	Business A	*Business B*	*Sum*
	£	£	£
Creditors	7000	5700	12700
Stock	3000	5000	8000
Premises	15000	–	15000
Loan from Bank	10000	–	10000
Motor Vehicle	3600	–	3600
Bank overdraft	–	1000	1000
Office equipment	–	800	800
Outstanding expenses	–	60	60
Furniture	–	800	800

Clearly a straight amalgamation of A with B would be possible but let us for a moment consider their positions. If you were A, would you sacrifice all your banked cash to the new partnership? What about the creditors? Surely you would be most willing to release these! but would B want them? What of the premises? Do you think 'A' would like to lose these? What of the outstanding expenses? Surely 'B' should be required to settle these debts before the partnership is created? These questions, and many others typify the problems of partnership formation and clearly agreement is required before amalgamation takes place.

Let us now assume the following agreement is made between A and B:

1. Cash in hand of both prospective partners is not to be taken over.
2. Five and ten per cent of A's and B's debtors is to be written-off.
3. B will pay off the overdraft.
4. Office equipment and furniture is to be revalued at £500 and £600 respectively.
5. A will clear the loan.
6. Motor Vehicles are to be revalued at £3000.
7. They agree to have fixed capitals of £30000 each.

The first stage is to structure the independent balance sheets of the two 'partners' and then to adjust these in such a fashion that they represent their positions just prior to amalgamation. The reader is left to do this initial stage for himself and to ensure that the following adjustments are made:

The Effect on the Independent Balance sheets of A and B

	Partner A		Partner B	
	1st change	2nd change	1st change	2nd change
1.	–240 cash	–240 capital	–160 cash	–160 capital
2.	–230 debtors	–230 capital	–620 debtors	–620 capital
3.			–1000 o/draft	+1000 capital
4.			–300 Off. eq.	–300 capital
			–200 Furniture	–200 capital
5.	–10000 Loan	+10000 capital		
6.	–600 Lorry	–600 capital		

Following these adjustments the 'pre-formation' balance sheets of 'A' and 'B' will show respective capitals of £20770 and £5920 respectively. To meet the requirements of the last element of their agreement (item 7 above) extra cash has to be found in sums of £9230 for 'A' and £24080 for 'B'. Once this has been done the two independent balance sheets then may be amalgamated to form the opening balance sheet of the new partnership, thus:

Opening Balance Sheet of A and B Partners --/--/--

Capital			*Assets*	
Partner A	30000		Premises	15000
Partner B	30000	60000	Furniture	600
			Office eq.	500
Liabilities			M/Vehicle	3000
Creditors		12700	Stock	8000
Outstanding			Debtors	9950
expenses		60	Bank	35710
		£72760		£72760

6.5.2 The Admission and Retirement of Partners

Now let us imagine a well-established partnership where the principal partner is about to retire. The balance sheet may well show the value of the assets and the liabilities of the partnership but when the partnership ceases albeit for interim purposes, then it is important that their real value is identified. For this reason, when there is a change, assets have to be revalued. We will now consider, briefly that process.

(i) *Revaluation of Assets*

The revaluation of assets is carried out to ensure that the balance sheet reflects the true worth of business. When such a process takes place, any adjustment in the historic cost of the asset is reflected in two accounts; first the asset account itself and secondly a "Revaluation Account". Say, for example, that the buildings of the above example (currently valued at £15000) were professionally surveyed and declared to be worth £25000. If this were the case, then the relative accounts would be:

Clearly, had the value dropped, then the double entery shown above would have been reversed.

This principle, applies equally to liabilities.

Whatever the case, the balance of the revaluation account is treated as an addition (or reduction) in the partner's capital. Such revaluation, of course, is apportioned in accordance with the Partnership Deed, failing which, the Partnership Act.

(ii) *Goodwill*

Perhaps one of the most important assets that must be revalued is Goodwill, an asset that arises from partners' connections and the business' reputation. It is one feature that distinguishes the old, established partnership from the new one. It represents an enhancement to the earning capacity of the business but it is intangible in its nature. Nevertheless, it precipitates returns to the business in excess of that which normally would be expected by the assets physically employed. Goodwill may arise for a variety of reasons, for example:

1. The favourable location of a business.
2. The business' reputation.
3. The past creation of a nucleus of customers who remain loyal to the business.
4. Staff loyalty.
5. Development costs which have already been incurred.

These all act as a justification for evaluating the worth of Goodwill, amounts, which because of their intangibility, are not easy to measure. Nevertheless, some objectivity must be brought.

One method involves the idea of purchasing a pre-determined number of years profits. Remember, however, that the unappropriated profit does not show the real return to the partnership. For example, it does not include a charge for potential services the partners rendered to the firm, neither does it give an indication of the opportunity cost of the net assets they have invested. For this reason, adjustments should be made. Consider the following figure which shows a series of hypothetical profits and salaries over a period of years: the opportunity cost is based on a return of 10 per cent on an assumed total net asset valuation of £20,000:

Year	Unappropriated Profits	Salaries	Opportunity Cost	Adjusted Profits
1	6000	1000	2000	3000
2	8000	3000	2000	3000
3	5000	1000	2000	2000
4	9000	3000	2000	4000
5	10000	5000	2000	3000

This tabulation shows two items added back with the sum of the adjusted profits over the five year period amounting to £15000, which is valuation given to Goodwill generated.

There are other methods available including methods which apply weighting factors. Whatever the method, Goodwill must be properly treated in the books of account.

Let us now assume that the partnership is a few years older and is ready to support a new partner. If this is the case, then clearly the existing partners would not wish to see a new partner benefit from a 'post-introduction' revaluation of assets. In addition, the question of Goodwill is likely to be raised with any benefit accruing to 'A' and 'B'. Once this is done the third, new partner will enter the business and his capital contribution will be added to the balance sheet with an equivalent increase in, say, the asset of cash.

Let us now assume that the balance sheet of A & B is as follows:

Balance Sheet of A & B Partners --/--/--

Capital			*Assets*	
Partner A	30000		Premises	18000
Partner B	30000	60000	Machinery	21000
			Office eq.	7800
Liabilities			M/Vehicle	7200
Bank O/D		2400	Stock	10200
Creditors		13200	Debtors	1800
			Bank	9600
		£75600		£75600

and that 'C' is invited to join, but on these terms:

1. Premises, Machinery and Fixtures and Fittings to be revalued at +10 per cent.
2. Goodwill is to be raised at £10000.
3. A provision for doubtful debts in the sum of £500 is to be raised.
4. £30000 Capital is to be introduced in form of cash.

If we are to assume that the basis of distribution of profits was three-fifths/two-fifths then the effects of these conditions may be assessed along the same lines as before by considering the effect on this balance sheet of the various conditions set. The effect is such that the existing partners capital will rise to £38508 and £35672, respectively. The balance sheet would, after 'C' has entered the business, now look like:

Balance Sheet of A B & C Partners --/--/--

Capital			*Assets*	
Partner A	38508		Premises	19800
Partner B	35672		Machinery	23100
Partner C	30000	104180	Goodwill	10000
			Office eq.	8580
Liabilities			M/Vehicle	7200
Bank O/D		2400	Stock	10200
Creditors		13200		
			Debtors 1800	
			less PBD 500	1300
			Bank	3960
		£119780		£119780

It will now be noted that the advantage in revaluation has accrued to the existing partners with no retrospective benefit to 'C'.

Let us now assume that even more years have elapsed for our partnership. 'A' is due to retire. The following represents the balance sheet and shows the new financial state of this business. Notice that in the interim, the Goodwill has been written-off and that revaluations have taken place.

Balance Sheet of A B & C Partners --/--/--

Capital			*Assets*	
Partner A	20000		Premises	19000
Partner B	20000		Machinery	20000
Partner C	20000	60000	Office eq.	6800
Liabilities			M/Vehicle	8200
Bank O/D		2000	Stock	12200
Creditors		13600	Debtors	800
			Bank	8600
		£75600		£75600

When 'A' retires, he in effect leaves the business and it is only right that the balance sheet reflects the business' indebtedness to him. Yet again, the terms of retiral are a matter of agreement and should be "wrapped-up" in the Partnership Deed. Let us assume the following provisions:

1. Revaluation of premises at £20000
2. Goodwill to be raised at £25000

The effect will be self evident. The assets would rise by £26000 which, of course, would result in an increase in the capital of the existing partners. As far as 'C' is concerned, the liability of the partnership to him would now be £20000 capital plus the £8666 revaluation in his current account, a total of £28666.

Clearly this partnership may find difficulty in settling this amount immediately and should have made provisions for this potential. Retirement has to be planned.

As 'A' has retired from the partnership then, technically, he is no longer a partner and his commitment to the partnership is now of an exogenous nature. For this reason, the new balance sheet would show the indebtedness to this former partner as a liability in the balance sheet. There would be no current nor capital account balances shown. Should 'A' wish to withdraw from any relationship there must be sufficient funds to cater for this and it may well be that the partnership has to make special arrangements for this potential, perhaps by purchasing insurance. Whatever the case, the new balance sheet will only show the partners as B and C, thus:

Balance Sheet of B & C Partners --/--/--

Capital			*Assets*	
			Premises	20000
Partner B	28667		Machinery	20000
Partner C	28667	57334	Goodwill	25000
Loan from A		28666	Office Eq.	6800
Liabilities			M/Vehicle	8200
Bank O/D		2000	Stock	12200
Creditors		13600	Debtors	800
			Bank	8600
		£101600		£101600

6.6 A Worked Example

To conclude this chapter, let us do a simple, worked example which produces from the following information, a Trial Balance, a Trading, Profit and Loss and Appropriation Account for the period ending 31st December 19-8 and a Balance Sheet at that date for the partnership.

Risk and Chance are partners sharing profits and losses equally, and the following entries have been extracted from the partnership books as at 31st December 19-8

	£
Capital Accounts	
Risk	40,000
Chance	70,000
Current Accounts 1st January 19-8	
Risk	5,000
Chance	12,000
Drawings	
Risk	20,000
Chance	8,000
Stock in Trade 1st January 19-8	18,000
Office Expenses	14,000
Sales	180,000
Fixed assets at cost	122,000
Provision for depreciation, 1st January, 19-8	50,000
Sundry Trade Expenses	8,000
Insurances	8,000
Salaries	80,000
Trade creditors	5,700
Trade debtors	26,800
Cash at bank	7,900
Raw Materials purchased	50,000

Additional information:

(1) Prepaid insurance amounts to £2,000.
(2) £4,000 of debtors are considered doubtful.
(3) Provide depreciation on a straight line basis at the rate of 5% per annum.
(4) Accrued office expenses at the end of the year amount to £3,000.
(5) Accrued bonuses to staff at 31st December 19-8 are £12,000.

Trial Balance at 31st December 19-8

	£	£
Capital Accounts		
Risk		40,000
Chance		70,000
Current Accounts		
Risk		5,000
Chance		12,000
Drawings		
Risk	20,000	
Chance	8,000	
Stock in trade, 1 January 19-8	18,000	
Office Expenses	14,000	
Sales		180,000
Fixed Assets at Cost	122,000	
Provision for depreciation, 1 January 19-8		50,000
Sundry Trade expenses	8,000	
Insurances	8,000	
Salaries	80,000	
Trade Creditors		5,700
Cash at Bank	7,900	
Trade debtors	26,800	
Raw Materials Purchased	50,000	
	362,700	362,700

Trading Account for the period ending 31st December, 19-8

Stock at 1st Jan, 19-8	18,000	Sales	180,000
Purchases	50,000		
	68,000		
Closing Stock	nil		
Cost of Sales	68,000		
Gross Profit	112,000		
	180,000		180,000

Profit and Loss and Appropriation Account for the period ending 31st December, 19-8

Trade expenses		8,000	Trading Account	112,000
Office Expenses	14,000		Net Loss	21,000
add Accrued	3,000	17,000		
Insurances	8,000			
less Prepaid	2,000	6,000		
Salaries		80,000		
Increase in provision for Depreciation		6,100		
Increase in provision for Bad Debts		4,000		
Bonus accrued		12,000		
		133,100		133,100
Net Loss		21,100	Current Account:	
			Risk	10550
			Chance	10550
		21,100		21,100

Balance Sheet, Risk and Chance as at 31st December 19-8

Capital Accounts			**Fixed Assets**			
Risk	40,000		Cost	122,000		
Chance	70,000	110,000	Depreciation	56,100		65,900
Current Accounts						
Risk (25,550)						
Chance (6,550)		(32,100)				
		77,900				
Current Liabilities			**Current Assets**			
Creditors	5,700		Stock			NIL
			Debtors	26,800		
Accruals:			*less* Provision	4,000	22,800	
Office expenses	3,000		Bank		7,900	
Staff Bonuses	12,000	20,700	Prepayment		2,000	32,700
		98,600				98,600

Chapter Seven

THE ACCOUNTS OF CORPORATIONS

We have seen that one method of overcoming capitalisation problems is to form a partnership. A further method of financing is to form a Corporation.

7.1 Creating a Corporation

A Corporation requires to be legally created. Unless it is so created, it can have neither existence nor terms of reference. Nor can it have power and authority. How then is it created? How is its birth legitimised?

A Corporation may be created by the Crown's prerogative. The most well known example is the Hudson's Bay Company. It may also be formed by a special Act of Parliament. British Airways, for example, was formed under the Civil Aviation Act of 1971. The most significant and important mode of formation, however, lies in the 1985 Companies Act.

Under section 1 of the 1985 Companies Act, a "public" company is defined and if it does not fall within this definition it is considered a "private" company.

A Company must have a "Memorandum of Association", a document from which this form of company derives its powers. Indeed, any action which exceeds these powers is considered to be null and void (the technical phrase is *ultra vires*). This document, must, amongst other things identify the location of the Company's registered office; must show what the objects are; indicate the amount of share capital and how it is to be divided.

There must also exist "Articles of Association". This document is intended to define the powers and duties of the directors. It also regulates the rights and duties of members among themselves.

In forming a company, those concerned must sign the Memorandum and Articles of Association; must make declarations to the effect that the Act is being complied with and that the Company is limited by shares. In addition, there must be identification of the directors, the company secretary and the registered office together with details of the shares and the date of incorporation.

The nature of the capitalisation process requires that these, and a few other rules and regulations are followed. In the end, the business receives a Certificate of Incorporation; in other words a "birth certificate".

The advantages of a limited company are many including:

1. Cash for further expansion can be obtained by share issue.
2. The liability of the owners of the Corporation is limited to the extent of their share holdings.
3. The Corporation, unlike the sole trader and the partnership, enjoys a perpetual succession.

There are a number of other requirements that are specific to a company limited by shares. Specifically, the following documents must be maintained:

1. A Register of Members.
2. A Register of Directors' Shareholdings.
3. A Register of Directors and Secretaries.
4. A Register of Mortgages and Charges.
5. A Minute Book.

7.1.1 Shares and Debentures

Clearly, the purpose of forming a Limited Company is to obtain sufficient funding from the market place. Many corporations employ a number of different types of capital. Broadly speaking they fall into two types, namely Debentures and Share Capital which may be differentiated by the degree of risk that is involved.

Debentures are essentially a loan on which interest is paid irrespective of whether or not profits are earned. On the other hand, the income of those holding shares is dependent upon the ability of the organisation to earn profits.

Even within these two broad categories, there are to be found differing methods whereby contributions can be made to the Corporation. These varying categories of Debentures and Share Capital are outlined in figure 7.1, following.

Briefly, let us consider the differences among the more important varieties:

Ordinary Shares

These are arguably the most 'risky' investment for they carry neither a rate of interest nor a guaranteed return. Holders of such stock are entitled to the residue of profits after all other claims on profits have been paid. Indeed, in the event of a Corporation being wound-up, they have the 'last' claim upon the assets.

These usually represent the most substantial proportion of a Corporation's capital structure.

Preference Shares

These types of shares are less risky and usually carry a fixed rate of dividend. Unless stated, such shares must be considered as being 'cumulative'; in other words, any arrears of dividend entitlement to these shareholders are considered as a prior claim upon current profitability. If this claim is not the case then the shares are non-cumulative and any 'indebtedness' that may arise in one financial period, lapses.

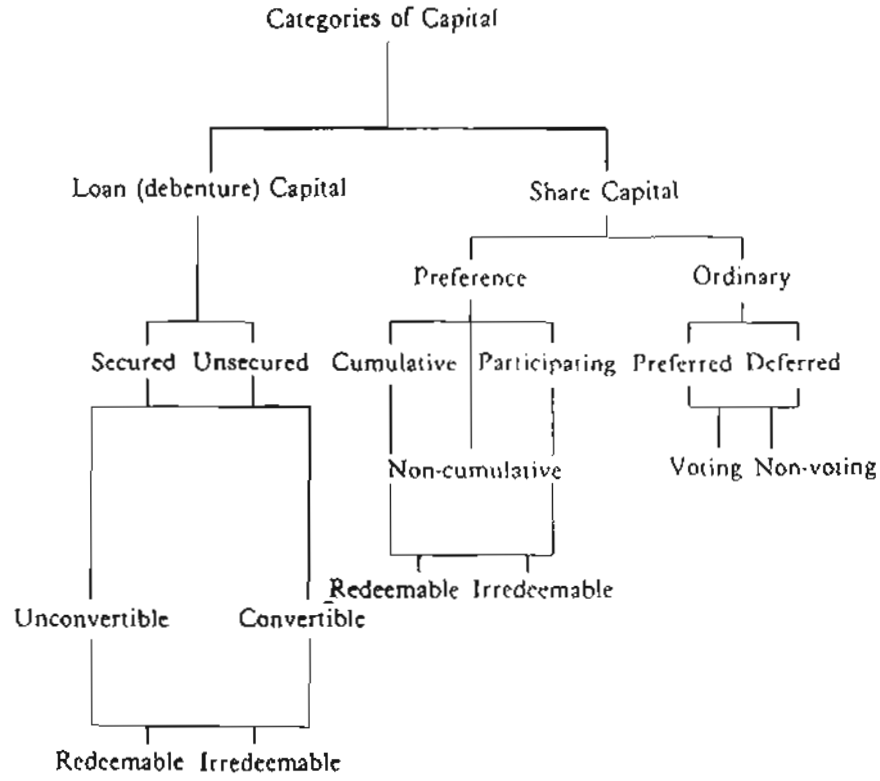

Fig. 7.1

Redeemable preference shares

This special type of preference share is issued on the basis that the amount invested will be returned sometime in the future to these shareholders. The nature of that return varies including, for example, the issue of new shares or the return of funds that have been accumulated from profits through the various financial periods. If the latter, these funds will be found in a Capital Redemption Reserve Fund Account.

Debentures

This second variety of raising funds is in the form of loan capital. The reader must be quite clear in his mind that these are not shares and that debenture holders receive a rate of interest per annum and not a dividend. Because of this, the amount paid is a charge against, and not an appropriation of, profits.

The application and allotment of shares is highly regulated and is a complicated process involving such matters concerning the prospectus issue, statements in lieu of a prospectus and, of course, the return to the Registrar, of allotments made. These matters are beyond this introductory guide and should be considered in more detail by further, independent reading together with such matters as Calls, Calls in Arrear, Calls in Advance and the Issue of Shares at a Premium, at a discount and the forfeiture of shares. Similar comment is made with respect to the issue and redemption of debentures.

7.1.2 A Typology of Capital

Clearly, there are a variety of methods by which funds for a Corporation may be raised. From the business' point of view, 'Capital', of course, represents the liability of the business to the owners. Now that we are considering a Corporation, it is apposite to consider the various types of Capital that may be found in their balance sheets:

Authorised Capital

This is the amount of Capital that the Corporation is permitted to issue in accordance with its Articles and Memorandum of Association.

Issued Capital

This is the portion of the authorised capital that has actually been issued to the shareholders.

Called-up Capital

This is that part of the share price which the Directors decide to use. What is left may be called-up at a later date as and when more funding is required.

Paid-up Capital

This is the portion of the called-up capital that has actually been paid. In other words it excludes the 'bad-debts' element.

Borrowed Capital

This is NOT share capital, it comprises capital that has been obtained by issuing a loan.

Working Capital

This is current assets net of the liabilities that are less than one-year old (i.e. current liabilities).

Liquid Capital

These are assets that can be easily converted to cash (for example, Cash in Bank) less the 'current' liabilities.

7.1.3 The unique features of a Corporation

Clearly, there are differences between the sole trader, the partnership and the limited company. These differences may be best summarised in the form of a simple tabulation such as in figure 7.2 following:

	Sole Trader	Partnership	Limited Company
Regulating Acts?	None	The Partnership Act	The Companies Act
Members?	1	Limited to twenty (with exceptions)	Minimum? Maximum .None
Entity?	Not in itself	Not in itself	A separate entity
Liability?	Unlimited	Unlimited (except in Scotland)	Limited to amount uncalled on capital
Profits?	Whole to the Owner	Partners all take their part	Vested in certain individuals
Tax?	All income of the Owner	All income of the Partners	All income of the Company
Audit Compulsory?	No	No	Yes
Winding Up?	Rules of Bancruptcy	Rules of Bancruptcy	In accordance with the Companies Act
Books Legally necessary?	No	No	Yes
Control?	The individual owner	Equally in the partners	The members
What trade?	any	any	As in Memorandum and Articles
Death?	Cessation	By the Deed	No effect

Fig. 7.2

7.2 A Perspective of the Companies Act

So far, we have indicated that the principal method of forming a Corporation is in accordance with the Companies Act 1985. Let us now take an accounting perspective of that Act.

We have seen how a Corporation enjoys a perpetual succession. Historically, a Limited Company was fraught with distrust as many frauds were perpetuated in its name. One attempt to overcome these was The Bubble Act of 1720. Another was the Companies Act 1862, an Act which was the base of our current legislation.

The UK is a member of the European Community and hence we are subject to many of their directives. An important one was the 4th, a directive which was reflected in the consolidation of the many Companies Acts into The Companies Act 1985.

Under this Act, every company is required to maintain effective accounting records. These should be sufficient to show and explain, on a day-to-day basis, the Company's transactions and in particular, moneys expended and received. All assets and liabilities must be shown and where goods are sold, the records must be able to reveal with whom the transactions were made. Additionally, the records must enable statements as to stock holdings to be made. These records must be kept at the registered Office of the Company. Where the accounts are kept overseas the statute gives special regulations.

For the relative "accounting reference period", the statute also imposes upon the Company Directors, a responsibility for:

1. Preparing the Profit and Loss Account
2. Preparing the Balance Sheet as at the last day of the financial period.
3. Preparing the auditors' and directors' report.
4. Preparing (where there exists a Company which has subsidiaries) a set of Group Accounts.
5. Presenting these accounts before The Company, the shareholders (including other specified interested parties) and to the Registrar of Accounts.

The "accounting reference period" is statutorily defined as the 31st March annually though this can be changed under certain conditions and by application to appropriate authorities.

Clearly, then, certain information has to be prepared and presented. Corporate Profit and Loss Accounts, Balance Sheets, Directors' and Auditors' reports are all statutorily required and a failure to comply is an infringement of the law.

Let us consider some of the effects of the 1985 Act, particularly:

1. The format requirements of the final accounts.
2. The valuation rules.
3. The Director's Report.
4. Modified Accounts.

7.2.1 Format Requirements

It is of the utmost importance that presented accounts can be understood; particularly by those not trained in their interpretation. Clarity is essential and whilst statutory regulations may imply rigidity, reality shows that many Companies are trying "new" methods of presentation yet retaining their obligation in law.

The 1985 Act deals with the format of accounts, their content, filing, publication and their audit. The Act specifically excludes Insurance Companies, Banks and Shipping Companies.

Prior to the Act, the style of presentation was much in the hands of the Directors. Whist the law did identify certain content requirements it did not say how it was to be presented. This is no longer the case. This act now prescribes.

The Profit and Loss Account

There are four styles suggested. Let us consider two of them. Figure 7.2, for example, concentrates upon expenses in a functional fashion and highlights Gross Profit. Figure 7.3, on the other hand, shows a style which concentrates upon the addition of value as raw materials move through the process of production.

Profit and Loss Account (Style 1)

		£
Turnover		xxx
Cost of Sales		(xxx)
Gross Profit		xxx
Distribution Expenses	xxx	
Administration Expenses	xxx	xxx
		xxx
Operating Income		xxx
Operating Profit		xxx
Income from investments		xxx
Interest Payable		(xxx)
Pre Tax Profit		xxx
Taxation		(xxx)
Post Tax Profit		xxx

Fig. 7.2

Profit and Loss Account (Style 2)

		£
Turnover		xxx
Changes in Stock		
Finished Stock	xxx	
Work in Progress	xxx	xxx
		xxx
Raw Materials and Consumables	xxx	
Other External Charges	xxx	xxx
		xxx
Staff Costs	xxx	
Depreciation	xxx	
Other operating Charges	xxx	xxx
Operating Profit		xxx
Income from investments		xxx
		xxx
Interest Payable		(xxx)
Pre Tax Profit		xxx
Taxation		(xxx)
Post Tax Profit		xxx

Fig. 7.3

Specifically, the Act requires that turnover, and its method of calculation, must be disclosed. From this must be deducted, the Cost of Sales. Gross profit must be identified. Next, the profit and loss account must show the expenses of distribution and administration. Finally, certain other operating income (for example, that derived from the sale of fixed assets) must be shown. Once these are done, the statutory requirement of deriving operating profit may be completed.

This is then adjusted such that pre-tax profit is identified and ultimately the identification of profit (or loss) for the financial period.

The Balance Sheet

The format for the balance sheet is also now prescribed. There are two formats offered, the first equates net assets to share capital and reserves, the second, total assets to liabilities. The reader by now should be familiar with both styles.

Fixed Assets and Current Assets are now prescribed, with the former *permitting* sub-classification into tangible assets (for example, property) and intangible assets (for example, goodwill). Amongst other things, the current assets must identify trade debtors, other debtors and prepayments.

As to liabilities, these must now be classified into:

1. Creditors (less than one year)...Formerly, current Liabilities.

and 2. Creditors (more than one year)...formerly, long term Liabilities.

The Notes to The Accounts

Before the passing of the 1981 Act, certain information had to be contained in the Director's Report. The effect of the 1981 Act (which of course is now consolidated into the 1985 Act) is to render certain aspects now a matter for audit.

1. Before the Act, statements of accounting practices were given in accordance with the accounting professions own practices which are encapsulated in their "Statement of Standard Accounting Practices" (SSAP). Now, a statement of accounting practices is a legislative requirement.
2. The charge for depreciation must be shown.
3. Where there are long-term loans, the amount, the rates of interest and the repayment dates must be shown.
4. An analysis of turnover and the pre-tax profits must be shown for each class of business.
5. A statement vis-a-vis new share issue must be included.
6. The nature of pension commitment(s) must be identified.
7. The number of employees, their aggregate wages, salaries, social security and pension costs must be shown.

Items 1 to 7 are but examples of some of the more important statutory notes. Wider reading will complement these.

7.2.2 The Valuation Rules

The valuation rules which were, prior to the Act, enshrined in SSAP2 have now become statutory. Those of importance are:

1. The company's business is a going concern. In other words, it is assumed that the business will continue to operate as a business entity for the foreseeable future.
2. There shall be consistency in accounting policies. In other words, there is consistency in the treatment of like items within accounting periods and of like items between accounting periods.
3. Amounts decided upon shall be upon a prudent basis. This implies that revenue and profits are not anticipated. In other words account is only taken when the ultimate cash which may be realised can be assessed with reasonable certainty.
4. All accounts (income and charges) shall be brought into the accounts. This reflects the 'accruals' concept wherein those revenues and costs which are earned (but not paid) are reflected in the profit and loss account of the period to which they refer.

Some of the effects include that the valuation of assets must be at either historical or production cost; in the case of fixed assets, depreciation must be shown. Goodwill must be written off and the period (which is not statutorily defined) justified in the notes.

7.2.3 The Directors' Report

We have already implied that much of what was formerly contained in the Directors' Report is now a matter of the notes to the accounts. Because of this, the auditor's role is now more onerous than heretofore; he must now make sure that the notes are consistent and if not, he must report accordingly.

The objective of the report, as defined by the Act, is to ensure a fair review of the development of the business and its subsidiaries during the financial year...and the balance sheet...and their position at the end of it. To do this requires the report to contain details of important events that have occurred during the course of the financial period, as well as future developments and the current state of research and development.

7.2.4 Modified Accounts

In some instances it is possible for modified accounts to be presented but this depends on whether or not a business falls into certain statutory classifications.

7.3 Preparation of the Final Accounts

In dealing with the preparation of the final accounts, the reader should realise that there exists little difference between the mechanics required for preparing the accounts for a sole trader or a partnership and that required for preparing those of a Corporate Body. In addition, the reader must also realise that the production of Statutory Accounts is different from the production of accounts by a Corporation for its *own* use. Though a full set of accounts invariably will be prepared by a Corporation, accounts that will be in considerable detail, it is most unlikely that the entire set will be released for publication, despite the fact that they are free to publish beyond the minimum requirements laid down by statute.

One major difference between accounting for Corporations and the accounting for Sole Traders and Partnerships lies in the owners' equity. Accounting for the assets and liabilities is not significantly different from that which we have already considered. In considering the "equity" part of the balance sheet we find that it is divided into two parts:

1. *The capital that has been contributed to the business*

   In essence this comprises the ordinary and preference commitment of the shareholders (remember, debentures are a loan and are therefore not treated as capital).

2. *The earnings that have been retained by the business (Reserves)*

   As we saw in an earlier chapter, reserves take two forms, namely revenue reserves and capital reserves. Within the framework of the Corporation, the former includes all appropriations and amounts that are set aside out of those profits that are available for distribution. An astute organisation will not distribute its entire residual profits but will retain a proportion, perhaps as a contingency for some uncertain future crisis. Such reserves may be identified in the balance sheet under the heading 'general reserves' or perhaps 'debenture redemption reserves'. Such reserves may, however be capitalised and issued through the profit and loss account to shareholders. This cannot be said of the Capital Reserves which typically are the Share premium account, the Capital Redemption Reserve Fund and any profits prior to incorporation.

7.4 Corporation Tax

The 1965 Finance Act introduced, for the first time, a new system of taxation specifically for Corporations. The issue of Corporation Tax is complex and here we can consider only the broad principles. However, readers are recommended to consider this matter in more depth by selecting from among those many specialist texts which deal with this matter more fully.

The main principles of taxation on Corporations are:

1. The application of a determined rate of tax charged on the Company's income. This rate is fixed by Parliament in the Finance Act each year. In particular, the 1984 Finance Act set a sliding scale for the years 1983 to 1986 inclusive.

Financial Year	*Tax Rate*
1983	50%
1984	45%
1985	40%
1986	35%

2. If a dividend *is paid* the Corporation will make a gross dividend payment to the shareholders and a payment of Advanced Corporation Tax (ACT) to the Inland Revenue, which amount is set-off against the total tax due. How is this calculated? The level of ACT is expressed as a fraction of the dividend that is paid; the fraction itself is a function of the current rate of income tax, for example if the current rate of income tax were 34% the fraction would be 34/66ths. If 30%, 30/70ths and if 25%...25/75ths, and so on.
3. If a dividend *is NOT paid* then all the tax due which is chargeable becomes payable on the due date (generally nine months after the end of the accounting period).
4. The Corporation Tax payable by reference to its profits as set off by the ACT is known as Mainstream Corporation Tax.

A simple example will help to make all this clear. Let us assume at the end of a financial period, a Corporation's taxable profits are £150,000 and that no dividend is to be paid. If we assume a thirty per cent rate of Corporation Tax, then the amount of tax that is due to be paid is £45,000, which amount would be paid on the due date (see point 3 above). On the other hand, if we now assume a dividend of £50,000 is to be paid, the company does not withold income tax from the payment. It is required to make an advance payment of Corporation tax. This being the case, and assuming an Income Tax rate of 25%, then the ACT due to be paid to the inland revenue is 25/75ths of £50,000, namely £16,667.

In summary:

	£
Corporation Tax Due	45,000
Less ACT	16,667
	28,333
Mainstream Tax to be paid on due date	28,288

In this example, the shareholders should receive a dividend of £50,000 plus a tax credit of £16,667. The effect, insofar as the shareholders are concerned, is that they will be assessed for income tax purposes upon the dividend and tax credit received (namely £66,667) but will be able to deduct the tax credit from their own tax bill. In this case, the rate of income tax is 25% and that deduction will result in a residual 'benefit' to the shareholder of £50,000.

However, there is a restriction and that is the Mainstream Corporation Tax must equal, at least, twenty per cent of taxable profits. If MCT is too low then adjustments are made such that MCT is retained at the twenty per cent level and ACT is lowered to match.

The computation of what comprises 'taxable profits' is complex and is beyond the requirements of this text where only the broad principles can be considered. Nevertheless, we have seen how Corporation Tax is assessed upon the profits arising during a Corporation's accounting period (normally 12 monthly) and how payment procedures comprise an advance payment (ACT), which is based upon the current rate of income tax, with a residual balance (MCT) which must be paid before a determined due date (usually nine months after the end of the financial period to which it refers).

Clearly, taxation payments and liabilities are represented in the accounts; particularly, any taxation which is deferred (for example MCT) is shown as such and separately in the balance sheet as a liability.

The reader is well advised to consult the more recent tax legislation upon this subject for as each Budget passes the principles and their application will tend to vary from what has been discussed here, a discussion which can only be retrospective in its nature.

7.5 A Practical Example

Perhaps one of the best ways of complementing your knowledge is through additional reading in this subject area and for the reader to obtain a set of recent Company Accounts from which it will be noted that typically, the annual report and accounts of an organisation, in addition to that already discussed, includes:

1. A Statement by the Chairman.
2. A Statement of Sources and Application of Funds. (which is discussed in a later chapter)
3. A Statement of Accounts adjusted for Inflation.
4. A Statement of comparative figures for the previous five or ten years.

To do so will facilitate a wider appreciation and understanding of the nature of Company Accounts and the relevant statutory requirements. Readers should be assured that the ramifications of the Companies Act are many and all that can be provided here are some guidelines. Nevertheless it is worthwhile to consider a practical example which will help to bring together some of the various issues that have been discussed.

Trial Balance of Risk Management plc as at 31st Dec. 1987.

	£	£
Authorised, issued and paid-up share capital		
£1 ordinary shares		150000
Share premium		8000
General reserves		20000
Unappropriated profit (1st Jan 1987)		16200
Goodwill	25000	
Stock (1st Jan 1987)	27900	
Purchases and Sales	221800	319700
Discounts	3400	5020
Salaries and wages	28500	
Rates and Insurance	6400	
Office Expenses	16100	
Directors' remuneration	5000	
Interim dividend (paid 1.7.1987)	7500	
Debtors and Creditors	24000	23300
Provision for Bad Debts		280
Cash at Bank	11780	
Premises	100000	
Furniture and Fixtures	15000	
Motor Vehicles	31000	
Provision for depreciation on:		
Furniture and Fixtures		3000
Motor vehicles		4500
General Expenses	26620	
	550000	550000

The following additional information is given:

1. Stock at the end of the year was valued at £36800.
2. Depreciation is to be provided as follows:
   (a) 10% on furniture and fixtures (book value)
   (b) 20% on motor vehicles (cost)
3. Provision for bad debts is to be adjusted to 2% of debtors.
4. Wages due, but unpaid at the year end, amounted to £3500.
5. Insurance prepaid at the year end was £1800.
6. The Directors are proposing:
   (a) To transfer £5000 to General Reserves.
   (b) To write off 20% of Goodwill.
   (c) To pay a final dividend of £0.06 per share.
7. Taxation is to be ignored.

Readers should now prepare for themselves the trading section of the final accounts which takes a by now familiar form with **goods available for sale** amounting to £249,700; **Cost of Sales** at £212,900 and finally, a **Gross Profit** of £106,800. This final amount is carried to the profit and loss section which results in a **Net Profit** of £16,500 as follows:

Discounts allowed		3400	Gross profit c/d	106800
Wages and salaries	28500		Discounts recd.	5020
add due	3500	32000		
Offices Expenses		16100		
Directors' remuneration		5000		
Rates and Insurance	6400			
less paid in advance	1800	4600		
Increase in provision for bad debts		200		
General expenses		26620		
depreciation:				
Motor vehicles	6200			
Fixtures & Fittings	1200	7400		
Net profit c/d		16500		
		111820		111820

As seen, the profit and loss section differs little. It is worth noting that directors' remuneration is a charge prior to, and not an allocation of, Net Profit. It is after all, a business expense Equally, had there been any debentures and interest paid on them, then such a payment would also have been made prior to Net Profit.

The next account that would be prepared is the appropriation account. This year's operation resulted in a net profit of £16,500 and as seen in the trial balance last year's undistributed profit was £16,200. £32,700 is therefore available for distribution this year. The question that remains open is how?

First, Goodwill is written off. As this is not an operating expense it is written off via the appropriation account.

We have already discussed the nature of General Reserves. In this instance, £5000 this year is written off, thereby increasing the current balance of £20,000 (see trial balance) to £25,000 which latter amount will appear in the balance sheet.

Then there is the dividend. We are advised that the final dividend is 6 pence in the pound. There are 150,000 ordinary shares at £1 hence the dividend due to be paid is £9000 (NB £7500 has already been paid as an interim award). Readers should be clear in their mind as to the double entries. In the latter instance the cash account has already been reduced by £7500 but by the end of the year the dividend due has NOT been paid and therefore the balance remains as a liability.

The appropriation account would be as follows:

Appropriation Account Risk Management plc 31 Dec 1987

Goodwill written off		5000	Balance b/d	16200
General reserves		5000	Net profit b/d	16500
Dividend				
Interim paid	7500			
Final due	9000	16500		
Unappropriated profit c/f		6200		
		32700		32700

We are now left with constructing the balance sheet. This may be done in either format. Here, it is in its traditional form and the reader is commended to 'transpose' it into alternate formats. There are a number of special aspects to this statement to which attention is drawn.

First the nature of the Capital Statement.

In this example, the authorised share capital has all been issued and called-up. This is not normally the case. Despite the level authorised in the Memorandum and Articles of Association, it is unusual for a Corporation to issue it all. More often then not only a certain proportion of that which is authorised is in fact issued. Indeed, in this case should further capitalisation be required, difficulties might arise in finding additional funds. Whatever the case, it is a statutory requirement that the **authorised share capital** is identified in the final accounts even although it may not actually form part of the calculations in the balance sheet.

We have already discussed the role of the share premium account, general reserves and the unappropriated profit balance. All of these 'belong' to the owners and hence are part of the shareholders' equity which clearly stands at £189,200.

Notable absentees from this trial balance are Preference Share Capital and Debentures. Had they existed, the former would have been part of the Capital and Reserve Section of the balance sheet (and therefore been an addition to Equity) with the latter being separately identified under liabilities greater than one year.

It will be recalled that the proposed final dividend was £9000. This appears as a liability and once the shareholders have ratified the directors' recommendation then this item will disappear and cash will drop by the same amount.

The final point concerns Goodwill. This is neither a fixed nor a current asset. It is intangible and appears as such in the balance sheet. Indeed, this item should be written-off as quickly as possible.

Balance Sheet of Risk Management plc as at 31st December 1987

Authorised				
Share Capital	150000			
Capital and Reserves		**Fixed Assets**		
Capital		Premises		100000
£1 Ordinary Shares	150000	Motor vehs.	31000	
		less depr.	10700	20300
Reserves		Fix & Fits.	15000	
Share Premium	8000	*less* depr.	4200	10800
General reserves	25000			131100
Unappropriated profits	6200			
Shareholders' equity	189200			
		Current Assets		
		Stocks		36800
		Debtors	24000	
		less prov B.D.	480	23520
Liabilities less		Prepayments		1800
than 1 year		Cash		11780
Creditors	23300			
Proposed Dividend	9000	**Fictitious Assets**		
Wages Due	3500	Goodwill		20000
	225000			225000

Section Two

Management Accounting

Chapter Eight

THE INTERPRETATION OF ACCOUNTS

8.1 Introduction

Management Accounting, without trying to be unnecessarily repetitive, is principally concerned with the management of resources. It is the management accountant's specific task to provide information to his functional counterparts. This implies the provision of information for the purposes of pricing; for asset, stock and work-in-progress valuation; for performance evaluation purposes and many other provisions that are required for the successful achievement of organisational goals.

The management accounting activity ranges from accounting interpretation through to basic costing and operational research. Whilst this text will certainly consider the former, the latter will not be considered. Nevertheless, the importance of that activity should not be underestimated. At this stage, it has to be said that management accounting and cost accounting are unquestionably linked. However, the emphasis does differ. The former, as said, takes a management viewpoint, whereas the cost accountant is more concerned with simple economic measurement. The lack of clarity between the two is often reflected in the fact that many topics in a management accounting syllabus are similarly found under one entitled "cost accounting". This distinction then, is perhaps more a matter for a discussion on semantics (which clearly has no place here). Nevertheless this, and following chapters, will deal with those aspects of accounting that are more concerned with the future rather than the past.

Broadly speaking, we will first examine performance analysis by considering such matters as ratios. This will be followed by a consideration of sources and application of fund statements and leverage. Next, an examination of budgetary control and breakeven analysis as elements of financial planning and lastly, costing and pricing.

8.2 Ratio Analysis

Many businesses are quite content to accept their final accounts and their balance sheets and to make no further use of them. In fact these accounts should be a guide for future activity and hence we must consider their interpretation. Such a science may be defined as a process of translation such that the financial strengths and weaknesses of a business and, importantly, the causal elements, are identified.

The term "accounting ratios" is synonymous with this action.

A considered judgement about an organisation can be drawn from the accounts by using ratios but it does require a standard to be set. Usually this standard is the past data for the same firm, or similar data from other firms in the same type of business. Only when this standard is set can proper judgements be made and meaningful conclusions reached about poor financial states or perceptions of unhealthy trends.

The interpretation of accounts requires a systematic approach and an understanding of the language of financial statements. In addition, it is essential to appreciate not only the relationship between one accounting figure and another but to grasp their significance.

Interest in the use of ratios is increasing, particularly in the competitive market of the 1980's. Owners, employees and special interest groups are "internally" assessing performance. Trade creditors, potential investors, bankers, trade unions, competitors and many others who are "outside" the organisation are equally interested in performance. All look to the final accounts, the balance sheets, the reports, and the many other sources of information that may help to shed light upon the success, or otherwise, of the organisation they are investigating.

An accounting system has a principal function, namely the provision of useful information. Remember, its initial purpose is to provide an historical record of transactions and, periodically, the Profit and Loss Account and the Balance Sheet. This feature of preparing "retrospective" statements of fact should always be a guide to the future. A methodical approach to the analysis and interpretation of financial accounts is important and clearly the ability to grasp the inference of what the figures are saying is more likely to produce satisfactory results.

Ratios are divided into five main categories, categories which we shall briefly examine:

These are:

1. Ratios as to profitability.
2. Ratios as to liquidity.
3. Ratios as to the use of assets.
4. Ratios concerned with capital structure.
5. Investment ratios.

8.2.1 Ratios as to profitability

The end product of most organisations is the calculation of profitability, perhaps the most important measure of success.

The first ratio we shall consider is the ratio of **Gross Profit** to **Net Sales.** This ratio centres upon the amount of profit earned by a business and it is used as a measure of the efficiency of the production process. It has a limitation, namely, it takes no account of selling, distribution and administration expenses. A manufacturer, for example, may operate with very little by way of these expenses and hence the resultant ratio may be misleading, particularly when compared with another business where these expenses are relatively higher.

There is no reason to limit the matter to gross profit. By taking the ratio of **Net Profit** (after tax) to **Net Sales,** interested parties will be able to obtain an indication of the proportion of revenue that is available for appropriation. Indeed, this is perhaps more useful because it takes account of all expenditure and does therefore act as a better base for performance evaluation.

Net Profit (after tax) may also be expressed as a proportion of the **Owners' Equity** (i.e. ordinary share capital and reserves). Such a ratio is not a measure of overall profitability but more a measure of the expected return to the shareholders.

Another ratio is the **Operating profit** (i.e. net profit before tax) expressed as a proportion of the **Capital Employed.** This ratio gives an indication as to how effectively the capital of the firm is being used.

8.2.2 Ratios as to liquidity

The function of a business is to generate income. This is done by constantly converting cash into a saleable resource. As businesses develop and their markets and points of sale widen, there is a need to consider the credit risk; both the credit obtained from the providers of raw materials and the credit awarded by the organisation to its own customers. There are many examples where "management" of these two aspects has resulted in business failure.

The following are the common ratios:

(i) *The Working Capital Ratio (or Current Ratio)*

Working capital is the excess of **Current Assets** over the **Short-term Liabilities.** It is a measure of the extent to which these liabilities of the business are covered by resources that, with relative ease, can be converted to cash. In other words, this ratio is providing a comparison of assets that will become liquid within a certain period, with liabilities that are due in the same time-frame.

The size of this ratio varies from one organisation to another. A general rule of thumb is that for every £2 of current assets there should be no more than £1 of short-term liabilities; in other words a 2:1 ratio. It has to be said, however that many organisations operate very effectively at a ratio much less than this.

(ii) *The Acid Test*

A second liquidity ratio is the "Acid Test", a ratio which is a refinement of the current ratio in that it *excludes* from the above calculation, the value of **stock.** It gives a "tighter" view of liquidity. If creditors and debtors are paid at the same time then this ratio gives an indication as to whether or not the business has sufficient resources to meet current liabilities.

For this ratio, an acceptable level might be 1:1 and clearly the difference between the Current and Acid Ratios is one indicator of the relative weight of stock in the overall level of current assets.

(ii) *The Liquid Ratio*

This is the ultimate test of liquidity in that it expresses how much ready cash is available to cover the immediate liabilities. It is expressed by the relationship of **Cash** to **Short-term Liabilities.**

8.2.3 Ratios as to the use of Assets

It is clear that the way in which assets are used will affect the profitability of an organisation. The following ratios provide a measure of that used and help to identify where effectiveness (ineffectiveness) arises.

The ratios most frequently used include:

(i) Stock Turnover ratios:
  (a) Raw Materials Stock to Purchases.
  (b) Work-in-Progress to Cost of Production.
  (c) Finished Stock to Turnover.
(ii) Sales to Fixed Assets.
(iii) Collection period for debtors.

(i) *Stock Turnover Ratios*

There can be no hard and fast rules laid down for much depends upon the nature of the industry. Consider, for example, work-in-progress. It is possible that this will be minimal in some businesses and hence this ratio might not be calculated; for others it might be substantial, however, they do provide an indication of how effectively management are controlling stocks; too much incurrs additional costs and ties up working capital.

(a) *Raw Material Stocks to Purchases*

This ratio:

$$\frac{\text{Average Raw Material Stocks}(^1) \times 365(^2)}{\text{Net Purchases}}$$

expresses the number of day's purchases that are held in stock. It is one guide to excessive stock holdings. If the ratio is high, then it might imply that there exists old stock, obsolescent stock or too much stock for requirements.

(b) *Work-in-Progress to Cost of Production*

By calculating this ratio, namely:

$$\frac{\text{Average Work-in-Progress}(^1) \times 365(^2)}{\text{Cost of Production}}$$

there will be obtained an indication of the length of the production cycle...particularly where there is a uniform product. If there are a number of similar departments in the business, by calculating this for each department, then a measure of their relative effectiveness can be established.

footnote[1] (Opening Stock + Closing Stock)/2
footnote[2] If the period being analysed is one month then this figure must be 30

Indeed, production bottlenecks may be identified and hence corrective action taken.

(c) *Finished Stock and Total Turnover*

The ratio is:

$$\frac{\text{Average Stock in Trade}(^1) \times 365(^2)}{\text{Cost of Goods Sold}}$$

Such a ratio is an indication of the time it takes to sell stock; in other words its storage time. If this ratio rises then it looks as though the production process is either providing too much or sales staff are not selling quick enough. If too low, then it is warning of a potential inability to meet consumer demand.

(ii) *Sales to Fixed Assets*

This ratio is an indicator of the utilisation of the investment made in fixed assets. Its purpose is to ascertain if there is too high a volume of fixed assets in relation to the business's turnover. Too low a ratio may indicate ineffective use.

(iii) *Collection Period for Debtors*

The average settlement period for debtors is an important aspect for any business. A measure, of this can be obtained by first dividing the annual net sales by 365 (or the monthly net sales by 30). This component expresses the average daily sales.

Another component is the average balance of debtors for the year (or month) which clearly is the average of the opening and closing amounts. These two components are then brought together thus:

$$\frac{\text{Average balance of Debtors}}{\text{Average Sales per Day}}$$

and thereby produce an index of the effectiveness of a business's credit control policy.

8.2.4 Ratios as to Capital Structure

A most important area to be considered is the manner in which a firm finances its assets. In this instance we are to consider the question:

"How does the capital structure of an organisation affect the cost of capital and the return to the shareholders?"

'Capital Structure' (i.e. the method by which an organisation funds its assets) is an element that is of prime importance to those who are the risk-takers and a number of techniques are available where the extent of that risk can be assessed.

footnote[1] (Opening stock + Closing Stock)/2
footnote[2] If the period being analysed is one month then this figure must be 30

(i) *Net Worth to Total Assets*

This is the ratio of:

$$\frac{\text{(Ordinary Share Capital + Preference Share Capital + Reserves)}}{\text{Gross Tangible Assets}}$$

and is an indication as to the stake that shareholders have in the total tangible assets of the business.

(ii) *Fixed Assets to Net Worth*

This ratio provides a measure by which may be assessed the extent to which funds are tied up in "low turnover" assets. If this is not at an acceptable level then it is likely that further capital would have to be raised

(iii) *Gearing*

This is an expression of the risk-taking relationship between debenture holders and shareholders. Sometimes it is known as "leverage". A company is said to be "highly geared" when the payments required to service the debenture holders and preference shareholders are high compared with the total earnings. When "Low Geared", then the fixed payments are relatively small. The difference between the two has a significant effect upon the amount available to the ordinary shareholder.

Consider the following example:

Company	Capital	Capital Structure		
		8% pref	7% Deb	Ord
	£	£	£	£
A	1000	400	400	200
B	1000	100	100	800
C	1000	–	–	1000

The gearing for each company is calculated by expressing the owners equity as a proportion of the fixed interest investments (namely the preference shareholders and the debenture holders).

Notice that "A" is the most highly geared.

If we were to consider the distribution of a hypothetical profit of £150, then for companies A, B and C it will be seen that the balance remaining for distribution to the ordinary shareholders (remember this shareholder is the last to receive) amounts to £90, £135 and £150 respectively. In other words a 45% dividend for the shareholders of Company "A" and 16.9% and 15% for "B" and "C".

If we were to revise our assumption of profitability and reduce the income by one third, then the comparative figures would be:

	A	B	C
Profit	£40	£85	£100
Rate of Dividend	20%	10.6%	10%

Now consider again company "A". This reduction by one third in the income has resulted in a larger fall in the residue available to the ordinary shareholder. This is symptomatic of a highly geared organisation such as "A".

Where a capital structure is low geared, those with fixed interest commitments enjoy a greater security and the ordinary shareholders will have reasonable stability in the dividend returns. Where the firm is more highly geared there is, as we have seen, the greater likelihood of dis-proportionate variations in the equity earnings.

(iv) *Coverage of Fixed charges*

The ability to pay the fixed interest charges is of equal importance, for if the company fails to do this, then the debenture holders can force the organisation to dispose of its assets in order that interest obligations are fulfilled.

These charges, of course, are an allowable expense for the purposes of taxation and hence the profit before tax should be used. The firm's ability to pay these interest charges may be measured with reasonable accuracy by:

$$\frac{\text{(Profit before Tax + Fixed charges)}}{\text{Fixed Charges}}$$

8.2.5 Investment Ratios

These are measures by which the share earnings (as distinct from company earnings) may be assessed.

(i) *Dividend Yield*

This ratio is an indication of the real rate of return that is obtained by an investment in shares. This ratio, which is:

$$\frac{\text{Gross Ordinary Dividend} \times 100}{\text{Issued Ordinary Stock} \times \text{Market Price,}}$$

and it indicates the risk that is attaching to the investment. In general, the greater the yield, the greater the risk.

(ii) *Dividend Cover for Ordinary Shares*

This ratio gives an indication of the relationship between dividend and the "plough-back" policies of the Directorate. If dividends are too small, then share prices may fall and there arises the likelihood of a takeover bid. If the converse is the case, then the fact that too generous a distribution of dividend exists might be an inhibiting factor to expansion.

The formula is:

$$\frac{\text{Net profit (after tax) – Gross Preference Dividend}}{\text{Gross Dividend on Ordinary Shares}}$$

(iii) *Earnings per Ordinary Share*

An indication of the dividend policy may be obtained by examining this ratio, a ratio which in particular, considers the profit in the period that could have been paid out had the directors so decided.

$$\frac{\text{Net Profit (after tax)} - \text{Gross Preference Dividend}}{\text{Number of Ordinary Shares}}$$

(iv) *The Price to Earnings Ratio*

This may be expressed as:

$$\frac{\text{Issued Ordinary Capital} \times \text{Market Price}}{\text{Net Profit} - (\text{Corporation Tax} + \text{Gross Preference Dividend})}$$

This relationship is an important indicator to the financial manager of the market's evaluation of the shares and is most important when considering a new share issue.

The nature of ratio analyses will vary from one organisation to another, but clearly there is a need to interpret and analyse accounts for many need to know about performance; prospective owners, shareholders, management, lenders and suppliers of materials, customers, contractors, employees and the inland revenue all have vested interests in the effective management of resources. Whatever the case, the analyst must be sure to realise that the evidence from the results of ratio analyses is not necessarily conclusive. Why? It is because methods of stock valuation may differ between organisations, as may the methods of calculating depreciation. The extent of provisions may be at variance and the treatment of extraordinary items (for example, Goodwill) may not be common. These all present difficulties for interpretation and give an uncertain flavour to the basic reliability of the resultant ratios. Whatever the case, ratios do provide identification of patterns in behaviour, patterns which can be compared with past performance or with other similar businesses or processes, perhaps even with budget expectations. They do point to where action may be needed and to further, deeper analyses that may be considered appropriate. Readers should not underestimate the importance of ratio analysis and for this reason they should work their way through a set of published accounts establishing for themselves, appropriate ratios.

8.3 Sources and Application of Funds Statements

We have seen how the financial accountant prepares the final accounts of a business, but on an historical basis. The most important financial statements are clearly the Profit and Loss Account and the Balance Sheet. These are prepared under a variety of conventions and for a variety of purposes but they do have a major deficiency, namely they do not reveal the movement of cash as it comes in and out of a business.

To overcome this problem, management accountants generally prepare a statement which identifies where funds have come from and how they have been used by a business. Clearly, the intent of these statements is to show a movement and hence they cannot be based upon the final figures of one financial period. It is essential to have at the least, two consecutive periods to work with.

The statement which provides that information is known as a Statement of Sources and Application of Funds. The term funds can be interpreted to mean either Cash or Working Capital.

8.3.1 Funds Interpreted as Cash

Consider the following balance sheets:

Balance Sheet Year 1		**Balance Sheet Year 2**	
Capital	Fixed Assets	Capital	Fixed Assets
Liabilities	Current Assets	Liabilities	Current Assets
	Non-cash		Non-cash
	Cash 1		**Cash 2**

We know through our basic accounting equation, (Capital = Assets − Liabilities) that the value of the balance sheet 'Cash 1' item must, for the first year, be the same as the net effect of Capital + Liabilites − (Fixed Assets + Non-cash current assets).

A similar argument may be made in the second year for 'Cash 2'.

If we take these two balance sheets and construct another balance sheet but this time with the values shown as the *differences* between the two years, then the same principal applies.

A simple example will make this clear. Consider these two balance sheets:

Balance Sheet Year 1	£		£	**Balance Sheet Year 2**	£		£
Capital	3000	Fixed Assets	1500	Capital	4000	Fixed Assets	5000
Liabilities	2000	Current Assets		Liabilities	3000	Current Assets	
		Non-cash	1200			Non-cash	1000
		Cash 1	2300			**Cash 2**	1000
	5000		5000		7000		7000

Now we shall calculate for each item the difference between year 1 and 2 and construct a Balance Sheet of 'Differences', thus:

"Differences" Balance Sheet Year 2-1

	£		£
Capital	+1000	Fixed Assets	+3500
Liabilities	+1000	Current Assets	
		Non-cash	−200
		Cash	−1300
	+2000		+2000

What can now be seen, is that between the first and second years, the reduction in cash (£1300) has been a reflection of the net effect of:

1.	A *use* of cash in the purchase of Fixed Assets	3500
2.	A *source* of Cash from a reduction in Non-Cash Current Assets	200
3.	A *source* of cash from an increase in Capital	1000
4.	A *source* of cash from an increase in Liabilities	1000
		2200

In other words, the cash reduction of £1300 can be explained by positing that in the course of the year fixed assets (to the value of £3500) have been purchased using physical cash from the business together with cash sourced from 2, 3 and 4 above. This then is a very basic example and it does show the underlying principal of such a statement, namely the explanation of a change in cash during a period under study. However, it is more complicated than this for not only must we consider the Balance Sheet we must also consider the Profit and Loss Account.

Most managers are keenly interested in maintaining an effective cash flow in their organisations if for no other reason than that of satisfying investment requirements or perhaps meeting the needs of creditor demands. A statement that identifies the expected "in's" and "out's" of cash is called a Cash-flow Statement and it must be distinguished from a Profit and Loss Account which, as we have seen, is concerned with revenue income and expenditure and is affected by such matters as accruals, prepayments, depreciation, appropriations and provisions. The Profit and Loss Account does NOT measure the flow of cash.

Consider the following Profit and Loss Account:

		£
Sales		100,000
Less Cost of Sales		75,000
Gross Profit		25,000
Expenses:		
Depreciation	10,000	
Salaries	5,000	
Accruals	1,000	
Rent	3,000	19,000
Net Profit		6,000

Clearly, the £6,000 has to be adjusted for those items where the principles of double entry do not manifest themselves in the cash account. In this example, the inclusion of depreciation and accruals in the Profit and Loss Account means that the £6,000 balance (which is Net Profit) is a reflection of such 'non-cash' adjustments.

Assume that in a financial period, cash amounting to £90,000 had been received from all debtors and that the opening and closing balances of their accounts totalled, for the year, £5000 and £6000. In the preparation of a cash-flow statement, £90,000 would be recorded and NO account would be taken of the fact that there has been a change in the debtors during the period. Similarly, if a business were to incur a debt (i.e. creditors) when buying stock then it is clear that there are no CASH flows but nevertheless there has been a source of funds and these funds have been used.

Clearly, the reality of business transactions is considerably more complex than this simple example. For these, typical sources and uses of cash include the following:

Sources of Cash

1. Proceeds from the sale of a Fixed Asset
2. Realisation of investments owned.
3. The issue of new capital.
4. The issue of loan capital
5. Increase in current liabilities.
6. Depreciation on fixed assets
7. Cash from Sales.
8. Cash from debtors
9. Rent received.
10. Interest and dividends received.
11. Miscellaneous Cash Receipts

Uses of Cash

1. Purchase of Fixed Assets.
2. Purchase of investments
3. Repayment of Capital.
4. Repayment of loan Capital
5. Cash purchases.
6. Cash paid to creditors
7. Salaries and Wages
8. Expenses (Manufacturing, Selling, Distribution, Administration)
9. Payments of dividends
10. Taxation
11. Losses incurred for a period.

The reader must be sure to remember that one of the most important elements in the development of a Sources and Application of Funds Statement, where changes in Cash are to be explained, is the conversion of items in the trading and profit and loss account (e.g. accruals, provision, prepayments), and changes in stock, debtors and creditors, from an accrual basis to a cash basis.

Here are some points to remember:

1. An INCREASE in stock and debtors represents an outflow of cash.
2. A DECREASE in stock and debtors represents an inflow of cash.
3. An INCREASE in creditors and accruals represents an inflow of cash.
4. A DECREASE in creditors and accruals represents an outflow of cash.
5. Depreciation is added to net trading profit.

8.3.2 Funds Interpreted as Working Capital

We have already discussed how the term "funds" can be interpreted to mean either Working Capital or Cash. Let us now deal with it as working capital. Let us return to our earlier balance sheets:

Balance Sheet Year 1		**Balance Sheet Year 2**	
Capital	Fixed Assets	Capital	Fixed Assets
Liabilities	Current Assets	Liabilities	Current Assets
	Non-cash		Non-cash
	Cash 1		**Cash 2**

Again, we may take these two balance sheets and construct, as follows, a balance sheet of *differences* between the two years.

Balance Sheet Year 1				Balance Sheet Year 2			
	£		£		£		£
Capital	3000	Fixed Assets	1500	Capital	4000	Fixed Assets	5000
Liabilities	2000	Current Assets		Liabilities	3000	Current Assets	
		Non-cash	1200			Non-cash	1000
		Cash 1	2300			Cash 2	1000
	5000		5000		7000		7000

"Differences" Balance Sheet Year 2-1

	£		£
Capital	+1000	Fixed Assets	+3500
Liabilities	+1000	Current Assets	
		Non-cash	−200
		Cash	−1300
	+2000		+2000

What can now be seen is that between the first and second years, the change in working capital (which, it will be recalled is Current Assets − Short term liabilities) is as follows:

	Year 1	Year 2	Difference
Current Assets	3500	2000	−1500
Less Liabilities	2000	3000	+1000
Working Capital	1500	−1000	−2500

Clearly, this fall in the level of working capital in the organisation under study must be a reflection of changes in "non-working-capital" elements of the balance sheet, in other words, Capital and Fixed Assets.

Clearly, the reduction of £2500 may be explained via the net effect of:

1.	A use of working capital in the purchase of Fixed Assets	3500
2.	A source of working capital via an increase in Capital	1000
		£2500

In other words, the working capital reduction of £2500 can be explained by positing that in the course of the year fixed assets (to the value of £3500) have been financed via the use of working capital and an ingestion of capital funds into the business. Again, this example serves to show the underlying principal of such a statement and gives an indication as to how such a statement may be used to explain change.

Adjustments again have to be made with respect to the *net profit*. Depreciation must be added back but this time, no adjustment with respect to debtors, creditors, or accruals is necessary for they are already an integral part of the working capital group.

8.3.3 A Practical Example

Let us now put this into context by considering a practical example. Remember, to start a funds statement you must have two sets of documents which show the opening and closing balances of the financial period under consideration. Here is such a document with the opening balances shown in parenthesis:

Balance Sheet for XYZ plc as at 31st March 1987

	£	£		£	£
Capital and Reserves			Fixed Assets		
Ordinary Share Capital	250	(375)	Plant and Equipment	350	(475)
Reserves	75	(325)			
Debentures	275	(150)			
Liabilities (less than 1 year)			Current Assets		
			Stock	50	(100)
Creditors	125	(200)	Debtors	300	(500)
Accruals	25	(50)	Cash in Bank and in hand	50	(25)
	750	(1100)		750	(1100)

By examining the differences between the two years we can create, as a first stage, a listing of asset and liability changes, thus.

	Decrease	Increase
Assets		
Plant	125.00	
Stock	50.00	
Debtors	200.00	
Cash		25.00
	375.00	25.00
Liabilities		
Shares	125.00	
Reserves	250.00	
Debentures		125.00
Creditors	75.00	
Accruals	25.00	
	475.00	125.00

Now, of course is required the trading and profit and loss account. Here it is.

Trading and Profit and Loss Account for XYZ plc Year ending 31st March 1987

	£
Sales	262.50
Less Cost of Sales	200.00
Gross Profit	62.50

Gross Profit		62.50
Expenses:		
Selling Expenses	205.00	
Admin Expenses	95.00	
Financial Expenses	12.50	
		312.50
Net Profit (Loss)		(250.00)

In the second stage, we must convert this in such a fashion that it shows the cash flow, in other words we adjust it from an accrual basis:

First, consider the sales of £262.50. This clearly includes sales made on credit and we see from the balance sheet that debtors have decreased by £200 hence we add to sales this amount. The resultant cash flow is £462.50

What now of the Cost of Sales? In this instance the level (£200) must be adjusted to account for the change in stock levels. Consider the balance sheet. It will be seen that stock has decreased by £50. This must be deducted. Then there is the change in creditors. Here the decrease is £75, an amount, of course, which does not represent an ingestion of cash. This must be added to the cost of sales. Thus the true "cash" basis of the cost of sales is £225.00.

Finally, there are the accruals. Here these have decreased by £25. This must be added to the operational expenses, thereby producing a cash flow figure of £337.50.

To summarise, the conversion of the profit and loss account to a cash-flow basis results in:

1.	A Sales Cash Flow of:	462.50
2.	A Cost of Sales Cash Flow of:	225.00
3.	A cash flow on operations of:	337.50

Now that we have this data we are in a position to explain the change in cash that has taken place during the year:

Sources and Application of Funds Statements for 1986-1987

Sources of Cash		
Cash Balance at the start of the period		25.00
Sales	462.50	
New Debentures	125.00	
Sale of Plant	125.00	712.50
		737.50
Application of Cash		
Decrease in Shares	125.00	
Cost of Sales	225.00	
Operations	337.50	687.50
Cash Balance at end of period		50.00

So much for explaining the change in cash. What of Working Capital? Essentially, the structure is much the same.

Sources and Application of Funds Statements for 1986-1987

Sources of Working Capital		
Working Capital Balance at the start of the period		375.00
New Debentures	125.00	
Sale of Plant	125.00	250.00
		625.00
Application of Working Capital		
Decrease in Shares	125.00	
Decrease in Reserves	250.00	375.00
Working Capital balance at end of period		250.00

It will now be seen how the two statements are drawn up. From a management point of view, it is more likely that they will be interested in the cash statement, however, shareholders interests are likely to be more concerned with the effective use of working capital. Why? It is that the latter is essential to expansion and although it may be of interest to know the extent to which working capital has changed (in this example by £125), it is of greater importance to have that change explained.

A Source and Application of Funds Statement does just that.

For the purposes of obtaining a better comprehension, readers should be sure to consider sets of published accounts (wherein such statements are found).

8.4 Conclusion

Effective management is a key to success, but it is not the role of this text to enter into a discussion upon that subject. Nevertheless, some pointers have been made. First, the management accountant is more concerned with the future and hence past data is used by him as a means of assessing the future. In this instance we have considered two techniques; namely ratio analysis and the creation of statements of the application and sources of funds. These, of course, are more concerned with past performance, but their use must not be underestimated for they are, nevertheless, useful catalysts to a management accountant's planning role.

Chapter Nine

COSTING

9.1 Introduction

We have seen how financial accounts are created for the prime purpose of presenting an historical perspective of performance and in the last chapter, we considered a number of methods by which such data could be used to provide an indication of performance. However, there is a further limitation which must be overcome, namely, that the financial accounts fail to give an indication of the relative profitability of a particular product. Management are in the dark for they allow for no "product-specific" controls, for example, the control of sales and expenses.

Consider, for a moment, the following statement of a company which manufactures rubber and synthetic tubing:

Income Statement for R & P Manufacturers

	£	£	£
Sales			26000
Raw Materials	6000		
Direct Costs	4000		
Prime Cost:		10000	
Indirect Costs:			
Power	2000		
Rent	1000		
		3000	
		13000	
Selling	2000		
Distribution	4000		
Administration	2000		
		8000	
Total Cost:			21000
PROFIT:			5000

It does not look unhealthy but if we were to break the data down, another picture emerges.

	Rubber £	Synthetic £	Total £
Prime Cost:	7000	3000	10000
Indirect Costs:			
Power	1500	500	2000
Rent	900	100	1000
Selling	1500	500	2000
Distribution	2000	2000	4000
Administration	500	1500	2000
Total Cost:	13400	7600	21000
Sales:	10000	16000	26000
PROFIT:	(3400)	8400	5000

What is now clear, is that the organisation is producing the rubber product at a loss and it may well be advised to discontinue production. Indeed had there been a proper budgeting system, some manipulation mid-term might have rendered this line profitable. However, this should not be done without careful consideration of the elements of cost.

Further care should be taken, for despite its loss-making feature, the product nevertheless contributes towards some costs (for example rent) and should production of that unprofitable line cease, then the burden of the rent will have to be borne entirely by the remaining product line.

It is within this framework that we find the role of cost accounting.

9.2 The Elements of Cost

Cost accounting plays an important role in monitoring profitability and ensuring that there is a reasonable return on the owner's investment in the business. Why? It is because product costs are a significant part of the determination of the financial position of the firm. Overall, cost accounting is concerned with cost estimation, cost allocation and the determination of product cost. It is one technique that attempts to overcome the limitations inherent in financial accounting and is used, amongst other things:

1. To assess profitability.
2. To prepare estimates and fix selling prices.
3. To provide a plan of operation.
4. To aid management and supervisory decision making.

The idea of prime, indirect and total costs has already been introduced in the earlier chapter on manufacturing accounts, but there are other ways in which costs can be categorised. For a moment consider the following three:

1. **Fixed Costs**

   These are the costs that do not change with the quantity produced. A typical example has already been considered, namely rent. Such costs have still to be paid even if the plant is idle!

2. **Variable Costs**

   These costs generally change with output. If production rises, then so does the variable cost (for example wages). If production falls then the converse is the case.

3. **Semi-variable costs**

   These costs are partly fixed and partly variable. The provision of services (for example gas or electricity) is usually subject to a "standing charge". To this minimum charge there is added further amounts according to that which is consumed.

The nature of the costs considered in the earlier discussions may, from a costing point of view, be summarised as follows:

Direct Materials
add Direct Costs = **Prime Cost**
add Overheads
Fixed Costs
and Variable Costs = **Production Cost**
add Sales
Fixed Costs and
Variable Costs

add Distribution
Fixed Costs and
Variable Costs

add Administration
Fixed Costs and
Variable Costs = **Cost of Sales**

From which is derived the formula for the selling price, namely:

Cost of Sales + Profit Margin = Selling Price

Now, if the basic structure is considered within the framework of "Cost Centres" (such as the departments in our earlier example or functional processes) then in the end there is the means by which responsibility can be identified and cost controls can be carried out. The allocation of these costs varies according to their nature; prime cost, for example, is absorbed directly, whereas those that cannot, have to be apportioned according to some laid down criteria. It is clear that providing a proper system of cost accounting exists, it will be possible to establish whether or not a profit is being made by:

1. A Business,
2. A Department,
3. A Production Process,
4. A Particular Job,
5. An Article

Costing is very much a planning tool but a costing system cannot parallel the annual preparation of the financial accounts; an annual time-frame is simply too long. To monitor and control costs, requires a short time frame such that at the end of the financial period, interim efforts have been exerted and profit expectations realised. Generally speaking, cost accountants use a recurring four-week period in order to ensure that comparative statistics are made available.

It has already been implied that there are a variety of costing methods. Broadly speaking there are two; the first is *job order costing* (which is a system that centres upon a particular job). Construction organisations, for example, are more able to identify individual jobs and are likely to use such a procedure as are firms engaged in the manufacture of products to order or contract. The process has the advantage of being simple but it does require relatively more resources to manage. The second is *process costing* and is more typically used where there are identical products produced in a continuous flow.

There are others, which we will consider, but they are all variations upon the job or process theme.

9.2.1 Job Order Costing

In this instance, the costing process monitors the item being processed with the objective of establishing the profitability of each job. Imagine that R and P Manufacturers lines the inside of storage tanks with a rubber compound; a compound which helps to restrict internal corrosion. Clearly, two features emerge, first the need to control it financially. The former is usually the remit of the production manager; the latter, the cost accountant. Once the production manager has made the arrangements (for example, tooling and machine useage) and authorises the go-ahead, the cost accountant must initiate systems for financial control. This he does by regulating the costs as they go through the production process. Broadly speaking, this question of cost control implies the cost effective use of resources and given that raw material costs are, on balance, much the same for similar production processes, profitability then is, arguably, a feature of adequate cost control and the quality of the finished goods.

In essence, the cost accountant records both material and labour costs (i.e. Prime Cost) and the indirect overheads (including selling, distribution and administration costs). The end product is the registration of the value of the work in progress until, ultimately, total cost is obtained and hence a measure of profitability.

Clearly, the method is such that as the job progresses in accordance with the physical plan, production re-scheduling, if necessary, can be re-considered. As it progresses in accordance with the financial plan, the state and value of the work-in-progress can be assessed and adjustments made in accordance with pre-determined limits with the ultimate objective of ascertaining the profitability of each job.

Other methods of costing which will be examined briefly are batch costing and contract costing.

(i) *Contract costing*

This method is used in the engineering and building industry. Typically, a cost sheet is maintained for each contract on which is recorded the direct and the overhead costs. Clearly, the determination of contract profitability is reasonably easy where contracts start and finish in the same financial period but problems can arise when contracts extend across financial periods

(ii) *Batch Costing*

It will be recalled with job costing, that each job is costed separately. In this form of costing, the unit comprises a group (or quantity) of objects which are generally homogeneous in nature The knitwear industry might use such a method where it is more practical to make batches of jumpers of similar styles, colours etc.

9.2.2 Process Costing

The second principal procedure, process costing, is one of the most common methods of costing. It neither considers the individual nor the batch but centres upon a production process. Its objective is to establish an average cost of a product via a simple process of accumulating for a specified period, the relevant elements of total cost and dividing by the total output (in other words, the number of units recorded as having been produced).

For example, let us now consider another hypothetical organisation:

Figure 9.1 identifies three production lines (A, B and C), A and B at Plant X, and C at Plant Y. In addition, each production comprises four processes as identified. Cost centres in this instance could be in accordance with location; possibly, the cost centres could be each of the plants. Each process could be a cost centre. Clearly, features such as the span of an individual's authority, the homogeneity of the work performed and the geographical grouping of personnel and machines are integral factors in the identification of cost centres

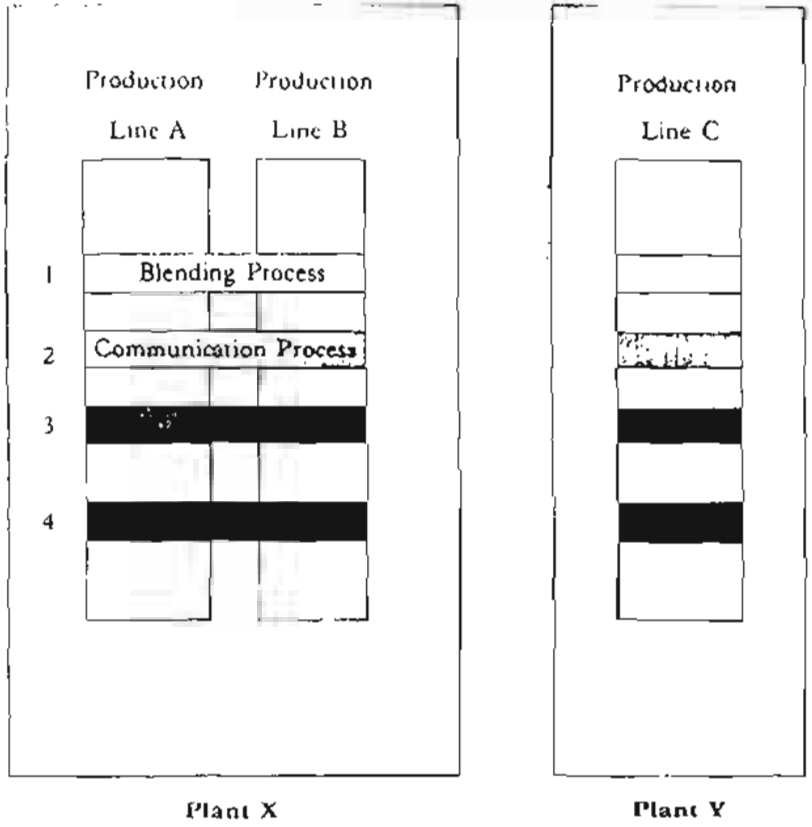

Fig. 9.1

Whatever the system, it must be designed to fit the organisation and not the converse and, wherever possible, costs which are easily identifiable to cost centres should be so charged.

Whatever method is chosen, direct and indirect costs are allocated to the centre and hence the value of the work carried out can be easily monitored. With the knowledge of the volume of production, unit cost can be determined with ease.

The reader must realise, of course, that not only must those units which are completed be estimated, but so also should those still in the production process. For example, let us presume production process A, at the end of the time period comprises 1000 completed units, with 200 units comprising "work-in-progress".

	£
Raw Material costs	6000
Direct Costs	3450
Indirect Costs	2750
	12200

and which were:

Raw material . . . . . fully completed
Direct Costs . . . . . ¾ completed
Indirect Costs . . . . . ½ completed

The question that remains open is this: "What is the valuation of the completed work in progress?" To establish the answer, the uncompleted units must be made equivalent to what is finished; for example:

100 units of fully completed materials	=	100 units completed
100 units of ¾ completed direct costs	=	75 units completed
100 units of ½ completed indirect costs	=	50 units completed

Thus:

	Completed (1000 units)	Work-in-progress (200 units)	Total	Average Cost
Materials	1000	200	1200	£6000 / 1200 = £ 5
Direct Costs	1000	150	1150	£3450 / 1150 = £ 3
Indirect Costs	1000	100	1100	£2750 / 1100 = £ 2 50
			Total	£10 50

This results in an average cost of £10.50 per unit produced, therefore transfer cost may be represented by the formula:

completed units x unit cost

1. Finished Goods . . . £10500 and
2. Work in Progress . £2100

9.2.3 Marginal Costing

Another kind of costing used with frequency is marginal costing. It is a technique which considers the costs involved in the production of the *additional* unit. There are some accountants who argue that the allocation of all overhead costs to products is wrong, particularly with respect to fixed costs which they argue should not be so apportioned because such costs are incurred in a defined time period and should not therefore be carried to further time periods.

As a concept, marginal cost is not unknown to the Economist, who considers that profit maximisation occurs at that point where the marginal cost of producing the extra unit equals the marginal revenue that it

obtains. Any production beyond this point, so they argue will result in a decrease in profitability. However, the idea of calculating the cost of the marginal unit seems more idealistic than practical.

To the cost accountant, the term implies more the total cost obtained by adding prime costs and variable costs; in other words, all costs other than those which are fixed are considered to be marginal costs.

In addition, the economist does tend to consider the long-run, rather than the short-run, a period in which the fixed costs can be considered as such. For this reason, any addition to the production process can be considered within the framework of variable costs and hence any addition to the quantity produced means a further "contribution". The reader will therefore realise that the burden of the fixed costs is thereby spread more widely, indeed, the "contribution" may be calculated mathematically by subtracting from the value of the sales, the sum of prime costs and variable cost.

9.3 Pricing

It is essential that an organisation obtains a price for its products that is sufficient to cover its costs. However, pricing problems are often more complex than simply the creation of a cost per unit and then adding to that a margin for profit. For example, we live in a changing environment where consumer demand, changes in society and environmental conditions, competitor advertising, sales force expansion and a host of other features are likely to have an effect upon price.

There exist two broad theories to pricing, namely:

1. The economist's theory, which, as we saw earlier, suggests that the most effective use of resources is at that point where marginal revenue is equal to marginal cost. An example will make this clear:

Selling Price per unit	No. of Units which may be sold	Revenue	Total Variable Costs (£'s 000's)	Fixed Costs (£'s 000's)	Profits (£'s 000's)
30	100	3.00	1.80	0.8	0.40
32	90	2.88	1.62	0.8	0.46
34(*)	80	2.72	1.44	0.8	0.48
36	70	2.52	1.26	0.8	0.46
38	60	2.28	1.08	0.8	0.40
40	50	2.00	0.90	0.8	0.30

(It should be clear that the maximum profit is yielded by a price of £34(*) per unit).

2. The other method is cost-based and is in line with the convention of conservatism (see chapter 5). On this basis, costs may be established by:

   1. Full cost pricing
   2. Conversion cost pricing
   3. Variable cost pricing.

9.3.1 Full cost pricing

Both fixed and variable costs are included in the selling price. The price that is thereby obtained is a function of total costs + profit margin. The following table gives an example, though the reader is warned that this method does have its problems in that it is sometimes an uneasy task to assign costs to individual products.

	Products A	Products B
	£	£
Prime Cost	10	16
Factory Overheads:		
Fixed	6	3
Variable	4	1
Total manufacturing Costs	20	20
Selling, Admin. overheads:		
Fixed	2	3
Variable	4	3
Full cost per unit	26	26
50% mark-up	13	13
Selling Price	39	39

The reader is now asked to assume there to be good demand for the first product (A). This being so, then it would seem reasonable to transfer some of the fixed costs that are being incurred by product line (B) to the other (A) in order that the price of (B) may be reduced (thereby increasing demand for that product). Notice, however, that this suggestion is moving away from the principle of full-cost pricing.

9.3.2 Conversion Pricing

This method accounts only for those costs that are incurred in converting the raw materials into the finished goods. In other words, direct materials are excluded. The advantage of this method is that it reflects the amount of effort used. Another example follows. Note how the 100% mark-up is based upon conversion costs only:

	Product X		Product Y	
	£	£	£	£
Direct Materials		4		12
Conversion Costs:				
Direct Labour	6		4	
Factory Overheads	10	16	4	8
Total factory Costs		20		20
Mark up (100% conversion cost)		16		8
		36		28
Selling and admin costs		6		6
Selling Price		42		34

9.3.3 Variable Cost Pricing

Such pricing is discriminatory. If, for example, a product is produced that has saturated one market, and has provided the revenue to cover fixed costs then a second market may be reached by making a minimal alteration to the product. The fixed costs are already covered and consequently the price can often be lowered.

Clearly, the price is an important element in business performance and generally speaking, the unit variable costs provide a means of determining (in the short term) the lowest limit of prices (in the short term) and in the long term all costs and the profit margin, must be considered.

9.4 Break-even Analysis

By analysing costs into those that are fixed and those that are variable, a point may be reached where neither profit nor loss is made. In other words a "Break-even" point. Such costs may be represented in the form of a graph, a graph which, in essence, is one of the profit and loss account.

The x-axis marks the volume of production and the y-axis, the costs and sales revenue. Let this be demonstrated by example.

Consider two companies (A and B) whose profits are identical at £20,000.

	A	B
Sales	100,000	100,000
Variable Costs	20,000	50,000
	80,000	50,000
Fixed Costs	60,000	30,000
Profit	20,000	20,000

The principal diagonal on the following graphs (see figures 9.2 for A and 9.3 for B) show that whatever the level of production, production and sales will be the same.

The fixed costs are represented by the horizontal lines to which is added the variable costs. At "nil" production, there are no variable costs; only fixed costs are incurred. At 100 per cent output, variable costs plus fixed costs for A and B are £80,000 and £80,000 respectively. Notice that these total costs are the same but the component parts are not. Notice also, that the "break-even" point (marked **XA** and **XB**) differ. These points indicate where total costs cut the principal diagonals which we know represent sales, hence neither a profit nor a loss is made. Here, costs of production equals the revenue obtained from sales.

The break-even point in the first graph (£75,000) is higher than in the second (£60,000). This serves to show that in the former, there exists a higher level of fixed costs that have to be absorbed by the production process. Clearly, the policy should be to keep fixed costs as low as possible.

The reader's attention is drawn to the "margin of safety", that is the distance between the maximum output and the break-even point. This margin identifies the extent to which production or sales may fall before incurring a loss.

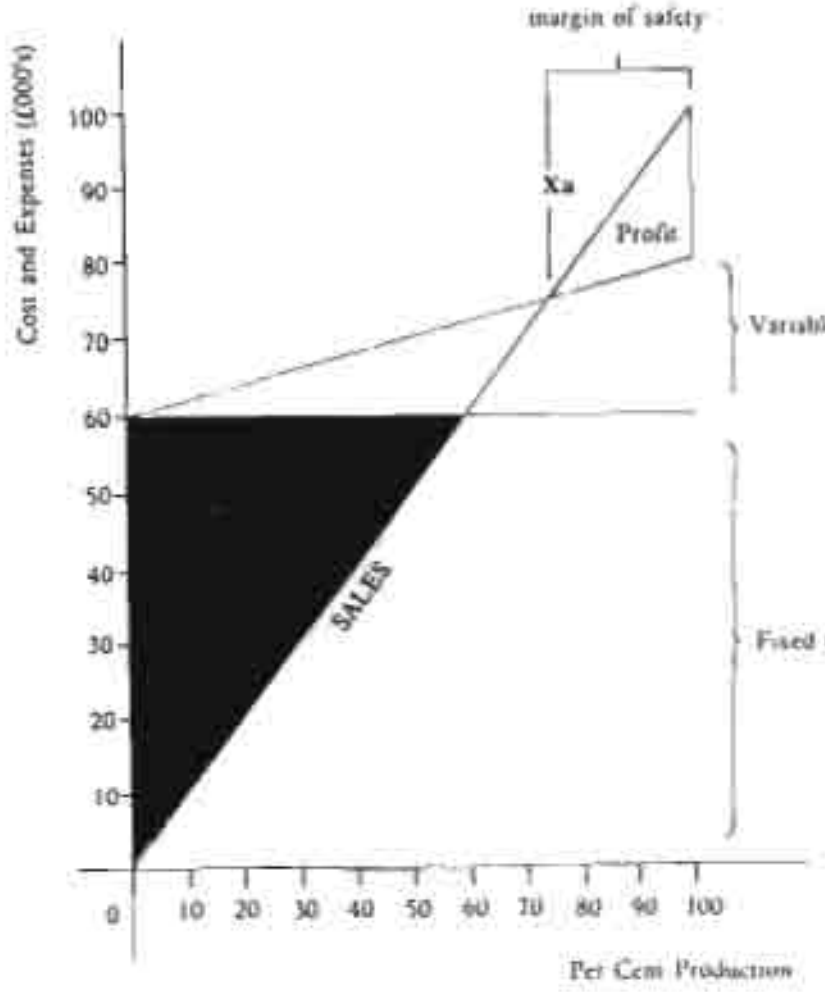

Fig. 9.2

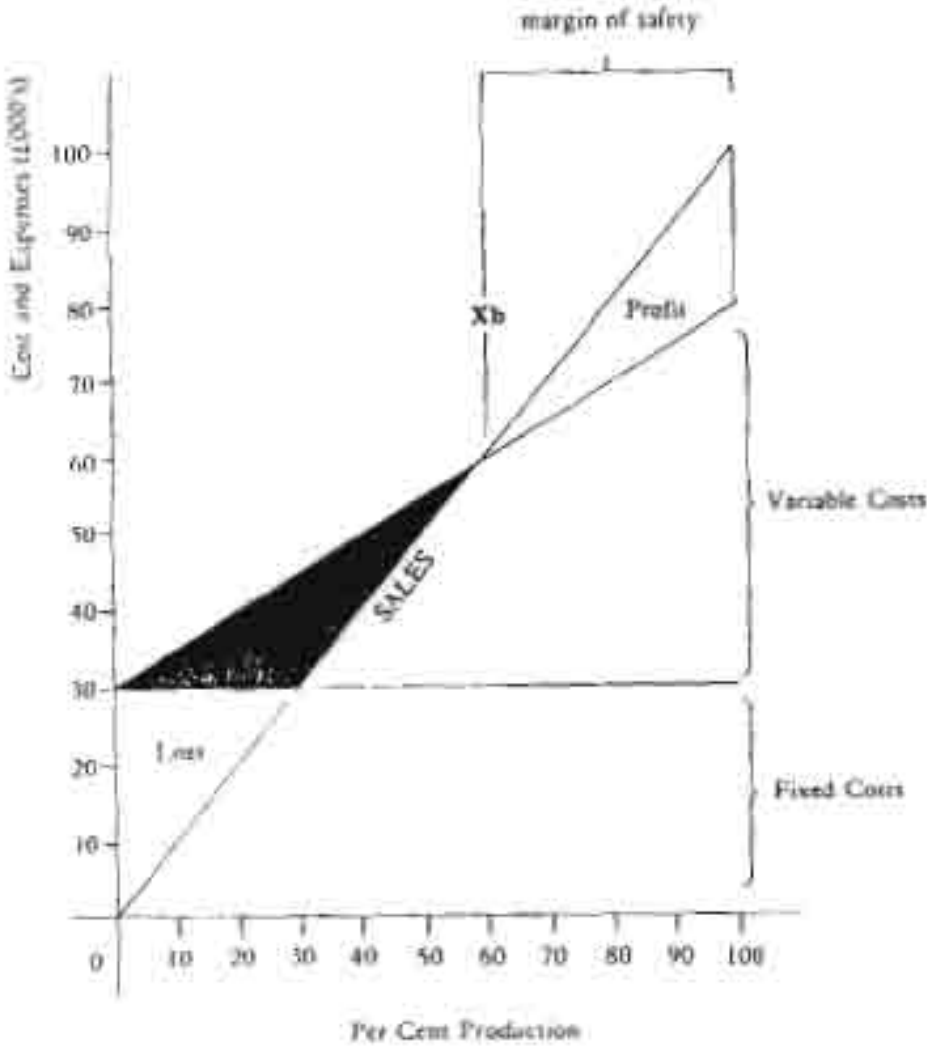

Fig. 9.3

Although break-even analysis is a valuable management tool, it does have some limitations:

1. It assumes that production and sales increases always coincide.
2. Profit margins do vary from product to product and consequently it is essential to forecast a sales mix.
3. Variable costs are assumed to be in direct proportion. This is not always so. Equally, fixed costs, as we have seen, are not always "fixed".

The break-even point may also be calculated mathematically via the following formula:

$$\frac{\text{Fixed Costs}}{\text{Percentage Contribution}}$$

What, then, is contribution?

9.4.1 Contribution

"Contribution" represents the amount of the revenue that remains available to contribute to fixed expenses. In this instance, the "contribution" for A and B may be established by using the formula:

	A	B
Sales – Variable Costs =	£80,000	£50,000

and hence the break-even points are £60,000/0.80 = £75,000 and £30,000/0.50 = £60,000, respectively.

9.4.2 The Profit/Volume Graph

Another way of representing the data is to draw what is known as a profit graph. This is a very useful way in which to show comparisons of break-even points between, for example, differing products. Figure 9.4 gives an example based on the data for Company A and figure 9.5, that of Company B.

The reader must not be led into thinking that the break-even point is rigid. It is not. It can move for many reasons, changes in fixed costs, in variable costs and in the selling price of the unit will precipitate a change. Indeed, readers should for themselves, reconstruct the break-even graphs and the profit graphs on the bases that there is a 10 per cent reduction in selling price. It should be observed that such a change will cause the break-even points to rise, and readers must be clear in their minds that although a fall in prices may cause an increase in demand (and therefore turnover), it does not necessarily mean that there will be an increase in profitability. In the circumstances it is clearly more important to effectively manage a reduction in fixed and variable costs.

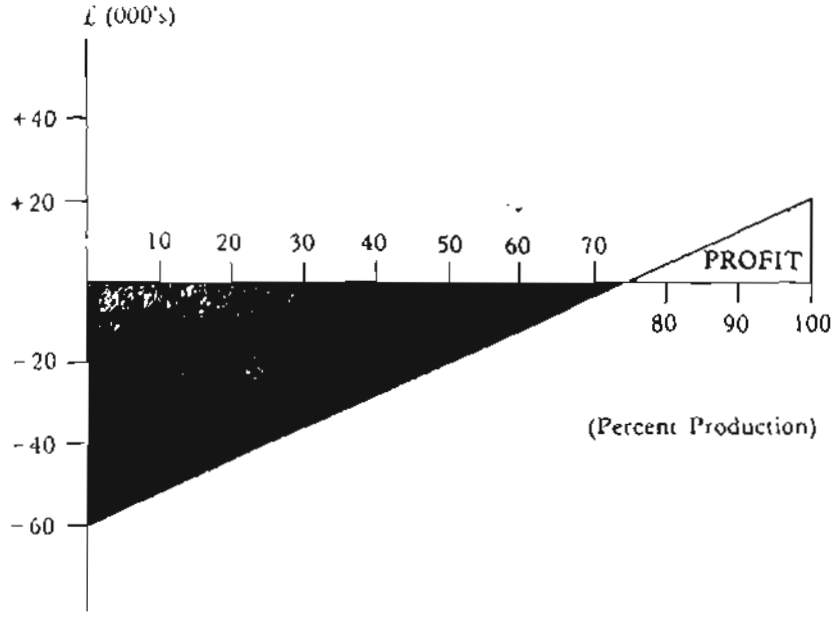

Fig. 9.4

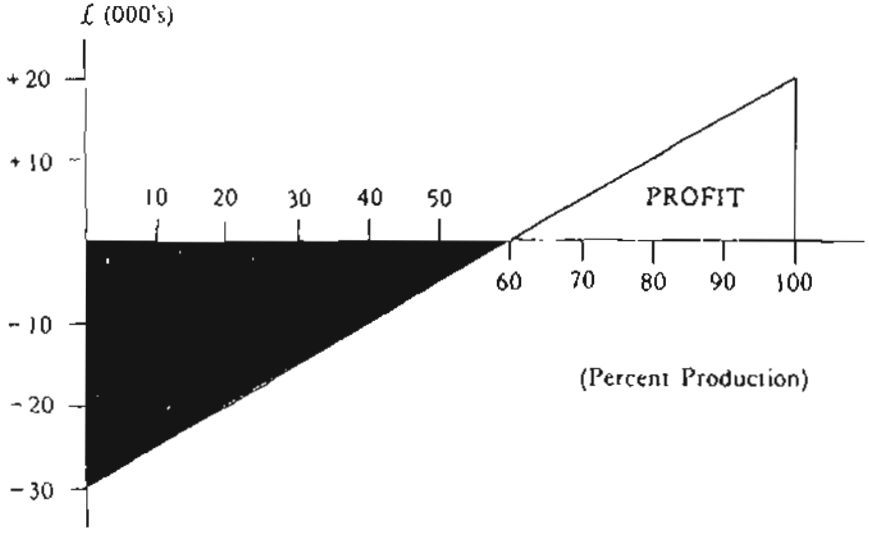

Fig. 9.5

9.5 Budgetary Control

There can be no doubt that the proper analysis of historical data provides valuable insight into performance and is one essential ingredient in the receipe for financial success. Another ingredient is maintaining control of short-run costs and monitoring and adjusting where necessary. By doing this, the manager is more likely to achieve the desired results rather than would a "laissez-faire" approach. One technique available to him is budgeting as a means to the realisation of organisational objectives.

No suggestion is made that planning and budgetary control will - *de facto* - obtain objectives, but, at least, they are an aid, particularly if a master budget is prepared and broken down into both budget centres and monthly equivalents. If this is done, then management may be able to implement recovery plans before it is too late.

The following, in very simple terms, is an example of a Master Budget -

Master Budget (£m's)

Budget Centres

1			2	3	4
Production			**Expenses**		
Raw Materials	Direct	Indirect	Selling	Administrative	Financial
30	15	.24	10	05	01

which, accounting for seasonal variations in the production process, may result in the following quarterly breakdown.

	Production			**Expenses**		
Quarter	Raw Materials	Direct	Indirect	Selling	Administrative	Financial
1	.10	.04	06	03	01	01
2	05	.035	.06	.02	.01	01
3	05	.035	06	02	01	01
4	10	.04	.06	03	02	01

This simple example serves to show the principal of a budget structure. However, it does vary from one organisation to another and, of course, is likley to be further broken down into the monthly elements suggested earlier. Sometimes, even, there are weekly components.

With such a structure, production staff will have their budgets to achieve. Those responsible for sales will also have theirs. The result ... all things being equal ... a planned business process and achieved profitability. The effect should be that an *expected* profit and loss account is created then broken down into its component parts. In effect, management prepare a detailed statement as to the need and use of resources over a specified time period. In monitoring this process, management will become aware of unhealthy deviations from plans and will be able to make appropriate, mid-term adjustments thereby providing a stronger base for goal achievement.

9.5.1 Limiting Factors

Clearly, there are two dependent elements to most business processes. First, the need to produce and second, to sell. It would be naive to suggest that there are not limiting factors in this process; factors which are of importance in the preparation of a budget. For example, market research may confidently predict that consumers will demand 1000 units of a good yet production may only be able to cope with 500. It would be a foolish business that would prepare a short run budget to satisfy the former.

Other limiting factors may exist, for example storage facilities, transport facilities and so on. Whatever the case, consideration of these limiting factors *within the entire* budgeting process is an essential prerequisite to master budget preparation.

What must also be borne in mind is that invariably there is a time-delay between production and selling. For example, in a brand new production line, production may start on DAY 1 and sales cannot be completed until DAY 10. This serves to illustrate that if sales commence on DAY 1, there would have to be finished goods already to hand. In other words, in any period, sufficient stock must exist from previous periods to satisy the next period's sales and budgets must cater for this eventuality.

Chapter Ten

INVESTMENT APPRAISAL IN RISK PROTECTION

10.1 Introduction

We have already seen how management use of information to help them in their decision-making, for example, by using product costing to determine pricing; by using cost analysis for operational planning and control. In this chapter we shall examine some further special analyses that will aid management to make more effective decisions.

Most organisations exist in a state of homeostasis; in other words, they are in a perpetually changing state of equilibrium. One feature of this ever changing state, is the fact that businesses are continually being confronted with problems about which decisions have to be made. It would be useful, therefore, to consider for a moment, the framework within which business decisions are made. Clearly they start with the identification of a problem which requires to be resolved. After this stage, the accountant as the supplier of data will consider the alternatives, estimating anticipated costs and revenues and their financial effect upon the business. Only then can a decision be made. It goes without saying, that thereafter, there must be an audit, or feedback process which ensures that the decision is being effective and if not, corrective action will have to be taken.

A further aspect we must consider is the structure of an organisation in terms of its decision-making characteristics. This is summarised in Figure 10.1

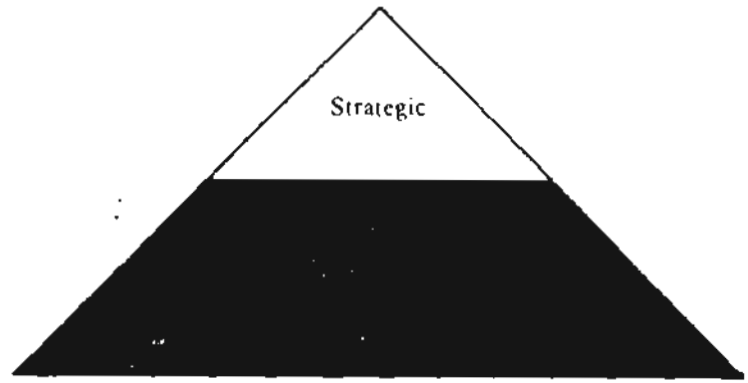

Fig. 10.1

At one end of the scale, problems are organisational in their nature; they are routine and generally highly structured. They occupy little of management's time. At the other end of the scale there are the strategic decisions. They are concerned with the longer term; they occupy a greater proportion of management time and usually involve considerable resource commitment. We only need to pick up a daily newspaper to see the nature of such commitments. They are frequently substantial. Witness the Westland affair of 1986; the £500 million expansion and modernisation of Marks and Spencer's chain stores. Clearly, such decisions require considerable thought, deliberation and above all, precision in the determination of objectives. They are decisions that very much determine the success (or failure) of an organisation's future and whilst, of course, there are many other examples of decisions with which organisations are faced, particularly as we move down the organisational structure, they tend to have less impact. That does not mean to say however that they are of less importance.

Consider, for example the tactical level of decision making. Here decisions are made in order to support the overall objective of the organisation. For example, a decision as to the nature of product packaging may well be less onerous in terms of the contribution by senior management and resources but nevertheless it may have a substantial impact upon the organisation's performance.

Then we have the bottom rung, namely those decisions which concern the day to day running of the enterprise. In themselves they have little major consequences but collectively they require to be performed in order that the overall objectives of the organisation materialise.

10.2 The Need for Goals

It is clear that whatever the nature of the decision, its resolution has a purpose; a goal that has to be achieved. Let us for a moment, consider the variety of goals that an organisation may consider. Imagine a large multi-national holding company which is deciding upon an investment of many millions of pounds. The question that remains open is this. Upon what criteria are management going to base their decision? For example, we frequently hear of "profit maximisation"as one, or "sales maximisation" as another. There are others ranging from obtaining some pre-determined "share of the market" to "organisational survival", perhaps even "peace of mind". What is essential to grasp is that an overall objective is more likely to be multi-dimensional; in other words a combination of variety of goals rather than dependence upon one alone.

Perhaps the most widely held view is that of profit maximisation. We have already seen that the net profit of a corporate enterprise is dependent upon so many features The costs of production – direct and indirect, the cost of sales and distribution: administration and financial costs are all elements to the assessment of profits and if profit maximisation is to be the objective then techniques have to be developed to ensure, with

reasonable certainty, that that objective will materialise. In other words, in deciding to invest, corporate management are concerned with the future and are more likely to consider long-run profits than those that are short-term. Because costs and revenues are an integral part of profitability it should be clear that the attainment of the objective is fraught with uncertainty. Such entrepreneurial risk-taking, of course, is common in business and techniques have been developed to reduce the likelihood of that risk manifesting itself.

Whilst profit maximisation may be an admirable approach to take, it must be realised that most organisations are complex and comprise many functional areas all of which provide a contribution to the firm. It seems reasonable to suggest that most organisations would not have such a singleminded approach particularly in the face of multi-various relationships that typify their structures. One concept worth mentioning is that of "satisficing", a concept which acknowledges that businesses are dealing in an uncertain environment and are therefore unable to choose with certainty the best alternative thus, rather than maximising profits, management tend to "satisfice profits". In other words they produce a satisfactory level of profits. This concept is well documented in the work of Herbert Simon.

Then there is the object of "survival". This seems somewhat in keeping with the accountant's ideals of conservatism but it does taste of a protective role and of a business adopting a risk-free approach to progression.

So far, we have always internalised the objectives, but what of the shareholders and their interests? After all, they have invested in the business and it seems reasonable to suggest they they would expect the maximum return possible. Whilst this may seem much in keeping with the ideals of the profit maximisation objective, there are differences for if faced with a small return from a risk-free investment and a larger, but nevertheless uncertain return from a risky investment, then albeit the latter has an apparent greater contribution to make to the shareholders wealth, the former may be preferable....much depends upon the utility attributed to the differences in the returns and the uncertainty level associated with the latter.

Clearly the issue is complex and the determination of organisational goals is not an easy task. In addition, the creation of uni-directional goals seems inappropriate and the ideals of multi-objectives more acceptable. Whatever the case, business operates in an uncertain environment and the management appraisal of investment projects will be ill-advised if that environment is not considered. Whatever the goal, whatever the mix of objectives, the long-run stability of an enterprise will be determined by management's ability to consider the risk element as an integral part of the achievement of their objectives.

10.3 The Nature of Capital Expenditure

Perhaps the most important decisions that face management are those which are called "capital expenditure" decisions. We have already discussed in an earlier chapter the nature of such expenditure. Whatever the case, it is clear that these decisions have a long-run effect, require careful consideration of the possible alternatives and equally careful analysis. For example, management may be considering a decision as to whether or not to buy or produce a good and if the latter, may be considering a variety of alternative production methods. The ultimate decision is a function of the analyst's ability to bring objectivity to what otherwise may be none other than a subjective assessment.

The process of identifying organisational needs, of formulating goals, obtaining data, analysing that data, forecasting requirements, choosing alternatives, allocating resources and the preparation of appropriate budgets is encapsulated in the term"Capital Budgeting". Clearly, the data collection process is complex and will invariably require input from all functional areas of the organisation. After this is done the accountant can then carry out his analysis so that management can eventually come to an effective decision from among the alternatives available.

There are a number of methods available to the accountant to assist him in this analysis including:

1. The Payback Method.
2. The Accounting Rate of Return
3. Discounted Cash Flow Techniques.
   (a) Net Present Value
   (b) Internal Rate of Return

These techniques we will consider later but let us, for a moment consider the Capital Budgeting process itself in a little more depth. In essence, the process may be encapsulated in five stages:

Stage 1 A search for profitable uses of investment funds.
Stage 2 The preparation of forecasts and estimates.
Stage 3 The preparation of control budgets.
Stage 4 An evaluation of alternative projects that are presented.
Stage 5 Audit of performance.

Most projects in a business are developmental in their nature. Investment projects require creativity and the nature of this creativity will vary from organisation to organisation. Once, however a proposal has reached the stage of being considered, then it requires to be augmented by estimates of costs and amongst other things, its effects upon cash-flow.

Whatever the case, management will, ultimately, have presented to them, a variety of projects for consideration and to aid their choice from among these, categorisation seems inevitable. The merits of a case may depend upon:

1. *The Project's Size*

   In this instance it is useful to categorise them into say "small", "medium" or "large".

2. *The Benefit to the Organisation*

   This may be considered within the framework of "cost reducing projects". Perhaps even "Expansion projects" or projects that will result in 'Risk reduction".

3. *The Degree of Dependence*

   For example, some projects may be "mutually exclusive" and hence the choice may be between either one or the other. Competing projects, on the other hand may be such that the effects of one may be of substantial benefit to another.

4. *Type of Cash Flow*

   Management may be concerned with the nature of the cash flows that materialise. Some may in early years be negative turning to positive in a shorter time than another. Perhaps there are those where even later positive cash flows become negative again.

5. *The Level of Urgency*

   Some clearly will be of greater urgency than others.

If submitted projects are presented to management within the framework of these various categories then they will have a filter mechanism which will allow them to prioritise and hence satisfy their needs and assist them in the allocation of scarce resources. It is the last stage (the performance audit stage) that is more frequently omitted and whilst it is arguable that this stage is not part of the current decision making process it is nevertheless valuable for such an audit can help to eliminate previous errors.

10.4 The Techniques of Analysis

Let us now turn to considering some of the capital expenditure analysis techniques that are available.

10.4.1 The Pay-Back Method

Perhaps one of the most widely used methods of producing an index of capital investment desirability is the pay-back method Essentially it results in the calculation of the number of years that are required to recover the initial investment outlay

Let us, for a moment, consider two features in the process:

1. *The Net Investment Outlay*

   This is the initial and subsequent amounts that are outlayed in setting up a project. Such outlays could include a variety of elements, for example, plant and machinery costs, installation costs,

manpower costs and so on. The analyses of such costs should always be net of the tax benefits where these are allowed.

2. *The Net Cash Inflows*

   These are the expected cash benefits that are received from the investment over its estimated life. These benefits, of course, must not include normal operating cash flows and should be net of taxation.

It is worth noting that the entire picture of capital investment programmes is a complex issue and in considering the calculations of cash flows perhaps one of the most important issues is taxation, an aspect, which like government grants must not be excluded.

The pay-back method, then may be represented by the following formula:

$$\text{Pay-back period} = \frac{\text{The Net Investment Outlay}}{\text{Net Cash Inflows}}$$

Perhaps a risk manager is considering whether or not to install sprinklers in his plant. The expected net cost is £500,000, with replacement in 10 years time. The annual net benefits are £100,000. Using the formula, then the pay-back period is clearly five years. In other words, it will take five years to recover the initial outlay.

Whilst, of course, this is an over-simplified example, it does, nevertheless, have deficiencies. For example, it ignores both the scrap value and the subsequent inflows of cash in years 6, 7, 8, 9 and 10 (and hence profitability). Its approach is break-even. Indeed, it sometimes aids indecision.

Consider another risk manager who is worried about shrinkage in a chain of department stores. He wishes to reduce losses and is considering three different projects whose initial investment outlays are similar:

1. Project A : Employing security personnel
2. Project B : Dot identification system
3. Project C : Installation of TV cameras

He calculates the expected net inflows of cash to be (in£m's):

		PROJECT		
		A	B	C
Initial Outlay:		1.8	1.8	1.8
Cash Inflows:				
	Year			
	1.	.7	.6	.5
	2.	.6	.5	.6
	3.	.5	.7	.7
	4.			
	5.			

In this instance, the cash flows are such that the pay-back period for each project is three years. Here, this method does not really help.

10.4.2 The Accounting Rate of Return

This is another popular method used to evaluate the potential of capital investment programmes. In principle, this approach expresses average net inflows of cash (after deducting depreciation) as a proportion of the total net investment outlays.

The formula is:

$$\text{ARR} = \frac{C - D}{I}$$

Where: ARR = The Accounting Rate of Return
$C - D$ = The average net cash inflows less depreciation
and I = Net investment outlays.

Let us now consider our initial example, the sprinklers. The "Capital" cost was £500,000 and the expected life was 10 years. Assuming the straight line method of depreciation and no scrap value, then the annual charge for depreciation would be £50,000. Average net cash inflows over the ten years is £100,000 and hence the ARR is 10%.

Let us for a moment consider the nature of this capital investment. It was, at the start of the project clearly valued at £500,000 but the recovery of depreciation over the project's life period implies that the average initial investment is not £500,000 but £250,000. The following graph (figure 10.2) will help to make this clear.

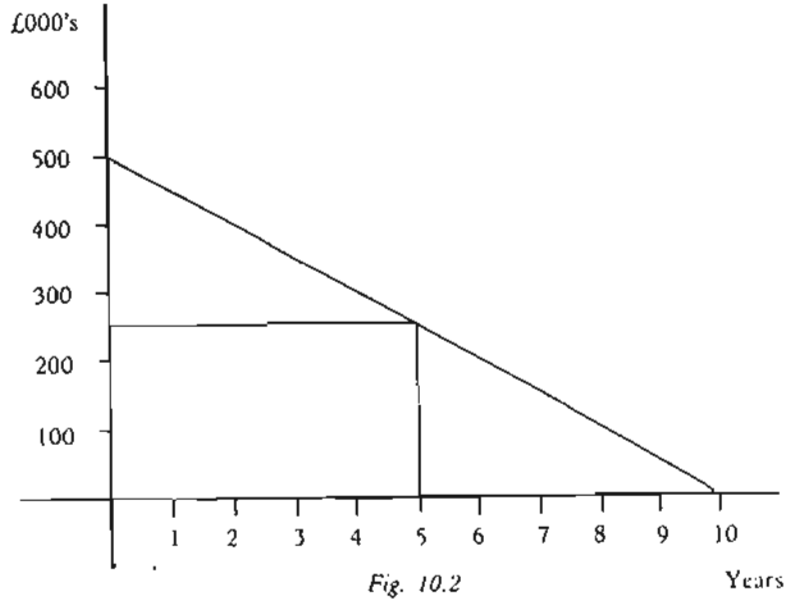

Fig. 10.2

In accepting this argument, then the denominator in the formula is now that lesser figure and the ARR rises to 20%.

Whilst this method may seem an improvement upon the pay-back method, they both still fail to consider the timing of cash inflows. Indeed, if we were to reconsider the second example, it will be seen that though the total inflows over the three year periods are identical, they do differ in their timings and this may have an effect upon management's decision.

A further deficiency is that they do not account for differences that may arise between periods in the value of the pound. In other words, they both assume currency stability.

10.4.3 Discounted Cash Flow

The methods we have used so far have been based upon an assumption of certainty about the future. We may have reasonable confidence about the amount of cash inflows but what about their timings? Yet again, a simple example will make this clear. Would you invest £1000 on January 1st in a project from which you expect to receive £1100. On the face of it, you might . but what if you could recover £1200 by investing the money in a bank account. Clearly, much depends upon the rate of interest being offered and this is an important factor in intelligent decision making, for the sacrifice of £1 today is NOT the same as the recovery of £1 tomorrow. Upon this principle then, the future value (FV) of £1 invested today at a rate of interest of 10 per cent (r), may be represented by the formula:

$$FV = 1\ (1 + r)$$
$$= 1\ (1 + 0.10) = \underline{\pounds 1.10}$$

In general, then, the future value of an amount V, at the end of n years, where the rate of interest is r is:

$$FV = V\ (1 + r)^n$$

Thus the FV of £1800 invested for 5 years at 10% rate return is:

$$1800\ (1 + 0.10)^5 = £2899$$

Let us now take this a stage further. If $FV = V\ (1 + r)^n$ then PV (The Present Value of V) is:

$$PV = \frac{FV}{(1 + r)^n}$$

Using our example the PV of £2899 received at the end of 5 years (assuming 10% rate of interest) is $2899\ (1 + 0.10)^5$ which, of course = £1800.

What this method of time discounting is saying is that if there is an alternative to investing money at 10% then the risk manager should avoid investing more than £1800 in this project for in doing so he could attain a higher FV. In other words, if the PV results in a figure which is less than the proposed outlay then the investment is not worthwhile.

Based on this idea two techniques of capital expenditure should be considered, first the *NPV Method;* a method based on an assumed minimum rate of return and second, the *Internal Rate of Return Method;* a method which identifies the rate of return required to reduce the NPV of a proposed project to zero.

10.4.4 The Net Present Value Method

In this case a rate of return is assumed; usually this is based upon the average cost of capital to the organisation.

What then is the cost of capital? Broadly speaking there are two aspects to consider. First, there is the firm's cost of capital, which may be defined as the firm's minimum required rate of return expected on new investments. This need not necessarily be the same as the returns being offered in the money market. On the other hand, there is the cost of capital for a specific project. In this latter instance, the choice of a discount factor may be based upon the firm's cost of capital, but the reader should be aware that when dealing with specific projects such a factor is likely to be chosen only when the risk profile of the organisation and that of the project match. Where there is greater certainty associated with the project then there is a sound argument for taking a discount factor that is less than that which would be assumed using the firm's cost of capital. The converse, of course, would also be the case. This issue is complex and will not be developed further here. As long as the reader is aware that in choosing a discount factor, the risk of the investment must be considered.

How then is the matter managed? In principle, the net cash inflows are discounted at a rate which reflects the value of the alternative use of the funds, to a present value from which is suggested the investment outlay. If this is positive (or zero) then there is evidence in favour of accepting the project.

Consider an example where a capital expenditure of £6000, produces five equal cash flows of £2000. Then by applying appropriate discount factors (an appropriate set of factors is given at the end of this Chapter) we can reduce forward cash-flows to a common base. Thus, the present value of £2000 received one-year hence is £1818; of £2000 received two years hence is £1652 and so on. The total present value of all cash-flows is, then, £7580. But it is not *net* for we have not accounted for the initial capital outlay. the following table shows the derivation of the Net Present Value.

Year	Net Cash Inflow	Discount Factor 10%	
			£
1	2000	.909	1818
2	2000	.826	1652
3	2000	.751	1502
4	2000	.683	1366
5	2000	.621	1242
Present Value			7580
Less the initial outlay			6000
Net Present Value of the Project			+1580

Since, in this case, the NPV of the project is positive, and hence increases rather than decreases the value of the firm (an aspect which, of course, is in line with our earlier thinking on wealth maximisation), then the project should be accepted. The reader will, of course, realise that differing cash flows over the five year period will produce differing NPVs.

It is worth noting that if there are uniform annual receipts on a project then the calculations can be made easier by summing the annual discount factors. Thus where the years of annual receipts are a constant amount each year, then we would have applied to that figure a factor of (.909 + .826 + .751 + .683 + .621), making the present value of that project £3.790. The reader should verify the matter by applying the principle to the above table (where the receipts are equal). Small differences will be due to rounding differences in the discount factors.

If annual results are not constant then this annuity method cannot be used.

10.4.5 The Internal Rate of Return

The second "time discounting method" is an attempt to produce that rate of return which reduces to a zero NPV. When this is done that rate can be compared with the required rate. The procedure is iterative: it requires the selection, at random, of a "close" discount rate and the calculation of the NPV. If this results in a positive figure then a higher rate discount figure should be chosen, if negative the lower. We have already seen how project "A"'s NPV at 10% is £1580: hence we must increase the discount rate in order to decrease the NPV.

Let's try 15%, then some other rates.

	Cash Inflows	Discount factors 15%	25%	20%	19%
1	2000	.870	.800	.833	.840
2	2000	.756	.640	.694	.706
3	2000	.658	.512	.579	.593
4	2000	.572	.410	.482	.499
5	2000	.497	.328	.402	.419
Present Value Cash Inflow		6706	5380	5980	6114
Net Investment outlay		6000	6000	6000	6000
Net present Value		+ 706	− 620	− 20	+ 114

This "trial by error" approach has shown that 15% is too low; and that 25% is too high; the compromise rate of interest (20%) is marginally too high and a "fine-tune" at 19% shows that the absolute value of the difference to be higher than that of the 20% difference. It is reasonable to conclude that the discount rate that would reduce the NPV to zero is just below 20%. If this is an acceptable level of return then the project should be accepted.

Clearly, the NPV and IRR methods are closely related. In the former, returns are expressed in cash terms, the latter evidences expected performance in percentage terms. This raises the question as to which method is best. For example, a risk manager, may be faced with two alternatives, both of which under a NPV calculation could produce positive figures. If the criteria for making the decision is wealth maximisation, then the optimal decision is that project whose NPV is largest.

Certainly, the reader should not be thrown into thinking that when companies consider projects, that those with largest discounted cash flows will necessarily be best. Much depends upon timing; for example, in a first project, where inflows could be smaller than that where actual cash inflows in a second project are initially large and decline through time. If, however, comparing two projects by the IRR method, it is somewhat meaningless to say that Project "A" (with an assumed rate of return of 20 per cent) is better than Project "B" (with an assumed rate of return of 15 per cent). What is required is a consideration of the rate of return vis-a-vis the initial outlays.

10.5 Independent and Dependent Projects

Let us now examine the nature of competing projects, particularly *within* an independent/dependent framework.

Imagine a series of competing projects that are independent, one of the other. In other words, the selection of one project does not preclude the choice of another. In such circumstances the NPV and the IRR methods will precipitate the same decision. Consider the following figure:

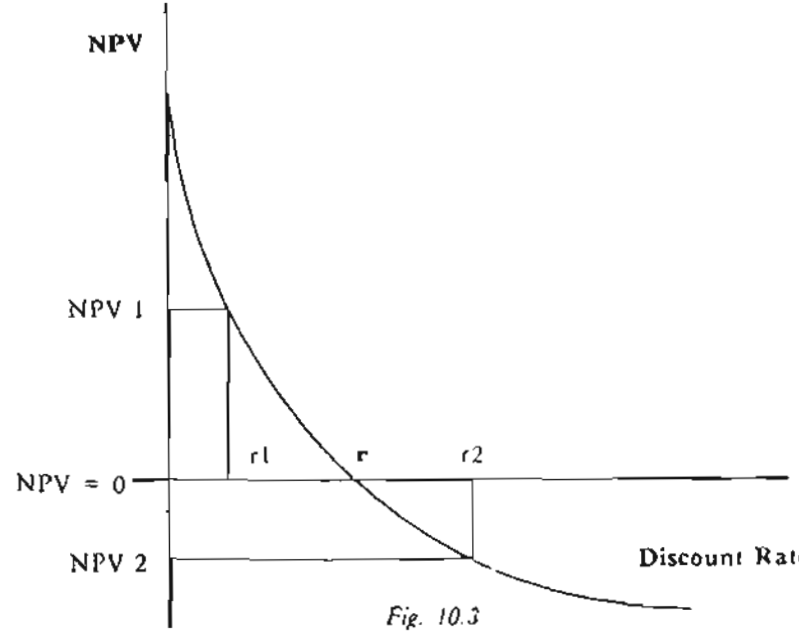

Fig. 10.3

Figure 10.3 is a graph of the NPV of a project expressed as a function of the discount rate. The graph cuts the horizontal axis at the position **r**, which represents the internal rate of return. In other words, that position is the rate of return which reduces the NPV of the project to zero. If we were to use a discount rate of r1, the NPV is positive; indeed it remains positive as long as the IRR is less than r. On the other hand, if we consider a discount rate of r2 then the NPV is negative. Clearly, where a firm has to consider competing investment proposals then management will be indifferent as to which method they use for these two methods result in similar accept/reject decisions.

What then of projects that are dependent? There are many instances where projects are mutually exclusive. A Risk Manager, cannot, for example, buy a fleet of motor cars and lease the same fleet. He cannot install in the same pipe system, water and gas.

Let us take this a stage further by considering two such projects:

	Initial Investment	Net Inflow at year end
	£	£
Project X	−1000	1200
Project Y	−1500	1770

The advantage of keeping the example to one year means that the internal rates of return may be easily calculated, Project X has an IRR of 20%, Project Y, 18%. If we assume a cost of capital of 10% (Discount factor of 0.909) then the resultant NPVs are £908.90 and £1089.00, respectively.

Clearly, project X has the higher internal rate of return and Y, the higher NPV. If these projects were independent, then there exists consistency in the decision; both X and Y are acceptable whatever method is used. However, what is the case if they are dependent and you have to choose between one or the other? If such a decision has to be made then the method becomes very important. Here is the paradox. It is clear that if the NPV method is selected, project Y will be preferred but the converse is the case if the IRR method is used. Hence, unlike when projects are independent, risk managers can no longer be indifferent between methods.

Figure 10.4 shows the NPV curves for the two projects, X and Y. They intersect the horizontal axis at 20% and 18%, their respective internal rates of return. As 20 is always greater than 18, any ranking between the two projects carried out on the basis of the IRR will remain the same. In other words the choice is clearly project X. But what of the NPV? Consider the graph. If we take a discount rate higher than r, there is no argument; the NPV method still indicates that project X is better, however, if we were to consider a discount rate less than r, a different decision will result.

Let us now examine this matter further by graphing the information:

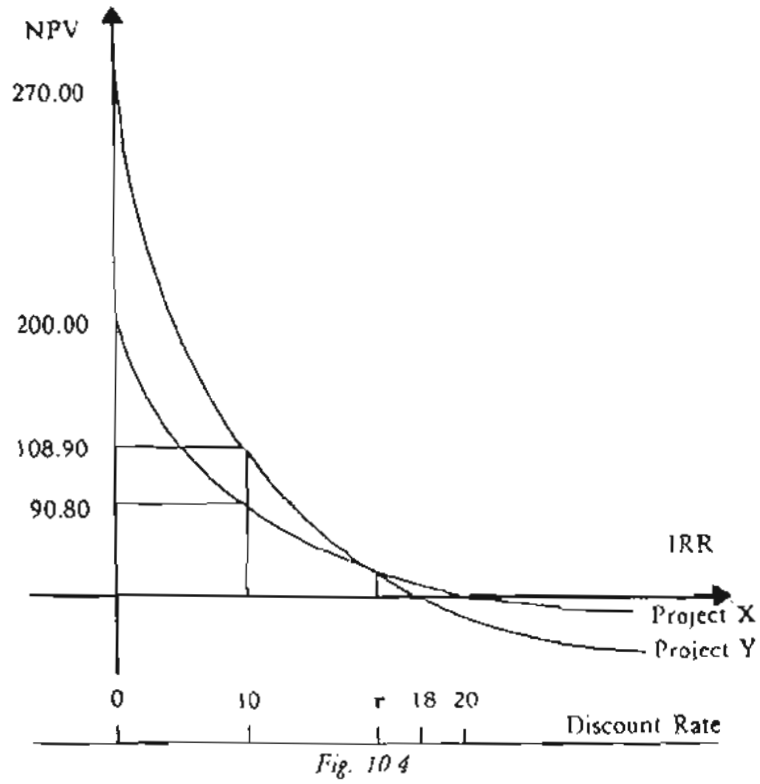

Fig. 10.4

This paradox has been raised simply to create an awareness in the reader's mind that in certain circumstances mutually exclusive decisions may have to be made and that in such circumstances, care may have to be taken in the choice of method used. No excuse is given for not explaining the many criteria which underly the choice of method, suffice it to say that on balance, when considering mutually exclusive events, differences in NPV's should be the criteria rather than IRR's (even although the latter, intuitively, may be more appealing).

10.6 Conclusion

This chapter has been concerned with considering the appraisal of investments in those projects which are concerned with the reduction of risk. I remember well the concluding remarks given by the closing speaker at the 1985 A.I.R.M.I.C. conference when it was said that Risk Managers must recognise that those in charge of handling Organisational funds are invariably accountants and hence there is a need to speak to them in their own language. This chapter has perhaps, provided some insight into the techniques by which competing projects may be assessed.

There can be no doubting the need for a clear definition of organisational goals. A goal is essential for without it there is a clear absence of objectivity and decision making can only be made in a vacuum. Certainly, it is an essential pre-requisite to the Capital Budgeting Process itself, a process which comprises five essential stages which were:

1. The profitable use of investment funds.
2. The preparation of forecasts and estimates.
3. The preparation of control budgets.
4. The economic evaluation of alternative projects.
5. A post audit of performance.

All in all, it is most important that these stages are "wrapped up" into an administrative framework. Without such a framework, it becomes well nigh impossible to effectively convert what is a project proposal into the decision process.

We have discussed the pay-back method, a method which simply considered the period of time that it took to recover an initial investment. Whilst having some distinct disadvantages (such as the absence of any "time-accounting" for cash inflows) it is simple and it is a method that is used extensively by commerce and industry, particularly if there is a philosophy that suggests the quicker a return is made, the quicker it becomes possible to re-invest!

Despite this simplicity, there are two others, namely the net present value method and the internal rate of return method. These two methods were in their way complementary. The first method used what is known as the Firm's cost of capital, which we saw to be the minimum rate of return that was required upon a new investment. This measure usually accounted for a level of entrepreneurial "riskiness" of individual projects. It is possible that some projects where there is considerable risk may feature a discount rate that is higher than the firm's cost of capital, whereas those where the expected returns are known with relative certainty will surely be subject to a somewhat less arduous rate!

In our examination of the internal rate of return method of assessing projects we found that unlike the net present value method, the calculation of the IRR was a once-and-for-all calculation. Its closeness with NPV must not be lost for in the latter instance the IRR equates with that Discount Rate which reduces the NPV to zero.

Finally, we considered mutually exclusive projects...in other words, those projects where one precludes the acceptance of the other. Where this is the case, similar decisions are not necessarily the consequence of using either method though on balance, however, it is the former (NPV) that should be used.

Table 1 A Selection of Present Value Factors

The table gives the present value of a single payment received 'n' years in the future discounted at x% per year. For example, with a discount rate of 3% a single payment of £1 to be received in two years time, has a present value of £0.9426 or 94p.

Years	1%	5%	7%	10%	15%	19%	20	25
1	.9901	.9524	.9346	.0091	.8696	.8403	.8333	8000
2	.9803	.9070	.8734	.8264	.7561	.7062	.6944	.6400
3	.9706	.8638	.8163	.7513	.6575	.5934	5787	.5120
4	.9610	.8227	.7629	.6830	5718	.4987	.4823	.4096
5	.9515	.7835	.7130	.6209	.4972	.4190	.4019	.3277
6	.9420	.7462	.6663	.5645	.4323	.3521	3349	.2621
7	.9327	.7107	.6227	.5132	.3759	.2959	.2791	.2097
8	.9235	.6768	.5820	.4665	.3269	.2487	.2326	.1678
9	.9143	.6446	5439	.4241	.2843	.2090	.1938	.1342
10	.9053	.6139	.5083	.3855	.2472	.1756	.1615	.1074
11	.8963	.5847	4751	.3505	.2149	.1476	.1346	.0859
12	.8874	.5568	.4440	.3186	.1869	.1240	.1122	.0687
13	.8787	.5303	.4150	.2897	.1625	.1042	.0935	.0550
14	.8700	.5051	.3878	.2633	.1413	.0876	.0779	.0440
15	.8613	.4810	.3624	.2394	.1229	.0736	.0649	0352
16	.8528	.4581	.3387	.2176	.1069	.0618	.0541	0281
17	.8444	.4363	.3166	.1978	.0929	.0520	.0451	0225
18	.8360	.4155	.2959	.1799	.0808	.0437	.0376	0180
19	.8277	.3957	.2765	.1635	.0703	.0367	.0313	.0144
20	.8195	.3769	.2584	.1486	.0611	.0308	.0261	.0115
21	.8114	.3589	.2415	.1351	.0531	.0259	.0217	.0092
22	.8034	.3410	.2257	.1228	.0462	.0218	.0181	.0074
23	.7954	.3256	.2109	.1117	.0402	.0183	.0151	.0059
24	.7876	.3101	.1971	.1015	.0349	.0154	.0126	0047
25	.7798	.2953	.1842	.0923	.0304	0129	.0105	.0038
26	.7720	.2812	.1722	.0839	.0264	0109	.0087	.0030
27	.7644	.2678	.1609	.0763	.0230	.0091	.0073	.0024
28	.7568	.2551	.1504	.0693	.0200	.0077	.0061	.0019
29	.7493	.2429	.1406	.0630	.0174	.0064	.0051	.0015
30	.7419	.2314	.1314	.0573	.0151	.0054	.0042	.0012
31	.7346	.2204	.1228	.0521	.0131	.0046	.0035	.0010
32	.7273	.2099	.1147	.0474	.0114	.0038	.0029	0008
33	.7201	.1999	.1072	.0431	.0099	.0032	.0024	.0006
34	.7130	1904	.1002	.0391	.0086	.0027	.0020	.0005
35	.7059	.1813	.0937	.0356	.0075	.0023	.0017	.0004
36	.6989	.1727	.0875	.0323	.0065	.0019	.0014	.0003
37	.6920	.1644	.0818	.0294	0057	.0016	.0012	.0003
38	.6852	.1566	.0765	.0267	.0049	.0013	.0010	.0002
39	.6784	.1491	.0715	.0243	.0043	.0011	.0008	.0002
40	.6717	.1420	.0668	.0221	.0037	.0010	.0007	.0001
41	.6650	.1353	.0624	.0201	.0032	.0008	.0006	.0001
42	.6584	.1288	.0583	.0183	.0028	.0007	.0005	.0001
43	6519	.1227	.0545	.0166	.0025	.0006	.0004	.0001
44	.6454	.1169	.0509	.0151	.0021	.0005	.0003	.0001
45	.6391	.1113	.0476	.0137	.0019	.0004	.0003	
46	.6327	.1060	.0445	.0125	.0016	.0003	.0002	
47	6265	.1009	.0416	.0113	.0014	.0003	.0002	
48	.6203	.0961	.0389	.0103	.0012	.0002	.0002	
49	.6141	.0916	.0363	.0094	.0011	.0002	.0001	
50	.6080	.0872	.0339	.0085	.0009	.0002	.0001	

Table 2 A Selection of Cumulative Present Value Factors

The table gives the present value of 'n' annual payments of £1 received for the next 'n' years with a constant discount of x% per year.

For example, with a discount rate of 7% and with 6 annual payments of £1 the present value is £4.767

Years 0 to:	1%	5%	7%	10%	15%	19%	20%	25%
1	0.990	0.952	0.935	0.909	0.870	0.840	0.833	0.800
2	1.970	1.859	1.808	1.736	1.626	1.547	1.528	1.440
3	2.941	2.723	2.624	2.487	2.283	2.140	2.106	1.952
4	3.902	3.546	3.387	3.170	2.855	2.639	2.589	2.362
5	4.853	4.329	4.100	3.791	3.352	3.058	2.991	2.689
6	5.795	5.076	4.767	4.355	3.784	3.410	3.326	2.951
7	6.728	5.786	5.389	4.868	4.160	3.706	3.605	3.161
8	7.652	6.463	5.971	5.335	4.487	3.954	3.837	3.329
9	8.566	7.108	6.515	5.759	4.772	4.163	4.031	3.463
10	9.471	7.722	7.024	6.145	5.019	4.338	4.192	3.571
11	10.368	8.306	7.499	6.495	5.234	4.486	4.327	3.656
12	11.255	8.863	7.943	6.814	5.421	4.611	4.439	3.725
13	12.134	9.394	8.358	7.103	5.583	4.715	4.533	3.780
14	13.004	9.899	8.745	7.367	5.724	4.802	4.611	3.824
15	13.865	10.380	9.108	7.606	5.847	4.876	4.675	3.859
16	14.718	10.838	9.447	7.824	5.954	4.938	4.730	3.887
17	15.562	11.274	9.763	8.022	6.047	4.990	4.775	3.910
18	16.398	11.690	10.059	8.201	6.128	5.033	4.812	3.928
19	17.226	12.085	10.336	8.365	6.198	5.070	4.843	3.942
20	18.046	12.462	10.594	8.514	6.259	5.101	4.870	3.954
21	18.857	12.821	10.836	8.649	6.312	5.127	4.891	3.963
22	19.660	13.163	11.061	8.772	6.359	5.149	4.909	3.970
23	20.456	13.489	11.272	8.883	6.399	5.167	4.925	3.976
24	21.243	13.799	11.469	8.985	6.434	5.182	4.937	3.981
25	22.023	14.094	11.654	9.077	6.464	5.195	4.948	3.985
26	22.795	14.375	11.826	9.161	6.491	5.206	4.956	3.988
27	23.560	14.643	11.987	9.237	6.514	5.215	4.964	3.990
28	24.316	14.898	12.137	9.307	6.534	5.223	4.970	3.992
29	25.066	15.141	12.278	9.370	6.551	5.229	4.975	3.994
30	25.808	15.372	12.409	9.427	6.566	5.235	4.979	3.995
31	26.542	15.593	12.532	9.479	6.579	5.239	4.982	3.996
32	27.270	15.803	12.647	9.526	6.591	5.243	4.985	3.997
33	27.990	16.003	12.754	9.569	6.600	5.246	4.988	3.997
34	28.703	16.193	12.854	9.609	6.609	5.249	4.990	3.998
35	29.409	16.374	12.948	9.644	6.617	5.251	4.992	3.998
36	30.108	16.547	13.035	9.677	6.623	5.253	4.993	3.999
37	30.800	16.711	13.117	9.706	6.629	5.255	4.994	3.999
38	31.485	16.868	13.193	9.733	6.634	5.256	4.995	3.999
39	32.163	17.017	13.265	9.757	6.638	5.257	4.996	3.999
40	32.835	17.159	13.332	9.779	6.642	5.258	4.997	3.999
41	33.500	17.294	13.394	9.799	6.645	5.259	4.997	4.000
42	34.158	17.423	13.452	9.817	6.648	5.260	4.998	4.000
43	34.810	17.546	13.507	9.834	6.650	5.260	4.998	
44	35.455	17.663	13.558	9.849	6.652	5.261	4.998	
45	36.095	17.774	13.606	9.863	6.654	5.261	4.999	
46	36.727	17.880	13.650	9.875	6.656	5.261	4.999	
47	37.354	17.981	13.692	9.887	6.657	5.262	4.999	
48	37.974	18.077	13.730	9.897	6.659	5.262	4.999	
49	38.588	18.169	13.767	9.906	6.660	5.262	4.999	
50	39.196	18.256	13.801	9.915	6.661	5.262	4.999	4.000

Supporting Texts

Recommended:

Butt, S A	A Practice Manual in Accounting (Volumes 1 to 3)	Cassell
Briston, R	Introduction to Accountancy	MacMillan
Drury	Management and Cost Accounting	Van Nostrad, Reinholt UK
Walton P and Bond M	Corporate Reports: Their Implications and Use in Business	Hutchison

Supplementary:

Butt, R J	Accounting in Business	Butterworths
Harvey and Kerr	Financial Accounting – Theory and Standards	Prentice Hall
Horngren	Cost Accounting – A Managerial Emphasis	Prentice Hall
Sizer	An Insight into Management Accounting	Pitman
Samuels, J and Wilkes, F	Management of Company Finance	Nelson
Pritchard	Taxation	Polytech publications

Index