these days.

Short term lending may be in the form of:

a) an overdraft, which a company should keep within a limit set by the bank. Interest is charged (at a variable rate) on the amount by which the company is overdrawn from day to day;
b) a short-term loan, for up to three years.

Medium-term loans are loans for a period of from three to ten years. The rate of interest charged on medium-term bank lending to large companies will be a set margin, with the size of the margin depending on the credit standing and riskiness of the borrower. A loan may have a fixed rate of interest or a variable interest rate, so that the rate of interest charged will be adjusted every three, six, nine or twelve months in line with recent movements in the Base Lending Rate.

Lending to smaller companies will be at a margin above the bank's base rate and at either a variable or fixed rate of interest. Lending on overdraft is always at a variable rate. A loan at a variable rate of interest is sometimes referred to as a *floating rate loan.* Longer-term bank loans will sometimes be available, usually for the purchase of property, where the loan takes the form of a mortgage. When a banker is asked by a business customer for a loan or overdraft facility, he will consider several factors, known commonly by the mnemonic **PARTS.**

- Purpose
- Amount
- Repayment
- Term
- Security

P	The purpose of the loan A loan request will be refused if the purpose of the loan is not acceptable to the bank.
A	The amount of the loan. The customer must state exactly how much he wants to borrow. The banker must verify, as far as he is able to do so, that the amount required to make the proposed investment has been estimated correctly.
R	How will the loan be repaid? Will the customer be able to obtain sufficient income to make the necessary repayments?
T	What would be the duration of the loan? Traditionally, banks have offered short-term loans and overdrafts, although medium-term loans are now quite common.
S	Does the loan require security? If so, is the proposed security adequate?

Leasing

A lease is an agreement between two parties, the "lessor" and the "lessee". The lessor owns a capital asset, but allows the lessee to use it. The lessee makes payments under the terms of the lease to the lessor, for a specified period of time.

Leasing is, therefore, a form of rental. Leased assets have usually been plant and machinery, cars and commercial vehicles, but might also be computers and office equipment. There are two basic forms of lease: "operating leases" and "finance leases".

Operating leases

Operating leases are rental agreements between the lessor and the lessee whereby:

a) the lessor supplies the equipment to the lessee

b) the lessor is responsible for servicing and maintaining the leased equipment

c) the period of the lease is fairly short, less than the economic life of the asset, so that at the end of the lease agreement, the lessor can either

i) lease the equipment to someone else, and obtain a good rent for it, or
ii) sell the equipment secondhand.

Finance leases

Finance leases are lease agreements between the user of the leased asset (the lessee) and a provider of finance (the lessor) for most, or all, of the asset's expected useful life.

Suppose that a company decides to obtain a company car and finance the acquisition by means of a finance lease. A car dealer will supply the car. A finance house will agree to act as lessor in a finance leasing arrangement, and so will purchase the car from the dealer and lease it to the company. The company will take possession of the car from the car dealer, and make regular payments (monthly, quarterly, six monthly or annually) to the finance house under the terms of the lease.

Other important characteristics of a finance lease:

a) The lessee is responsible for the upkeep, servicing and maintenance of the asset. The lessor is not involved in this at all.

b) The lease has a primary period, which covers all or most of the economic life of the asset. At the end of the lease, the lessor would not be able to lease the asset to someone else, as the asset would be worn out. The lessor must, therefore, ensure that the lease payments during the primary period pay for the full cost of the asset as well as providing the lessor with a suitable return on his investment.

c) It is usual at the end of the primary lease period to allow the lessee to continue to lease the asset for an indefinite secondary period, in return for a very low nominal rent. Alternatively, the lessee might be allowed to sell the asset on the lessor's behalf (since the lessor is the owner) and to keep most of the sale proceeds, paying only a small percentage (perhaps 10%) to the lessor.

Why might leasing be popular

The attractions of leases to the supplier of the equipment, the lessee and the lessor are as follows:

- The supplier of the equipment is paid in full at the beginning. The equipment is sold to the lessor, and apart from obligations under guarantees or warranties, the supplier has no further financial concern about the asset.
- The lessor invests finance by purchasing assets from suppliers and makes a return out of the lease payments from the lessee. Provided that a lessor can find lessees willing to pay the amounts he wants to make his return, the lessor can make good profits. He will also get capital allowances on his purchase of the equipment.
- Leasing might be attractive to the lessee:

i) if the lessee does not have enough cash to pay for the asset, and would have difficulty obtaining a bank loan to buy it, and so has to rent it in one way or another if he is to have the use of it at all; or

ii) if finance leasing is cheaper than a bank loan. The cost of payments under a loan might exceed the cost of a lease.

Operating leases have further advantages:

- The leased equipment does not need to be shown in the lessee's published balance sheet, and so the lessee's balance sheet shows no increase in its gearing ratio.

- The equipment is leased for a shorter period than its expected useful life. In the case of high-technology equipment, if the equipment becomes out-of-date before the end of its expected life, the lessee does not have to keep on using it, and it is the lessor who must bear the risk of having to sell obsolete equipment secondhand.

The lessee will be able to deduct the lease payments in computing his taxable profits.

Hire purchase

Hire purchase is a form of instalment credit. Hire purchase is similar to leasing, with the exception that ownership of the goods passes to the hire purchase customer on payment of the final credit instalment, whereas a lessee never becomes the owner of the goods.

Hire purchase agreements usually involve a finance house.

i) The supplier sells the goods to the finance house.
ii) The supplier delivers the goods to the customer who will eventually purchase them.
iii) The hire purchase arrangement exists between the finance house and the customer.

The finance house will always insist that the hirer should pay a deposit towards the purchase price. The size of the deposit will depend on the finance company's policy and its assessment of the hirer. This is in contrast to a finance lease, where the lessee might not be required to make any large initial payment.

An industrial or commercial business can use hire purchase as a source of finance. With industrial hire purchase, a business customer obtains hire purchase finance from a finance house in order to purchase the fixed asset. Goods bought by businesses on hire purchase include company vehicles, plant and machinery, office equipment and farming machinery.

Government assistance

The government provides finance to companies in cash grants and other forms of direct assistance, as part of its policy of helping to develop the national economy, especially in high technology industries and in areas of high unemployment. For

example, the Indigenous Business Development Corporation of Zimbabwe (IBDC) was set up by the government to assist small indigenous businesses in that country.

Venture capital

Venture capital is money put into an enterprise which may all be lost if the enterprise fails. A businessman starting up a new business will invest venture capital of his own, but he will probably need extra funding from a source other than his own pocket. However, the term 'venture capital' is more specifically associated with putting money, usually in return for an equity stake, into a new business, a management buy-out or a major expansion scheme.

The institution that puts in the money recognises the gamble inherent in the funding. There is a serious risk of losing the entire investment, and it might take a long time before any profits and returns materialise. But there is also the prospect of very high profits and a substantial return on the investment. A venture capitalist will require a high expected rate of return on investments, to compensate for the high risk.

A venture capital organisation will not want to retain its investment in a business indefinitely, and when it considers putting money into a business venture, it will also consider its "exit", that is, how it will be able to pull out of the business eventually (after five to seven years, say) and realise its profits. Examples of venture capital organisations are: Merchant Bank of Central Africa Ltd and Anglo American Corporation Services Ltd.

When a company's directors look for help from a venture capital institution, they must recognise that:

- the institution will want an equity stake in the company
- it will need convincing that the company can be successful
- it may want to have a representative appointed to the company's board, to look after its interests.

The directors of the company must then contact venture capital organisations, to try and find one or more which would be willing to offer finance. A venture capital organisation will only give funds to a company that it believes can succeed, and before it will make any definite offer, it will want from the company management:

a) a business plan
b) details of how much finance is needed and how it will be used
c) the most recent trading figures of the company, a balance sheet, a cash flow forecast and a profit forecast
d) details of the management team, with evidence of a wide range of management skills
e) details of major shareholders
f) details of the company's current banking arrangements and any other sources of finance
g) any sales literature or publicity material that the company has issued.

A high percentage of requests for venture capital are rejected on an initial screening, and only a small percentage of all requests survive both this screening and further investigation and result in actual investments.

Franchising

Franchising is a method of expanding business on less capital than would otherwise be needed. For suitable businesses, it is an alternative to raising extra capital for growth. Franchisors include Budget Rent-a-Car, Wimpy, Nando's Chicken and Chicken Inn.

Under a franchising arrangement, a franchisee pays a franchisor for the right to operate a local business, under the franchisor's trade name. The franchisor must bear certain costs (possibly for architect's work, establishment costs, legal costs, marketing costs and the cost of other support services) and will charge the franchisee an initial franchise fee to cover set-up costs, relying on the subsequent regular payments by the franchisee for an operating profit. These regular payments will usually be a percentage of the franchisee's turnover.

Although the franchisor will probably pay a large part of the initial investment cost of a franchisee's outlet, the franchisee will be expected to contribute a share of the investment himself. The franchisor may well help the franchisee to obtain loan capital to provide his-share of the investment cost.

The advantages of franchises to the franchisor are as follows:

- The capital outlay needed to expand the business is reduced substantially.
- The image of the business is improved because the franchisees will be motivated to achieve good results and will have the authority to take whatever action they think fit to improve the results.

The advantage of a franchise to a franchisee is that he obtains ownership of a business for an agreed number of years (including stock and premises, although premises might be leased from the franchisor) together with the backing of a large organisation's marketing effort and experience. The franchisee is able to avoid some of the mistakes of many small businesses, because the franchisor has already learned from its own past mistakes and developed a scheme that works.

Now attempt exercise 7.1.

Exercise 7.1 Sources of finance

Outdoor Living Ltd., an owner-managed company, has developed a new type of heating using solar power, and has financed the development stages from its own resources. Market research indicates the possibility of a large volume of demand and a significant amount of additional capital will be needed to finance production.

Advise Outdoor Living Ltd. on:

a) the advantages and disadvantages of loan or equity capital
b) the various types of capital likely to be available and the sources from which they might be obtained
c) the method(s) of finance likely to be most satisfactory to both Outdoor Living Ltd. and the provider of funds.

Key terms

Bank lending
Capital markets
Debentures
Deferred ordinary shares
Franchising
Government assistance
Hire purchase
Loan stocks
New share issue
Ordinary shares
PARTS
Preference shares
Retained earnings
Rights issue
Sources of funds
Venture capital