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University of Sunderland
BA (Honours) Accounting and Financial Management

APC309

Strategic Management Accounting

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How to use this workbook

This workbook has been designed to provide you with the course material necessary to complete Strategic Management Accounting by distance learning. At various stages throughout the module you will encounter icons as outlined below which indicate what you are required to do to help you learn.

This **Activity** icon refers to an activity where you are required to undertake a specific task. These could include reading, questioning, writing, research, analysing, evaluating, etc.

This **Activity Feedback** icon is used to provide you with the information required to confirm and reinforce the learning outcomes of the activity.

This icon shows where the **Virtual Campus** could be useful as a medium for discussion on the relevant topic.

It is important that you utilise these icons as together they will provide you with the underpinning knowledge required to understand concepts and theories and apply them to the business and management environment. Try to use your own background knowledge when completing the activities and draw the best ideas and solutions you can from your work experience. If possible, discuss your ideas with other students or your colleagues; this will make learning much more stimulating. Remember, if in doubt, or you need answers to any questions about this workbook or how to study, ask your tutor.

Unit 1

An Introduction to Strategic Management Accounting

LEARNING OBJECTIVES

At the end of this unit students will be able to:

1. Identify and describe the elements involved in the decision making, planning and control process.

2. To identify the users of Management Accounting Information and the function of Management Accounting.

3. Explain the factors that have influenced the changes in the Competitive Environment.

4. To identify how Strategic Management Accounting helps management to manage the competitive environment.

5. Explain what is Strategic Management Accounting.

Introduction

Strategic Management Accounting has developed out of Management Accounting and has come about as a direct result of the new competitive environment that firms are now facing. This movement has involved the move from traditional management accounting techniques under management accounting (e.g. absorption costing) to new techniques under strategic management accounting like activity based costing and the balance scorecard.

To this end, the unit starts by looking at Management Accounting in relation to:

1. The Decision Making Process

2. Users of Management Accounting information and functions of Management Accounting

3. This unit then Maps the evolution of Management Accounting and its techniques through the competitive environment to Strategic Management Accounting.

The Decision Making Process

A simple definition of Management Accounting is the provision of appropriate information for decision making, planning, control and performance evaluation.

Information produced by Management Accountants must be judged in the light of its ultimate effect on the outcome of decisions. A necessary precedent to an understanding of management accounting is an understanding of the decision making process. Below is a traditional decision making diagram (Figure 1).

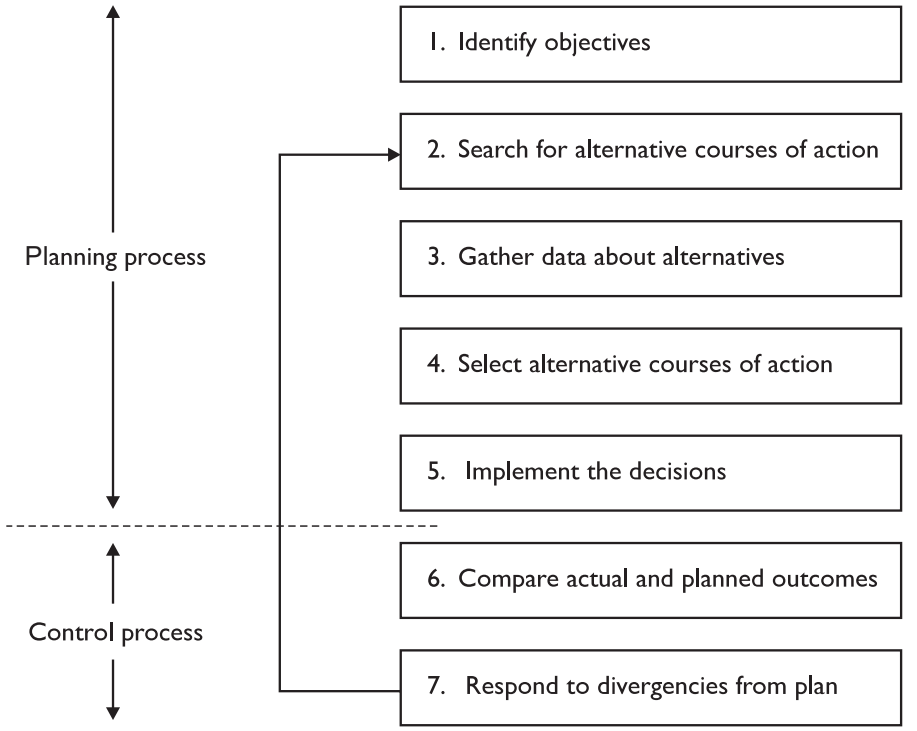

Figure 1

Explanation of diagram

1) Identifying Objectives – The first phase in the decision-making, planning and control process is concerned with establishing aims/objectives for the organisations. Put simply, the organisation needs to know where it wants to go.

Objectives may be:

(a) Maximisation of profit

(b) Maximisation of shareholders wealth

(c) Satisfactory profit

(d) Maximisation of sales revenue

Conflict may occur between other parties of the organisation (i.e. the various user groups) who will undoubtedly have vested interests of a different nature compared with those, say, of shareholders.

2) Identify Strategies – This stage involves asking what strategies the company must pursue in meeting its objectives. It will involve gathering information both internally and externally to determine where it is.

3) Evaluate Strategies -The company must review strategies which have the greatest chance of success.

4) Choose alternative courses of action and co-ordinate them into a long term plan. Implement long term plan through e.g. budget.

5) Implementing the decision.

6) & 7) Comparing actual and planned outcomes and responding to divergences from plan.

The final stages in the process are comparing actual and planned outcomes and responses to divergencies from plan, and represent the firm's control process. The managerial function of control consists of the measurement, reporting and subsequent correction of performance in an attempt to ensure that the firm's objectives and plans are achieved; that the process is dynamic and stress the interdependencies between the various stages in the process. The feedback loop between stages 7 and 2 indicates that the plans should be regularly reviewed, and if they are no longer attainable then alternative courses of action must be considered for achieving the organisation's objectives. The second loop stresses the corrective actions, taken so that actual outcomes conform to planned outcomes.

Users of Management Accounting Information

Unlike Financial Accounting, the users of Management Accounting information are internal.

Internal Users of Management Accounts information are:

1. Employees
2. Trade Unions

3. Management (Junior/Senior)

A table showing the various groups and their interest in Management Accounting information is shown below in Figure 2. As can be seen each user group has its *own information requirements*. The information supplied by Management Accounting is primarily for managers use.

User group	Aims/objectives/vested interests
Customers	Reliability of supply of organisation's products and/or services; type of credit facilities available.
Government	Collection of taxes and duties; enforcement of legal requirements.
Employees	Trade union activities; wages bargaining/settlements.
Management	Personal career ambitions; divorce of ownership from control; Internal departmental struggles/conflicts.

Figure 2

It can be argued that *useful* Management Accounting information should possess the following:

1. Relevance
2. Reliability
3. Comparability
4. Understandability
5. Materiality

Relevance – this information must have an overall effect on the decision, that it must be timely.

Reliability – the information must be correct and be able to be checked as correct.

Capability – the information must be able to be compared and therefore help managers evaluate the performance of the business. Compatibility is achieved be treating items that are basically in the same manner for management accounting purposes.

Understandability – Management accounts should be clear so that management may comprehend its information.

ACTIVITY

Is it true that accounting information needs to be communicated to and understood by non-accounting managers?

ACTIVITY FEEDBACK

There is no doubt that a key focus of an accountant's work is communicating to non-accountants, and this should never be overlooked. At the same time, accounting information cannot always be expressed in such a way that someone with little or no accounting knowledge can absorb it successfully. There is therefore a focus on managers to acquire a working knowledge of the key accounting reports which are prepared for them and an understanding of the ways in which they improve their own decision making capabilities. While preparation of complex management accounting reports and models will be limited to the accounting section of most organisations, it is necessary that non-accounting decision makers understand the output of such reports and models. Managers, be it in HRM, marketing, operations management or strategic management, will have control over resources and will create a financial effect as a result of decisions made. As such, it is fundamental that the financial objectives of the organisation in general and their area of responsibility in particular are clearly communicated to them. In addition, to ensure such objectives are most effectively met, it is essential that their decision making is supported by an understanding of the financial consequences of their actions.

Features of Management Accounting Information

Having looked at the users of Management Accounting information, let us therefore summarise what the feature of this information is.

1. Management accounts and models are used to aid management and to record, plan and control activities.

2. There is no legal requirement to prepare or disseminate management accounts

3. The format of management accounts is at management discretion. There are no strict rules that govern the way they are prepared or presented.
4. Management accounts can focus on specific areas of an organisation's activities at the discretion of the organisations management
5. Management accounts are both an historical record and a forward-looking planning tool.

ACTIVITY

As a manager of company you are presently considering launching a new product. What management accounting information do you require?

ACTIVITY FEEDBACK

The following accounting information might be relevant to a manager launching a new producing (or service):

- The intended level of return that will be required for the project to be considered successful.
- An accurate costing of the production and delivery of each unit of the product to the market.
- The capital investment that will be necessary to enable the business to produce the product.
- Financial details of any other project foregone if resources are directed towards production of this product.

The Function of Management Accounting

By function of Management Accounting we mean what is the purpose of Management Accounting.

C. Drury in *Management and Cost Accounting* has argued that Management Accounting consists of three key functions, which are to:

1. Allocate costs between cost of goods sold and stock for internal external prompt reporting.
2. Provide relevant important to help Managers make better decisions
3. Provide information for planning, control and Performance Measurement.

The Chartered Institute of Management Accounts [CIMA] prescribes the following definition in explanation of what it perceives to be the detailed role of Management Accountancy. Management accounting is:

> "An integral part of management concerned with identifying, presenting and interpreting information used for:
>
> – formulating strategy; planning and controlling activities; decision making; optimising the use of resources; disclosure to shareholders and others external to the entity; disclosure to employees; safeguarding assets. "

The above involves participation in management to ensure that there is effective:

> formulation of plans to meet objectives (strategic planning); formulating of short-term operation plans (budgeting/profit planning); acquisition and use of finance (financial management) and recording of transactions (financial accounting and cost accounting); communication of financial and operating information; corrective action to bring plans and results into fine (financial contrite; reviewing and reporting on systems and operations (internal audit management audit).'

The next section discusses the competitive environment in which the management accountant provides information for.

The Competitive Environment

Firms have always been subjected to competition. However, this competition has become more dynamic. In particular, the following changes have occurred: (a) globalisation of world trade (b) privatisation of government-controlled companies and deregulation in various industries; (c) changing product life cycles; (d) changing customers tastes that demand ever improving levels of service in cost, quality, reliability, delivery and the choice of new products; and (e) the emergence of e-business.

As a result of these various changes new management themes have evolved which in turn has resulted in the development of Strategic Management Accounting.

Newly evolving management themes

Management accounting is intended to help managers make better decisions. Changes in the way managers operate require re-evaluating the design and operation of the management accounting systems themselves. The diagram below illustrates the key themes in the new management approach.

Key themes in the new management approach

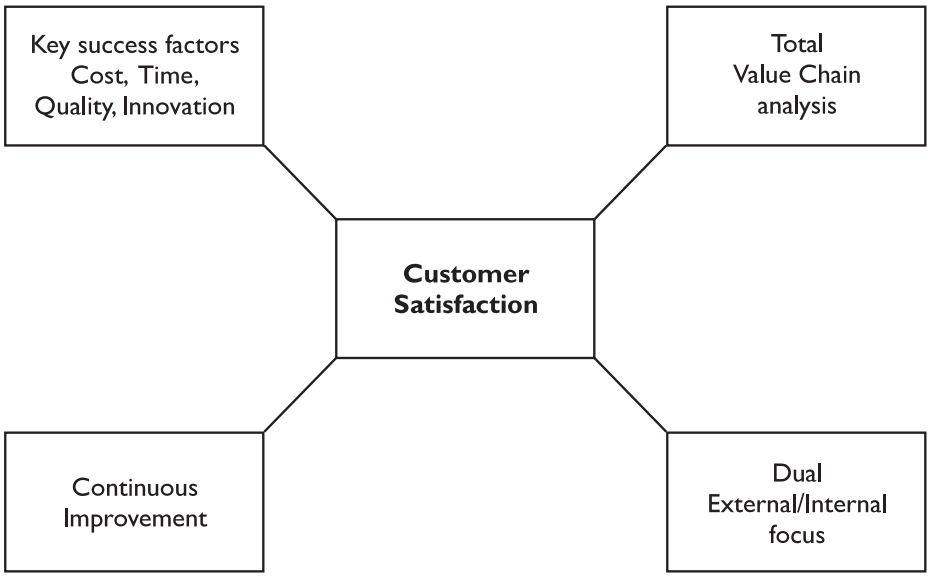

Figure 3 Total Value Chain analysis.

Explanation of diagram

Innovation – Companies must pursue a policy of innovation in their product so as to create and maintain success.

Continuous improvement – This involves a process of the company continually seeking to reduce costs, eliminate waste, improve the quality so as to eventually lead to an increase in customer satisfaction.

Employee empowerment – employees have been provided with information so as to enable them to make continuous improvement to the output process.

The Value Chain – Coordinating the individual parts of the value chain together to work as a team creates the conditions to improve customer satisfaction, particularly in terms of cost efficiency, quality and delivery. It is also appropriate to view the value chain from the

customer's perspective, with each link, if each link in the value chain is designed to meet the needs of its customers.

The aim is to manage the linkages in the value chain better than competitors and thus create a competitive advantage.

Primary activities:

- Inbound logistics – receiving goods from suppliers, storing and handling them until required.
- Operations – production (may be many departments).
- Outbound logistics – storage and distribution of the finished product to customers.
- Marketing and sales – determining what customers want, advertising products and selling them.
- Service – support for the product – satisfying customer.

Secondary activities:

- Procurement – obtaining resources (materials, finance, etc.).
- Technology development – R&D function.
- Human Resource Management – Recruitment, training payment, etc.
- Firm infrastructure – planning and control, accounting.

Key questions for assessing Strengths and Weaknesses in the value chain and value system are:

- Where is value added?
- How effective are the links between primary activities?
- How effective are the links between secondary activities?
- How effective are the links between primary and secondary activities?

Businesses can rarely produce without relying on other businesses to:

- Provide inputs and/or;
- Distribute the product to the final customer

Therefore it is also useful to understand the value system made up of value chains of other related businesses. This is shown below in Figure 4

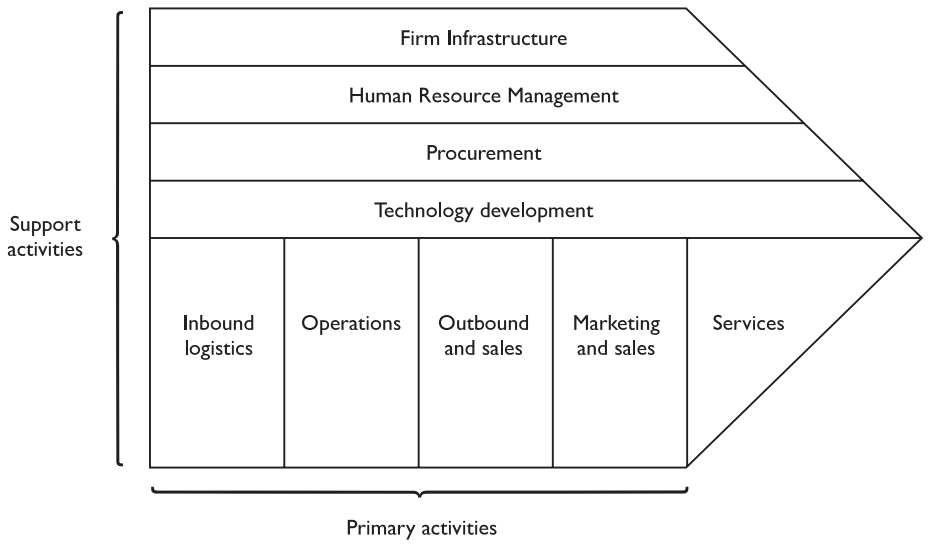

Figure 4

Over time the emphasis placed on the four themes on page 9 may change and new themes may be added. If management accountants are to remain useful to managers they must keep up with changes in management and respond accordingly. One area of new development right now is an investigation into the management accountant's role in *E-commerce*. Watch this space!

How has Management Accounting responded to the changes in business operations?

Answer: By introducing new techniques and creating Strategic Management Accounting.

Here is a list of a few of the new techniques

1. Activity based techniques
2. Customer account profitability
3. Life cycle costing
4. Target costing
5. Variances/ Performance Measurement
6 Balanced scorecard approach
7. Benchmarking
8. Just in time

9. Back flush costing

Note

Some of these areas will be discussed later in the course. You may like to return to this section when you have completed the final unit in the module.

In the next section, the unit will expand on some of the items that have been listed above.

The review of some of the current techniques and its relevance to a modern business environment

1. The traditional overhead apportionment method - its criticisms and alternatives

(a) Traditional overhead, apportionment and absorption methods were developed around the time of the Industrial Revolution when organisations were trying to determine the cost of their industrial production. Production processes at the time were:

- Labour intensive
- A low level of overheads compared to direct costs
- A relatively non-competitive and local market

The characteristics of the modern production environment however are quite different:

- Capital intensive and machine paced environment
- A higher level of overheads compared to direct costs
- A highly competitive global market

Due to the change in the environment traditional methods have been criticised as not producing useful or accurate information for decision-making.

(b) Activity Based Costing (ABC)

The inadequacy of traditional absorption costing as practised in the UK and the USA has been known for several years and this was the first area to undergo radical reform. In 1988 Cooper and Kaplan developed a more refined approach for assigning overheads to products and computing product costs – Activity Based Costing (ABC). It is claimed that ABC provides product cost information that is useful for decision- making purposes.

A study by Drury et al. (1992) reported that 12% of respondents had implemented, or were in the process of implementing, ABC. A further 38% were considering implementing ABC systems.

ABC emphasises the need to obtain a better understanding of the behaviour of overhead costs and ascertains:

- what causes overhead costs
- how they relate to products.

ABC causes a change in the product costing of high volume and low volume products. This is because traditional overhead allocation methods use volume-related measures (for example machine hours) to apportion overheads to products. In reality, many overheads are not volume related- for example set-up costs and ordering costs.

Arguments against ABC

Various theorists have argued against ABC. The following are some of the arguments against ABC:

Piper and Walley of the Loughborough Management Centre argue that whilst the cost driver approach may be useful to analyse problems, to use the concept as a basis for overhead allocation "it is not empirically or logically established". In particular they question the proposition that activity causes cost, arguing that decision causes activity and therefore causes cost .

a. It has been argued that "ABC tries to improve on traditional costing techniques by looking for better methods of overhead allocation. But to say that it produces the accurate product cost and that this can be used for pricing and strategic purposes is an over simplification of business issues and may result in poor management decisions. The argument concludes that it is this process of ABC, not the results that bring company, that forces managers to understand cost drivers and thereby manage them better.

b. Others have argued that ABC is time consuming and expensive to apply, and not justified by the possible improvement in the quality of information.

2. Budgeting

The majority of organisations still rely heavily on traditional incremental budgeting. Other traditional methods used include zero based budgeting, flexible budgeting, probabilistic budgeting, etc.

The above methods classify costs as fixed and variable and assume variable costs vary with output. The process of activity based costing gave us a better understanding of the behaviour of costs — it is now realised that most costs are not fixed in the long term and fluctuate in relation to an activity (cost driver). Activity based budgeting addresses this issue. Handelbanken (1970) scrapped the process of budgeting and went on to expand and perform successfully. Not many accountants appear to have been prepared to accept this view — probably due to the

time and effort already invested in the budgeting process. However during the 1990s a number of Swedish companies (Ikea, Volvo) followed Handelbanken's lead. Ikea has effectively abolished all control of its managers and now sets managers a ratio of profit to sales, which they must meet in any way they see, fit.

3. Performance management

(a) **Variances**

The effect of advanced manufacturing technology is that a greater emphasis is placed on machines and much less emphasis on direct labour. Traditional direct labour efficiency variance therefore is of limited use. The overhead absorption rates on which overheads variances are based are calculated using direct labour hours. This becomes meaningless when labour hours are an insignificant part of the operations. Another criticism of traditional variance analysis is the timing. Standards are set some time prior to the beginning of the budget period. In a dynamic business these standards may have become outdated by the start of the budget period and as a consequence incorrect variances may be reported and decisions made on these. Planning and operational variances take care of this criticism.

(b) **Return on Investment (ROI)**

ROI is a popular method of measuring the performance of a division/investment centre. It is seen as a ratio that is easily understood by managers. It is a relative measure (unlike residual income) which makes comparison of divisions easier.

However in an inflationary situation ROI over-estimates the rate of return as it not only overstates profits but also understates the capital employed. ROI also discourages investment in new plant and processes, as this would lower the value of the ratio. Managers tend to reject investments with a relatively low ROI even when the return is greater than the cost of capital invested in the division. This leads to sub-optimisation, which may not be in the interest of the group as a whole.

(c) **Financial measures**

Traditional performance measurement relies heavily on internally set financial measures — ratio analysis, variances, meeting of targets and budgets, etc.

For a business to have sustained competitive advantage it has to be responsive to its customers, produce a quality product/service, be flexible, innovative and competitive. Financial measures alone are insufficient measure of an organisation's progress in these areas. Both financial and non-financial measures are required to give a complete appraisal of an organisation's performance. The balanced scorecard is

largely a non-financial performance measurement system to meet present needs.

The Balance Scorecard

The need to integrate financial and non financial measures of performance and identify key performance measures that link measurements to strategy led to the emergence of the balance scorecard. This is an integrated set up performance measures derived from the company's strategy that gives top management a fast but comprehensive view of the organisational unit.

The balance scorecard philosophy assumes that an organisation's vision and strategy is best achieved when the organisation is viewed from the following perspectives:

1. The customer perspective (How do customers see us?)
2. Internal business process perspective (What must we excel at?)
3. Learning and growth perspective (Can we continue to improve and crate value?)
4. Financial perspective (How do we look to shareholders?)

C. Drury has argued that:

Benefits of that balanced scoreboard approach are:

1. "It brings together in a single report for different perspectives on a company performance
2. The approach provides a comprehensive framework for translating a company's strategic goals into a coherent set of performance measures by developing the major goals for the perspectives and then translating these goals into specific performance measures.
3. It helps managers to consider all important operational measures together
4. It improves communications within the organisation and prompts the active formulation and implementation of organised strategy. "

Limitations

1. Is there really a cause and effect relationship (too ambiguous and lacks theoretical underpinning)?
2. There is an omission the environmental input on society.

So What is Strategic Management Accounting?

C. Drury in *Management Accounting for Businesses* argued that strategic management accounting has several strands. These include:

1. The extension of traditional management accounting's internal focus to include external information about competitors.
2. The relationship between the strategic position chosen by a firm and the expected emphasis on management accounting (i.e. accounting in relation to strategic positioning).
3. Gaining competitive advantage by analysing ways to decrease costs and/or enhance the differentiation of a firm's products, through exploiting linkages in the value chain and optimising cost drivers.

The Chartered Institute of Management Accounting (CIMA) defines Strategic Management Accounting as:

> "a form of Management Accounting in which emphasis is placed on information which relates to factors *external* to the firm, as well as *non-financial* information and internally generated information.'"

Therefore, Strategic Management Accounting aims to provide relevant information to an organisation's management to enable them to make strategic plans and strategic decisions.

The emphasis is on external information on competitors, customers, market, environment, etc. Organisations cannot rely on financial information alone – non-financial information plays an important part.

It can be argued that Strategic Management Accounting therefore has a positive role of supporting the financial needs of management in their task of directing and controlling the business in the best interest of its owners and other stake holders.

ACTIVITY

Define Strategic Management Accountimg.

ACTIVITY FEEDBACK

(There may be other definitions)

Strategic Management Accounting provides information to support strategic decisions in organisations. This involves alignment with the objectives detailed by Drury and CIMA as noted above and is carried out via concepts, models and techniques as detailed in the brief review of current techniques and throughout the subsequent chapters.

ACTIVITY

How does Strategic Management Accounting differ from Management Accounting?

ACTIVITY FEEDBACK

The objective of strategic accounting (SMA) is to provide information to managers that will help them run business in a way towards achievement of strategic management of businesses' strategic objectives. Traditional management accounting is not necessarily so much different, but lacks the clear focus on achievement of strategic objectives. Given its focus SMA necessarily needs to be more outward looking and more competitive. It must also monitor the businesses' strategies and be concerned with these to a successful conclusion.

The Strategic Management Accounting System

Writers have identified the following as critical factors that need to be considered/addressed when designing a Strategic Management Accounting system. It should:

a) Aid strategic decisions – Must provide two types of information

   (i) One-off information to support and evaluate particular strategic decisions

   (ii) Information to monitor strategies and the firm's overall competitive position

b) Close the communication gap between managers and accountants – financial data off-putting to most people. Avoid technical jargon. Provide relevant information only in user friendly format.

c) Identify the type of decision – despite strategic decisions being one-off decisions, most strategic decision fall into one of three main types of decisions

   (i) Changing the balance of resource allocation

   (ii) Entering a new business area

   (iii) Exit decisions – either closing down or selling part of business as a going concern

d) Offer appropriate financial indicators – but these alone are not sufficient. Customers drive a business and competitors are greatest threat to a business. Monitoring key performance variables on these two stakeholders crucial to the success of an organisation.

e) Distinguish between economic and managerial performance – distinguish between controllable and non-controllable costs and charge only controllable costs when measuring managerial performance.

f) Provide relevant information – use management by exception principle. Only relevant costs to be included in financial statements. Each report should be tailored to recipient/requirement

g) Separate committed from discretionary costs

h) Distinguish discretionary from engineered costs

i) Use standard costs strategically – engineered standard costs can be useful for control purposes. Standard costs are a useful way of analysing the cost structure of the business, particularly in trying to understand the impact of changes in cost structure in relation to competitor costs.

j) Allow for changes over time – strategic objectives long-term and can change over time. Relationships between input and output can change as manufacturing technology changes. Information system should be flexible to cope with such changes.

It is vital for the strategic management accounting system to use a range of internal and external sources to gather both financial and non-financial information to aid strategic decisions and planning.

REVIEW ACTIVITY

Describe what is meant by the following.

(a) Continuous improvement

(b) Benchmarking

(c) Employee empowerment

REVIEW ACTIVITY FEEDBACK

(a) An on-going process to reduce costs, eliminate waste and improve the quality and performance of activities that increase customer value of sales factor.

(b) It is a continuous measuring of a firm's products, services or activities against the other best performance organisations either internal or external to the firm.

(c) It is the process of giving employees relevant information. So that they will able to react faster to customers, increase process flexibility, reduce cycle time and improve morale

REVIEW ACTIVITY

What are the four main areas on which the Balanced Scorecard is based?

REVIEW ACTIVITY FEEDBACK

The four main areas in the Balanced Scorecard are:

1. Finance. Here targets for measures such as return on capital employed will be stated.

2. Customer. Here the market/customer that the business will aim for is established, as will targets for such things

3. Internal business process perspective. We must strive to excel with regard to our internal operations management to ensure maximum efficiency and effectiveness

4. Learning and growth perspective. Our perspective should be forward-looking, preparing the organisation and its members for future, rather than just present, challenges and opportunities

REVIEW ACTIVITY

Put the following steps in the planning and control cycle in the correct order (the round up above!)

- Evaluate strategies
- Feedback from implementation
- Implement the long-term plan
- Identify objectives
- Choose alternative courses of action
- Identify potential strategies

REVIEW ACTIVITY FEEDBACK

- Identify objectives
- Identify potential strategies
- Evaluate strategies
- Choose alternative courses of action
- Implement the long-term plan
- Feedback from implementation

It must be recognized that to be strategically effective the development of an ongoing strategic plan requires a logical and structured approach where each of the above steps interconnect and support each other. Ongoing planning and control requires that the above is operated as a cycle with no end point but instead a constant process.

REVIEW ACTIVITY

What kind of objectives may we set?

REVIEW ACTIVITY FEEDBACK

These should outline where you want to be. It could be:

1. Profit Maximising
2. Sales fixing
3. Increased market share

A key feature of a strategic objective should be sustainability. An objective achieved only in the short term and at the expense of future performance is counter productive. For example, it would be unwise to increase market share

through price cuts if this damaged overall profit and was unsustainable in the long term.

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Unit 2

Relevance Costs for Decision Making

LEARNING OBJECTIVES

After completing the module the students will be able to.

- Distinguish between relevant and irrelevant costs and revenues
- Explain the importance of qualitative factors in relevant costs
- Consider relevance in relation to various situations, i.e.

  1. Material cost
  2. Labour cost
  3. Cost of a machine
  4. Limiting factor
  5. Outsource or in-house
  6. Continue or discontinue

Introduction

In decision making not all costs are relevant. This unit essentially argues it is the future cost (i.e. relevant cost) that needs to be considered in decision making. The past can be responded to through our future actions but it cannot in itself be changed. As such, past costs can provide useful information but it is the future, as yet uncommitted, costs that are relevant as these are controllable. That which we cannot control may inform our decision making by making us aware of the environment in which we exist but the decisions management makes must focus on the controllable to be relevant.

To this end a variety of scenarios are presented as well as the important qualitative factors.

Relevant Costs

One of the main problems facing organisations is how to identify and evaluate the relevant costs and benefits resulting from alternatives. These must be those that are affected by the decision. Independent costs and benefits should therefore be ignored. The first principle is therefore:

ONLY FUTURE COSTS ARE RELEVANT

Past or committed costs do not affect the decision. This concept is often difficult to grasp as human nature dictates to us that we should attempt to recover past costs. This is particularly relevant where someone has purchased an asset in the past.

The second principle is:

ONLY THOSE COSTS WHICH DIFFER BETWEEN
THE AVAILABLE ALTERNATIVES ARE RELEVANT
[SOMETIMES CALLED INCREMENTAL COSTS]

Hence, if one is attempting to decide between two motor cars as to which is the cheapest to run, one may ignore the road fund licence as it will be the same whichever vehicle you purchase. The third principle is:

ONLY CASH COSTS ARE TO BE INCLUDED

One should ignore depreciation as it is only a book-keeping entry and an accountant's attempt to find the value of an asset in the future. It does not represent the cash paid or received for an asset.

There are some additional terms which you may come across in your studies for relevant costs like:

a) Avoidable costs. These costs would not occur if the activity they are related to did not occur.

b) The opportunity costs – the benefit which could have been earned, but which had been given up, by choosing one option instead of another.

c) Variable costs will usually be relevant costs.

Irrelevant costs are therefore

a) Fixed costs – unless it is directly attributable fixed costs

b) Depreciation

c) Any sunk cost – a cost that has already been incurred.

Much will depend upon the circumstances in the decision as to whether a cost is relevant or irrelevant

Example: To determine the Relevant Costs

Julian Ltd was making a machine to order for a customer, but the customer has decided it does not want the machine any more. There may be subsequent legal remedies which are not considered for now. Costs incurred to date are £60,000. Fortunately, the sales department has found another company willing to buy the machine for £450,000 once it has been completed. To complete the work, the following costs would be incurred:-

(a) Materials: these have been bought at a cost of £7,000. They have no other use, and if the machine is not finished, they would be sold for scrap for £3,000.

(b) Further labour costs would be £9,000. Labour is in short supply and if the machine is not finished, the work force would be switched to another job, which would earn £20,000 in revenue, and incur direct costs of £13,000 and absorbed (fixed) overhead of £8,000.

(c) There are consultancy fees of £5,000. If the work is not completed, the consultant's contract would be cancelled at a cost of £1,000.

(d) The company has general overheads of £9,000.

Required

Determine the relevant costs and whether the new customer offer should be accepted.

ANSWER to example:

(a)

	£
Labour costs required to complete work	9,000
Opportunity costs: contribution forgone by losing other work (£20,000 - £13,000)	7,000
Relevant cost of labour	16,000

(b) £7,000. The price paid in the past for the materials is irrelevant. £3,000 is the opportunity cost of the revenue from scrap which would be forgone it is therefore relevant.

(c) £60,000. Costs incurred in the past are not relevant because they will not affect a decision.

(d) £4,000 is an incremental cost. That is, the incremental cost of consultancy from completing the work is the difference between

the cost of completing the work and the cost of cancelling the contract (£5,000 – 1,000 = £4,000).

(e) Absorbed overhead and general overheads are irrelevant.

(f) Therefore the relevant costs are:

		£
Revenue from completing work		40,000
Relevant costs		
Labour opportunity costs	7,000	
Materials: opportunity costs	3,000	
Labour: basic pay	9,000	
Incremental cost of consultant	4,000	
		23,000
Gain from special order		17,000

ACTIVITY

In your own words define what is a relevant cost

ACTIVITY FEEDBACK

A relevant cost is future cost. You may have used avoidable incremental or opportunity cost in your definition. This is perfectly acceptable.

Relevant cost for materials

Rule - Relevant cost is the current replacement cost.

However if the materials have already been purchased then the relevant cost is the higher of

- The alternative use value, or
- The current resale value

Go through the following examples:

Material I

A job required Material I. The job requires 2000 units. There are no stocks already in place nor is there a book value or realisable value for the material. Material I has however a replacement cost of £8.00 per unit. This material will be used regularly by the company.

Answer

Relevant cost is £8.00 per unit (2000x£8)=£16000

Material J

A job requires 1,500 units of Material J. There are 900 units in stock already as a result. The book value of the material is £3 per unit, the realisable value is £3.50 and its replacement cost is £7. If used Material J would need to be replaced. What is the relevant cost?

Answer

Material J is used regularly by the company. There are existing stocks (900 units) but if these are used on the contract under review a further 900 units would be bought to replace them. Relevant costs are therefore 1,500 units at the replacement cost of £7 per unit = £10,500.

Material K

Material K is required in a job. The job requires 1500 units. 800 units are already in stock as a result of overbuying. Material K has a book value of £4, a realisable value of £2.55 and a replacements cost of £6 per unit. Material K has no other use. What is the relevant cost?

Answer

1,500 units of material K are needed and 800 are already in stock. If used for the contract, a further 700 units must be bought at £6 each. The existing stocks of 800 will not be replaced. If they are used for the contract, they could not be sold at £2.55 each. The realisable value of these 800 units is an opportunity cost of sales revenue forgone. Thus (700 x £6) + (800 x£2.55) = £6241

Material M

Material M is required in a job which requires 100 units. There are 100 units already in stock as a result of over buying. When used however it will not be replaced. The book value of Material M is £5 per unit, the realisable value is £7 per unit and its replacement cost is £4.

Material M could be used in another job as a substitute for 200 units of Material Z. Material Z currently cost £8 per unit. There are no stocks of Material Z in stock. What is the relevant cost?

Answer

The required units of material M are already in stock and will not be replaced. There is an opportunity cost of using M in the contract because there are alternative opportunities either to sell the existing stocks for £7 per unit (£700) or avoid other purchases (of material Z) which would cost 200 x £8 = £1,600. Since substitution for Z is more beneficial, £2,400 is the opportunity cost.

Now try this:-

ACTIVITY

Francis Ltd regularly uses material X and currently has in stock 600 kg, for which it paid £1,600 two weeks ago. If this were to be sold as raw material it could be sold today for £2.00 per kg. You are aware that the material can be bought on the open market for £4.25 per kg but it must be purchased in quantities of 1000 kg.

You have been asked to determine the relevant cost of 600 kg of material X to be used in a job for a customer.

ACTIVITY FEEDBACK

The material is in regular use and if used will have to be replaced at a cost of £2,550(600 x 4.25). Therefore the relevant cost is £2,550.

Relevance costs for machines

The following are Irrelevant :

1. If a machine is bought the purchase price is a sunk cost.
2. Depreciation is only a book entry – no movement of cash.

The relevant costs will therefore be incremental costs.

Example

A machine which originally cost £13,000 has an estimated life of ten years and is depreciated at a rate of £300 a year. The machine has been unused for the last 5 years.

James, a young whiz kid in the sales department, has now won a special order which require the use of the machine.

The current net realisable value of the machine is £9,000. If it is used for the job, its value is expected to fall to £8,500. The net book value of the machine is £6,000.

Required

Calculate the relevant cost of using the machine for the order.

Answer

Loss in net realisable value of the machine
Through using it on the order (£9,000 - £8,500) = £500

Qualitative Factors

These are factors that cannot be expressed in monetary terms yet are important to the final decision. A decline in employee morale that results from redundancies arising from a closure decision is an example of a qualitative factor. It is essential that qualitative factors be brought to the attention of management during the decision-making process, since otherwise there may be a danger that a wrong decision will be made. For example, the cost of manufacturing a component internally may be more expensive than purchasing from an outside supplier. However, the decision to purchase from an outside supplier could result in the closing down of the company's facilities for manufacturing the component.

In our subsequent discussion we will be considering qualitative factors.

Limiting Factor

Limiting factor is a scarce resource which limits the company from maximising its profits it could be sales, materials or labour.

Profits are maximised when contribution is maximised per limiting factor.

The calculation involves the determination of the contribution for each product per unit of limiting factor and then determining the production mix.

Example: Limiting Factor

Samuel Ltd makes two products, the Ace and King Unit. Variable costs are as follows:

	Ace	King
Direct materials	£2	£4
Direct labour (£3 per hour)	£6	£3
Variable overhead	£2	£2
	£10	£9

The sales price per unit is £20 for ACE and £15 for King . During August the available direct labour limited is to 8,000 hours. Sales demand in August is expected to be 3,000 units for ACE for and 5,000 units for King.

Required

Determine the profit-maximising production levels, assuming that monthly fixed costs are £25,000 and that opening stocks of finished goods and work in progress are nil.

The calculation involves three steps:

Answer

Step 1 Confirm what the limiting factor is:

	Ace	King	Total
Labour hours per unit	2 hours	1 hour	
Sales demand	3000 units	5000 units	
Labour hours needed	6000 hours	5000 hours	11000 hours
Less Labour hours available			8000 hours
Shortfall			3000 hours

Therefore direct labour is the limiting factor on production

Step 2 Calculate the contribution earned by each product per unit of scarce resource

	Ace	King
Sales price	£20	£15
Variable cost	£10	£9
Unit contribution	£10	£6
Labour hours per unit	2 hours	1 hour
Contribution per labour hour (=unit of limiting factor)	£5	£6
Rank (i.e. produce in this order)	(2)	(1)

Although Ace have a higher unit contribution than King. Because labour is in short supply it is more profitable to make King.

Step 3 Work out the budgeted production and sales. Sufficient King will be made to meet the full sales demand, and the remaining labour hours available will then be used to make Ace

Rank	Product	Hours required	Hours	Total Contribution
1	King	5,000	5000	£30,000 (£6 x 5000 hours)
2	Ace [Balancing hours]	6,000	3000	£15,000 ((£10 x 3000) x 3000 / 6000 hrs)
	Total available	11,000	8000	£45,000
Less fixed cost				£25,000
Profit				£20,000

You produce King first as it maximises contribution per limit actor. The balance is ACE amount. Given there is only 8,000 hours available the balance is 3000.

Now try these activities

ACTIVITY

Define what is meant by a limiting factor and give example.

ACTIVITY FEEDBACK

A limiting factor is any scarce resource that limits the production capacity of the company. Examples are labour, material sale.

ACTIVITY

ABC Limited manufactures three products, the selling price and cost details of which are given below.

	Product P £	Product Q £	Product R £
Selling price per unit	85	105	105
Direct materials (£5/kg)	10	5	15
Direct labour (£4/hour)	15	23	19
Variable overhead	9	13	11
Fixed overhead	24	36	30

In a period when direct materials are restricted in supply, calculate the contribution per limiting factor and rank.

ACTIVITY FEEDBACK

	P	Q	R
Selling price	85	105	105
Direct materials (£5/kg)	10	5	15
Direct labour	15	23	19
Variable overheads	9	13	11
Total variable cost per unit	34	41	45
Contribution per unit	51	64	60
Materials 10/5 per kg	2	(5/5) 1	(15/5) 3
	= 25.5	= 64	= 20
Rank	(2)	(1)	(3)

ACTIVITY

James Ltd makes two products, A and B for which there is unlimited demand at the budgeted selling prices. A takes three hours to make and has a variable cost of £23 and a selling price of £35. B takes two hours of make and has a variable cost of £15 and a selling price of £25. Both products use the same type of labour, which is in short supply.

Required

Determine the product which should be made to maximise profits, and describe the other considerations which might alter your decision.

ACTIVITY FEEDBACK

	A	B
Sales	35	25
Variable costs	23	15
Contribution	12	10
Rank	(1)	(2)
Contribution per	£12	£10
Limited factor	3	2
	£4	£5
Rank	(2)	(1)

Decision: Produce B

Other qualitative factors

(1) Will selling price change?

(2) Will variable cost change?

(3) Who are our competitors?

ACTIVITY

A company has the following costs and revenues relating to a product

Selling price	£63.50
Labour @ £7.50 per hour	£22.50
Raw materials @ £4 per kg	£20.00
Variable overheads	£6.00
Fixed cost per unit	£3.00
Profit per unit	£12.00

(i) What is the contribution per labour hour?

(ii) What is the contribution per kilogram of raw materials?

ACTIVITY FEEDBACK

(i)

Selling price		£63.50
Less variable cost	£22.50	
Labour	£20.00	
Raw Material		
Variable overhead	£6.00	£48.50
Contribution per unit		£15.00

Need quantity of labour

22.50/7.50 = 3 hours

therefore £15/3 = £5 contribution per labour hour

(ii) Raw materials £20 / £4 = 5kg

Contribution per kilogram of raw material

= £15 / 5k

= £3

ACTIVITY

Which of the following should be taken into consideration when making a ranking decision based on contribution per limiting factor?

a) Variable cost per unit

b) Total variable costs

c) Fixed cost per unit

d) Demand levels for the products

e) Total fixed costs

ACTIVITY FEEDBACK

a) Variable cost per unit

Outsourcing or in-house

For various reasons it may suit a manufacturer to make the product itself (in-house) or to outsource it (buy).

The relevant cost is the *differential costs* between the two options.

Example: Outsource or in-house

Jameson Ltd makes four components A, B C, and D for which costs in the forthcoming year are expected to be as follows.

	A	B	C	D
Production (units)	2000	3000	4000	5000
Unit marginal costs				
Direct materials	5	6	3	5
Direct labour	10	11	6	8
Variable production overheads	3	2	2	3
	18	**19**	**11**	**16**

Directly attributable fixed (incurred as a direct consequence) costs per annum are as follows. A £2000, B £7000, C 7000, D9000, and other fixed costs are £3000.

A subcontractor can supply units of A, B, C and D for £10, £23, £17 and £18 respectively.

Required

Decide whether Jameson Ltd should outsource or make in hour

Answer and Discussion

a) The relevant costs are the differential costs between making and buying. Subcontracting will result in some fixed cost savings

	A	B	C	D
Unit variable cost of making	£18	£19	£11	£16
Unit variable cost of buying	£10	£23	£17	£18
	(£8)	£4	£6	£2
Annual requirements (units)	2000	3000	4000	5000

	A	B	C	D
Extra vc of buying	(16000)	12000	24000	18000
Fixed cost of buying	2000	7000	7000	9000
Extra total cost of buying	(18000)	5000	17000	1000

The company would save £18,000 subcontracting to A

ACTIVITY

What qualitative factors would you consider in this decision?

ACTIVITY FEEDBACK

1. Spare capacity, how should it be used?
2. Could there be an industrial dispute as a result of company's action?
3. Quality of buying in.
4. Reliable figures? Estimated may not be true.

Now try the next activity

ACTIVITY

Sahai Limited makes three components: A, B and C. The following costs have been recorded:

	Component A Unit cost	Component B Unit cost	Component C Unit cost
Variable cost	£2.50	£8.00	£5.00
Fixed cost	£2.00	£8.30	£3.75
Total cost	£4.50	£16.30	£8.75
Buy in price	£4.00	£7.00	£5.50

Which components should Sahai Ltd buy in if at all?

ACTIVITY FEEDBACK

	A	B	C
Variable cost	2.50	8.00	5.00
Variable cost buy	4.00	7.00	5.50
	1.50	(1.00)	0.50

Therefore, choose B

Assuming that fixed costs will remain unchanged whether or not the company makes or buys the components the relevant cost of manufacture will be the variable cost. Under these circumstances the company should only purchase components if the purchase price is less than the variable cost.

Outsource or in-house with scarce resources

Rule

If a company has to subcontract to make up a short-fall then the company needs to minimise its total costs. The units bought must have the lowest extra variable cost of buying per unit of scarce resource saved.

Example

Johnson Ltd manufactures three components, X, Y and Z using the same machines for each. The budget for the next year calls for the production and assembly of 80,000 of each component. The variable production cost per unit of the final product is as follows:

	Machine hours	Variable cost
1 unit of X	4	£21
1 unit of Y	3	£37
1 unit of Z	5	£25
Assembly		£17
		£100

Only 24,000 hours of machine time will be available during the year, and a sub-contractor has quoted the following unit prices for supplying components. £30; £41; £35

Required

Advise Johnson Ltd

We need to minimise the extra variable cost of sub-contracting per unit of scarce resource saved.

	X	Y	Z
Variable cost of making	21	37	25
Variable cost of buying	30	41	35
Extra variable cost of buying	9	4	10
Machine hrs saved	4	3	5
Machine hrs saved by buying	£2.25	£1.33	£2.00
Rank	(3)	(1)	(2)

Cheaper to buy Y and Z

Cheaper to make X and Z

Please consider the following:

Example

MR Ltd manufactures - products A and B using the same and material for each. Annual demand for A is 9,000 units, while demand for B is 13,000 units.

The variable production cost of A is £11 and that of B is £16

A requires 3.5 kgs of raw material per unit, the requires 8 kgs of raw material per unit

Supply of raw material will be limited to 90,000 kgs during the year.

A sub contractor has quoted prices of £18 per unit for the D and £26 unit for the E to supply the product.

How many of each product should MR Ltd manufacture in order to maximise profits.

Answer

	A £ per unit	B £ per unit
Variable cost of making	11	16
Variable cost of buying	18	26
Extra variable cost of buying	7	10
Raw material saved by buying	3.5 kgs	8 kgs
Extra variable cost of buying per kg saved	£2	£1.25
Priority for internal manufacture/ranking	(1)	(2)
Priority for external manufacture	(2)	(1)

Production plan

Therefore make	A (9,000 x 3.5 kgs)	31,500 kgs
	B*(7312.5 x 8 kgs)	58,500 kgs Balancing fig
		90,000

*(58,500/104,000) x 13,000 = 7,312.5

The remaining 5687.5 units of B should be purchased from the external manufactures.

Now try these Activities

ACTIVITY

Bronze Ltd manufactures two components in its machine division, in which capacity per month is limited to 3,500 machine hours.

Production costs are as follows:

	Component A £	Component B £
Variable costs	20	25
Fixed overhead	10	15
	30	40
Hours per unit	2	3
Monthly requirements	1,000 units	1,000 unit

Component X can be brought from an external supplier for £31 per unit and component Y can similarly be bought for £47 per unit.

Required

What are the minimum total costs per month of the machining division and external purchases, given that all the monthly requirements for units of each component must be either manufactured or purchased?

	A	B	Total
Machine hours per unit	2 hrs	3 hrs	
Total machine hours per month needed	2,000 hrs	3,000 hrs	5,000 hrs
Machine hours available			3,500 hrs
Shortfall			1,500 hrs

	£	£
Variable cost per unit	20	25
External purchase cost	31	47
Extra cost of purchase per unit	11	22
Hours saved by purchasing	2 hrs per unit	3 hrs per unit
Extra cost per hour saved	5.5	7.3

The company should therefore buy 750 units of A per month

	£
In-house production costs	
Variable cost of A (1,000 – 750) x £20	5,000
B (1,000 x £25)	25,000
	30,000
Fixed costs 3,500 hrs x £5 per hr	17,500
	47,500
External purchase costs of A (750 x £31)	23,250
	70,750

ACTIVITY

Johnson Ltd manufactures three products using the same direct labour force. Budgeted data is as follows:

	Product A £	Product B £	Product C £
Sales price per unit	10	20	24
Variable cost per unit	6.5	12.0	15.0
Fixed cost per unit	0.5	4.5	4.0
Total cost per unit	7.0	16.5	19.0
Profit per unit	1.0	1.5	3.0
Direct labour hours per unit	.5 hr	1.5 hrs	2 hrs
Budgeted monthly sales	500 units	300 units	400 units

There are 1,200 direct labour hours available in normal working hours each month. Direct labour employees are paid £4 per hour in normal time.

ACTIVITY FEEDBACK

	Hours
Product A 500 x .5	250
Product B 300 x 1.5	450
Product C 400 x 2	800
	1500

Direct labour is the limiting factor with 1200 hours

ACTIVITY FEEDBACK

	A	B	C
Selling price	10	20	24
Variable cost (labour)	6.5	12	15
Contribution	3.5	8	9
Hours	0.5	1.5	2.0
Contribution per limiting factor	7	5.3	4.5
Ranking	(1)	(2)	(3)

Production Plan

Ranking	Hours	Total Contribution
A	250	(500 x 3) = 1,750
B	450	(450 x 8) = 3,600
C (Balance)	500	(500 x 9) = 4,500
	1,200	9,850

Continue or discontinue

Whether or not a company ceases production (i.e. closes down) depends in practice and long-term decisions. In this type of decision, one should consider the contribution made to the business as a whole rather than just the product/factory.

Example:

The company is concerned about its poor profit performance, and is considering whether or not to cease selling YY. It is felt that selling prices cannot be raised or lowered without adversely affecting net income. £5,000 of the fixed costs of YY are direct fixed costs which would be saved if production ceased. All other fixed costs, it is considered, would remain the same.

	XX	YY	ZZ	Total
Sales	£50,000	£40,000	£60,000	£150,000
Variable costs	£30,000	£25,000	£25,000	£28,000
Contribution	£20,000	£15,000	£25,000	£60,000
Fixed costs	£17,000	£18,000	£20,000	£55,000
Profit/loss	£3,000	(£3,000)	£5,000	£5,000

By stopping production of YY, the consequences would be a £10,000 fall in profits.

Loss of contribution	(£15,000)
Sorting in fixed cost	£5,000
Incremental loss	(£10,000)

It does not therefore seem a good idea to stop producing YY.

Rule: Should continue producing as long as product contributes to the overall profitability of the company. Must consider qualitative factors.

ACTIVITY

What are the qualitative factors in this decision?

ACTIVITY FEEDBACK

1. If decided to close – effect on demand for other products
2. Pricing: is YY a loss leader?
3. Etc

Accept or Reject orders (Special Orders)

Special pricing decisions relate to pricing decisions outside the main market. Typically they involve one-time only orders or orders at a price below the prevailing market price.

Depends upon if there exists spare capacity within the company.

a) If a company has spare capacity then the rule is to accept if the product makes a contribution to fixed costs and profit (Activity/Feedback)

or

b) If no spare capacity then existing business should only be turned away if the contribution from the order is greater than the contribution from the business which must be sacrificed

Example

Symister Ltd makes a single product which sells for £30 and for which there is great demand. It has a variable cost of £12, made up as follows:

Direct material	£6
Direct labour (2 hours)	£6
	£12

The labour force is currently working at full capacity producing a product that earns a contribution of £4 per labour hour. A customer has approached the company with a request for the manufacture of a special order for which he is willing to pay £5,500. The costs of the order would be £2500 for direct materials and 600 labour hours will be required.

Required

Decide whether the order should be accepted.

Answer

Labour is a limiting factor. By accepting the order, work would have to be diverted – from the standard product – contribution will be lost that is, there is an

Selling price		£5,500
Direct materials	£2,000	
Direct labour (600 x £3)	£1,800	
Opportunity cost		
600 x £4 (contribution Forgone)	£2,400	£6,200
Profit/Loss		(£700)

Although accepting the order would earn a contribution of 5,500 - (2000 + 1800) = 1700 the last contribution would reduce the contribution earned elsewhere by £2,400 and so the order should not be accepted.

Test

Qualitative Factors

1. Existing customers may be affected by special order
2. Should existing business be turned away?
3. Others /etc …

Essentially, special orders are seen as short-term decisions. However Kaplan has argued that:

(i) If special order decisions are always evaluated as short term decisions, a situation can arise whereby the decision to reduce capacity is continually deferred. If demand from normal business is considered to be permanently insufficient to utilise existing capacity, then a long-term capacity decision is required.

(ii) By utilising the unused capacity to increase the range of products produced, the production process becomes more complex and thus fixed cost of managing the additional complexity will eventually increase. Long term considerations should therefore always be taken into consideration when evaluating special pricing decisions.

Now try the following activities and feedback.

ACTIVITY

Northampton has three divisions. Information for the year ended 30 September 2007 is as follows

	Division A £000	Division B £000	Division C £000	Total £000
Sales	350	420	150	920
Variable costs	280	210	120	610
Contribution	70	210	30	310
Fixed costs				262.5
Net profit				47.5

General fixed overheads are allocated to each division on the basis of sales revenue; 60% of the total fixed costs incurred by the company are specific to each division, being split equally between them.

Using relevant cost, determine, which divisions should remain open if Northampton wishes to maximise profits?

ACTIVITY FEEDBACK

	A	B	C
Contribution	70	210	30
Specific fixed cost	52.5*	52.5*	52.5*
Profits/Loss	17.5	157.5	(22.5)

*The specific avoidable fixed overheads per division = £262.5 x 60%

= 157.5/5

= 52.5

Only divisions A and B should remain open since they both provide positive contributions to fixed costs.

REVIEW ACTIVITY

Bevel Ltd is an English company that assembles tables and sells them to a wholesaler in Europe. It manufacturers four different types of tables. It has a labour intensive factory where all staff are skilled in the manufacture of all four types of tables, and staff can be moved immediately from the production of one board to another at no additional cost. All four products are essential components of most personal computers sold on the market today.

The budgeted figures for the forthcoming month are as follows:

All figures are in £ per unit except for sales volume

	W	X	Y	Z
Selling price	25	30	35	30
Costs				
Direct labour at £10 per hour	5	6	8	10
Raw materials				
Brass fittings kg	1	1	2	4
Nails at £30 per kg	3	6	5	3
Sundries: glue	1	1	2	3
Overheads				
Variable overhead	2	2	2	2
Fixed overhead	12	12	12	12
Estimated demand (units)	10,000	7,000	6,000	8,000

Required

a) Calculate whether the company should drop product Z as it is currently making a loss.

b) If the company could only manufacture 20,000 units per month due to limited total production space being available, show how the company could maximise its profitability under this constraint.

c) What other factors would you take into account before finally making a decision about the production mix?

REVIEW ACTIVITY FEEDBACK

BOVELL Ltd

a) Z makes a positive contribution to fixed costs and profit

£30 – (10 + 4 + 3 + 2) = £8 per unit

Dropping the product would lose the Company 8,000 x £8 = £64,000 contribution and divert the fixed costs on to the other three products.

b) Contribution per limiting factor:

	Rank
W 25 – (5 + 1 + 3 + 1 + 2) = 13	3
X 30 – (6 + 1 + 6 + 1 + 2) = 14	2
Y 35 – (8 + 2 + 5 + 2 + 2) = 16	1
Z 30 – (10 + 4 + 3 + 3 + 2) = 8	4

Manufacture in this order up to 20,000 units:

Product	Cont per unit x £	No of units =	Total contribution
S	16	6,000	96,000
R	14	7,000	98,000
Q	13	7,000 (limit)	91,000
		20,000	285,000
Less overheads			372,000
Loss			(87,000)

c) Nails required for full capacity

W 10,000 x 1/10kg	=	1,000
X 7,000 x 1/5 kg	=	1,400
Y 6,000 x 1/6kg	=	1,000
Z 8,000 x 1/10kg	=	800

Available

Nails 4,200 x 0.75 = 3,150

Ranking by contribution per limiting factor (kg of nails)

	Rank
W 13 x 10 = 130	(1)
X 14 x 5 = 70	(4)
Y 16 x 6 = 96	(2)
Z 8 x 10 = 80	(3)

c) Usual marketing implications

Product range, loss leaders, valued customers, large orders, company image, etc.

REVIEW ACTIVITY

Mokia Ltd is currently reviewing its manufacturing operations

Currently four products are produced X1, X2, X3 and X4. It has been suggested that products X3 and X4 should be dropped from production as they are creating financial losses.

The forecast financial results are details below

	Forecast financial results 2008			
	X1	X2	X3	X4
Sales	£450,000	£550,000	£200,000	£260,000
Variable costs	£300,000	£250,000	£210,000	£220,000
Fixed costs				
Specific	£20,000	£15,000	£5,000	£10,000
General	£60,000	£105,000	£25,000	£50,000
Profit/(Loss)	£40,000	£180,000	(£40,000)	(£20,000)

General fixed costs have been absorbed on a direct labour hour's basis.

Required

a) Based on the information given, advise management whether X3 and X4 should be dropped.

Support your advice with appropriate calculations

b) The production manager has informed senior management that because of skills shortages, she is unlikely to have enough machine operators to provide all the labour requirements. How would this affect your analysis?

c) The purchasing manager is outraged at the suggestion that X3 should be dropped as a special machine with no alternative use was purchased 12 months ago for £30,000 specifically for the X3 production line.

Disposal will result in a book loss of £20,000.

What impact would this information have on your analysis?

REVIEW ACTIVITY FEEDBACK

MOKIA LTD

a) General fixed costs are unlikely to be reduced by dropping products X3 and X4. Directly attributable or specific fixed costs will be avoided as will variable costs. Sales revenue will obviously be lost.

Effects of dropping X3

Lost sales	(£200,000)
Variable cost savings	£210,000
Specific fixed costs	£5,000
Net saving	£15,000

X3 should be dropped as it is currently yielding a negative contribution. Possible future sales/demand elasticity should be considered before a final decision is made.

Effects of dropping X4

Lost sales	(£260,000)
Variable cost savings	£210,000
Specific fixed costs	£10,000
Net loss of contribution	(£30,000)

b) Existence of scarce resource: optimal production plan found by ranking products according to contribution per hour of machine operator. As X3 has a negative contribution it would still be dropped.

c) None, as the sunk cost of a book loss is not a cash flow.

REVIEW ACTIVITY

XYZ Ltd has already incurred research and development costs of £200,000 on a contract and expects to incur £100,000 more in costs before the R&D project is completed in one year's time. The estimated future costs are as follows.

	Expected future costs £
Materials	60,000
Staff costs	70,000
Overheads	20,000
	170,000

The expected sales value of the completed research is just £80,000 of materials needed. If not used, the materials must be disposed of at a cost of £3,000.

Labour costs. The expected future staff costs represent the annual salaries of Inderjeet and Harjit, who each earn £20,000 per annum, and an allocation of £10,000 of the salary of their supervisor Patel, who is in overall charge of several research projects. If this project is abandoned, Inderjeet and Harjit will be made redundant, each receiving £10,000 in compensation.

Required

The company is considering whether or *not* to *continue* with the research project.

1. Calculate the relevant costs for materials in the project.

2. Calculate the relevant cost for labour.

REVIEW ACTIVITY FEEDBACK

1. Relevant cost is £3,000. All other costs are past cost in relation to materials.

2. The full salary of Patel is a cost that will be incurred whether or not the project goes ahead, and so the relevant cost of his allocated salary is nil. Relevant labour costs are:

Salaries of Inderjeet and Harjit *(Incurred if the project goes ahead)*	40,000
Less Redundancy payments *(Incurred if the project is abandoned)*	20,000
Net relevant costs	22,000

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Unit 3

Activity Based Costing

Introduction

In calculating the selling price of a product, a company must include both direct cost and indirect costs.

The direct costs are easy to ascertain as one knows the labour and material, etc. that went into the product. The indirect cost of overheads are quite different. How much overheads should be included in the product? We know that it should be included though.

The costing methods of traditional costing (absorption costing) and the Activity Based Costing methods seek to determine how much overheads should be included in the product.

Both the traditional system and the ABC have an identical approach to assigning direct costs.

Traditionally we tend to think of overheads as rendering a service to cost units, the cost of which will be charged to those units. ABC sees overheads as being caused by activities, and it is the cost units that cause the activities that must be charged.

This unit will introduce Absorption Costing (traditional costing) and then compare it to Activity Based Costing.

The unit then looks at Activity Based Costing in more detail by recognising the types of cost drivers, designing an ABC system, and, finally, considering the Resource Consumption Model.

ACTIVITY

List as many direct costs of a furniture manufacturer as you can.

ACTIVITY FEEDBACK

1. Wood
2. Glue
3. Nails
4. Handles
5. Hinges, etc.

There may be more that you can think of.

What is Activity Based Costing?

Activity Based Costing (ABC) involves the identification of the factors which cause the costs of an organisation's major activities. Support overheads are charged to products on the basis of their usage of the factor causing the overheads. Thus ABC allocates indirect costs to cost centres based on activities rather than departments.

The major difference between the ABC method and Traditional Costing method of overheads also relates to the two-stage allocation process.

The first stage for both allocates indirect costs to cost centres (normal departments).

In the second stage, the traditional costing method uses a limited number of different types of second stage volume-based allocation (non-drivers), whereas activity based systems use many different types of volume-based and non volume-based cause and effect second stage drivers. This will be illustrated in the forthcoming examples.

Reasons for development of ABC

Modern manufacturing environment

- An increase in support services (such as production scheduling)
  - These services assist in the manufacture of a wide range of products.

  - They are unaffected by changes in production volume.
  - They vary instead with the range and complexity of products.
- An increase in overheads as a proportion of total costs.

Inadequacies of absorption costing

- Implies all overheads are related to production volume.
- Developed at a time when organisations produced only a narrow range of products and when overheads were only a small fraction of total costs.
- Tends to allocate too great a proportion of overheads to high-volume products (which cause relatively little diversity) and too small a proportion to low-volume products (which cause greater diversity and use more support services).

A comparison Absorption Costing v ABC

ABSORPTION COSTING [Traditional Method]

Absorption costing is an old method of product costing which aims to include in the total cost of a product (unit, job and so on) an appropriate share of an organisation's total overhead. Product costs are built up using absorption costing by a process of allocation, apportionment and overhead absorption.

As stated earlier, there are two stages to apportioning overheads:

(1) The first stage of overhead apportionment involves sharing out (or apportioning) the overheads within general overhead cost centres between the other cost centres using a fair basis of apportionment.

(2) The second stage of overhead apportionment is to apportion the costs of service cost centres (both directly allocated and apportioned costs) to product cost centres.

The final stages (stage 3 and 4) in absorption costing is the absorption into product costs (using overhead absorption rates) of the overheads which have been allocated and apportioned to the product cost centres.

We will now calculate each stage.

Example

A company is preparing its production overhead budgets and determining the apportionment of those overheads to products. Cost centre expenses and related information have been budgeted as follows.

Data

	Total	X	Y	Z	Stores	Maintenance
	£	£	£	£	£	£
Indirect wages	98,560	13,586	9,190	14,674	29,650	20,460
Materials	26,900	11,400	13,700	1,200	600	-
Rent & rates	10,700					
Buildings Ins	2,600					
Power	9,600					
Heat & Light	7,400					
Depreciation (machinery)	20,200					
Value of machinery	402,000	201,000	179,000	22,000		
Power	100	55	40	3	-	2
Direct labour (hours)	35,000	8,000	6,200	20,800	-	-
Machine usage (hours)	25,200	7,200	18,000	-	-	-
Area (sq ft)	45,000	10,000	12,000	15,000	6,000	2,000

Required

Calculate overhead totals for all departments by using direct apportionment as an appropriate basis for apportionment.

Note: Service overheads of stores and maintenance are allocated on the basis of direct labour and machine usage respectively.

Answer

Stage 1

1. The Indirect Expense of Materials and indirect wages can be directly allocated to the production cost centres XYZ and to the service department's stores and maintenance (as these actually occurred in the departments).

2. The overheads of Rent and Rates, Building Insurance, Power, light and heat, and depreciation need to be apportioned (i.e. shared out) using a fair and suitable basis.

We could use:

(i) value of machinery

(ii) power

(iii) direct labour hours

(iv) machine hours, and

(v) area

Which would be the most appropriate basis to use for rent and rates?

From this list the most suitable is area.

Therefore the calculation is

Rent and Rates = £10,700 this needs apportioning out using the basis of area

Dept X = $\frac{10,000}{45,000} \times 10,700$ = £2,378

Dept Y = $\frac{12,000}{45,000} \times 10,700$ = £2,853

Dept Z = $\frac{15,000}{45,000} \times 10,700$ = £3,567

Stores = $\frac{6,000}{45,000} \times 10,700$ = £1,427

Maintenance = $\frac{2,000}{45,000} \times 10,700$ = £475

= £10,700

The same approach of appointment was adopted for insurance, power heat and high and depreciation. The basis for appointment has been shown on the right hand side of the table

Step 1

	Total £	X £	Y £	Z £	Stores £	Maintenance £	Basis of apportionment
Indirect wages	98,560	13,586	14,190	20,674	29,650	20,460	Actual
Materials	26,900	11,400	13,700	1,200	600	-	Actual
Rent & rates	10,700	2,377	2,853	3,567	1,427	476	Area
Insurance	2,600	578	693	867	347	115	Area
Power	9,600	5,280	3,840	288	-	192	Usage
Heat & Light	7,400	1,644	1,973	2,467	987	329	Area
Depreciation	20,200	10,100	8,995	1,105	-	-	Val of mach
	175,960	44,965	46,244	30,168	33011	21,572	

This is the end of Stage 1.

In the table it can be seen that the service cost of £33,011 (stores) and £21,572 (maintenance) needs to be reapportioned to the production units. A suitable basis for reapportioning stores appears to be direct labour and maintenance machine usage.

Therefore, using direct labour to reapportion stores; (Note data taken from page 58)

$$\frac{8000}{35000} \times 33011 \qquad = £7,545$$

$$\frac{6200}{35000} \times 33011 \qquad = £5,848$$

$$\frac{20800}{35000} \times 33011 \qquad = £19,618$$

$$= £33,011$$

ACTIVITY

Now try to reapportion maintenance based on machine usage.

ACTIVITY FEEDBACK

$\frac{7200}{25200} \times 21572 = £6,163$

$\frac{18000}{25200} \times 21572 = £15,409 = £21,572$

Step 2

Reallocate	-	7,545	5,848	19,618	(33,011)		Direct labour
Reallocate	-	6,163	15,409	-	-	(21,572)	Machine usage
Totals		**58,676**	**67,502**	**49,792**	-	-	

Step 3

Calculate separate overhead absorption rates for each production cost centre.

The overhead rates are calculated by applying the following formula:

$$\frac{\text{cost centre overheads}}{\text{cost centre direct labour hours or machine hours}}$$

The choice of an absorption rate is a matter of judgement but the management accountant should choose a basis which reflects the characteristics of a given cost centre.

Thus department X and Y could be assigned labour hours and department Z machine hours because they are dominated by labour and machines with 10,000 machine hours for X and Y and 20 labour hours for Z

Therefore the absorption rates are:

$$X = \frac{58673}{10000} = £5.87$$

$$Y = \frac{67501}{10000} = £6.75$$

$$Z = \frac{49786}{10000} = £2.49$$

Step 4

Assigning cost-centre overheads to products

Now suppose: Direct costs were £120 per unit.

Total number of units for Product A was 100. Each department takes 1 hour to produce Product A:

Direct cost		100	x	£120	= £12,000
Overheads					
X	5.67	x		100 x 1hr	£587
Y	6.75	x		100 x 1hr	£675
Z	2.49	x		100 x 1hr	£249
				Total cost for Product A	**£13,511**

13511 /100 = £135.11 cost per unit

ACTIVITY

Briefly list the type of factors you believe which could affect the choice of the bases an organisation can use to apportion service department costs.

ACTIVITY FEEDBACK

(a) The type of service being provided.

(b) The amount of overhead expenditure involved.

(c) The number of departments benefiting from the service.

(d) The ability to be able to produce realistic estimates of the usage of the service.

(e) The resulting costs and benefits.

Try working through this example.

Example: Activity Based Costing system and traditional system

Russell Ltd manufacturers four products, A, B, C and D.

	Output units	Number of runs in the period	Material cost per unit	Direct labour hours per unit	Machine hours per unit
A	20	4	40	1	1
B	20	4	100	2	2
C	200	5	40	1	1
D	200	5	100	2	2
		18			

Direct labour cost per hour £5

Overhead costs

Scheduling costs £14,280

Materials handling costs £8,800

£23,080

Absorption rates are calculated on machine hours.

Required

Calculate costs for traditional Absorption Costing and ABC.

Solution

Absorption costing method

	A	B	C	D	Total
Direct material (1)	£80	£2,000	£8,000	£20,000	£30,080
Direct labour (2)	£100	£200	£1,000	£2,000	£3,300
Overheads* (4)	35	1,398	6,994	13,988	22,415
	215	3,599	15,994	35,998	55,795
Units produced	20	20	200	200	
Cost per unit	10.75	179.90	79.97	179.94	

Note: that the direct costs for ABC are exactly the same as for Absorption Costing. Observe carefully how the cost drivers (scheduling and material handling) are multiplied by the number of runs to obtain the overhead amount for the products.

Calculations

Direct Material Cost (1)

A	£40 x 20	=	£80
B	£100 x 20	=	£2,000
C	£40 x 200	=	£8,000
D	£200 x 100	=	£20,000

Direct Labour cost (2)

A	20 x 1hr x £5	=	£100
B	20 x 2hr x £5	=	£200
C	200 x 1hr x £5	=	£1,000
D	200 x 2hr x £5	=	£2,000

Overhead Calculations

$$\frac{\text{Total overheads}}{\text{Machine hours}} = \text{Absorption Rate}$$

Machine hours (3)

A	20 x 1	=	20
B	20 x 2	=	40
C	200 x 1	=	200
D	200 x 2	=	400
			660

Absorption rate

$$\frac{\text{Total overheads}}{\text{Machine hours}} = \frac{23080}{660} = \text{£34.97 per machine hour}$$

Overheads (4)

A	£699.40 x 1hr	x	20	=	£34.97
B	£34.97 x 2hr	x	20	=	£1,398.80
C	£34.97 x 1	x	200	=	£6,994
D	£34.97 x 2	x	200	=	£13,988

Activity Based Cost Method

	A	B	C	D	Total
Direct material	80	2,000	8,000	20,000	30,080
Direct labour	100	200	1,000	2,000	3,300
Scheduling costs	3,173	3,173	3,966	3,966	14,278
Materials handling costs	1,956	1,956	2,445	2,445	8,802
	5,309	7,329	15,411	28,411	56,460
Units produced	20	20	200	200	
Cost per unit	265.45	366.45	77.06	142.06	

Note: that the direct costs for ABC are exactly the same as for Absorption Costing. Observe carefully how the cost drivers (scheduling and material handling) are multiplied by the number of runs to obtain the overhead amount for the products.

ABC Calculations

Cost drivers are scheduling cost and handling

Scheduling costs

$$\frac{14{,}280}{18 \text{ runs}} = 793.33 \text{ per run}$$

A 793.33 x 4 = 3173
B 793.33 x 4 = 3173
C 793.33 x 5 = 3966
D 793.33 x 5 = 3966

Material handling

$$\frac{8{,}800}{18 \text{ runs}} = 489 \text{ per run}$$

A 489 x 4 = 1956
B 489 x 4 = 1956
C 489 x 5 = 2445
D 489 x 5 = 2445

8802*

* error due to rounding - should be 8800.

Summary

Product	Conventional costing unit cost	ABC unit cost	Difference per unit
A	10.75	265.45	254.70
B	179.90	366.45	186.50
C	79.97	77.06	2.91
D	179.94	142.06	37.88

Conclusion

The figures suggest that the traditional volume-based absorption costing system is flawed.

(a) It underallocates overhead costs to low-volume products (here A and B) and over-allocates overheads to higher-volume products (here Z in particular)

(b) It underallocates overhead costs to smaller-sized products (here A and C with just one hour of work needed per unit) and over allocates overheads to larger products (here B and D).

Cost drivers

A cost driver is a factor which causes a change in the cost of an activity. For example, materials handling cost would have a possible driver in the number of production runs. Cost drivers are a significant part of a ABC system. Indeed, there are different types.

Volume-based and non-volume-based cost drivers

ABC systems rely on a greater number and variety of second stage cost drivers. The term 'variety of cost drivers' refers to the fact that ABC systems use both volume-based and non volume-based cost drivers. In contrast, traditional systems use only volume-based cost drivers. Volume-based cost drivers assume that a product's consumption of overhead resources is directly related to units produced. Volume-based cost drivers used by traditional systems are units of output, direct labour hours and machine hours. These cost drivers are appropriate for measuring the consumption of expenses such as machine energy costs, depreciation related to machine usage, indirect labour employed in production centres and inspection costs where each item produced is subject to final inspection.

Volume-based drivers are appropriate where the activities are performed each time a unit of the product or service is produced. In contrast, non-volume related activities are not performed each time a unit of the product or service is produced.

Using only volume-based cost drivers to assign non-volume related overhead costs can result in the reporting of distorted product costs. If a large proportion of an organisation's costs are unrelated to volume there is a danger that inaccurate product costs will be reported. Also, if non-volume related overhead costs are only a small proportion of total overhead costs, the distortion of product costs will not be significant. In these circumstances, traditional product costing systems are likely to be acceptable.

Activity Cost Drivers

Activity cost drivers consist of transaction and duration drivers. Transaction drivers, such as the number of purchase orders processed, number of customer orders processed, number of inspections performed and the number of set-ups undertaken, all count the number of times an activity is performed. Transaction drivers are the least expensive type of cost driver but they are also likely to be the least accurate because they assume that the same quantity of resources is required every time an activity is performed.

Duration drivers represent the amount of time required to perform an activity. Examples of duration drivers include set-up hours and inspection hours.

ACTIVITY

Define a cost driver.

ACTIVITY FEEDBACK

Any factor which causes a change in the cost of an activity.

ACTIVITY

Differentiate between a volume-based cost driver and a non volume-based cost driver. Why is it necessary to differentiate between the two?

ACTIVITY FEEDBACK

Volume-based cost drivers are related to activity. Non volume-cost drivers are cost drivers that do not change with the level of activity.

It is necessary to differentiate between the two because by using only volume-based cost drivers to assign non-volume related overhead costs can result in distorted product costs.

Designing an ABC System

Designing an ABC system would involve the following steps

Step 1 Identify an organisation's major activities.

Activities are identified by carrying out activity analysis.

Step 2 Identify the factors which determine the size of the costs of an activity/cause the costs of an activity. These are known as cost drivers.

Step 3 Collect the costs associated with each cost driver into what are known as cost pools.

In order to assign the costs attached to each activity cost centre to products, a cost driver must be selected for each activity centre. Cost drivers used at this stage are called activity cost drivers.

REVIEW ACTIVITY

Consider the likely benefits and problems of the Activity Based Costing system. Make lists of each.

REVIEW ACTIVITY FEEDBACK

Compare your ideas with those benefits and problems identified below:

Benefits

- Greater understanding of customer profitability.
- Identification of non value-adding activities; that is tasks which add no further value to the product or service, such as manual checking of customer orders and specifications.
- Identification and understanding of cost behaviour and thus the potential to improve cost estimation.
- Improves accuracy and utility value of management information, thus enabling managers to make better informed decisions a both tactical and strategic levels.
- Allows all managers to understand and control costs in their area.
- By involvement with ABC, accountants can now contribute to the organisation's future, rather than merely reporting on its past.

Problems

- Identifying cost drivers is a problem. This would need to be explored with each department manager.
- Overheads, common to several cost-pools, may be required to be arbitrarily apportioned across all product lines or customers. Examples are: rent; rates; insurance; depreciation; power; heat and light.
- Overall time and cost involved in implementation. Data gathering can be very expensive. Not only is it very labour intensive, it can also take many hours to extract all the relevant information from

the various managers and staff. Costs will also rise, of course, if external consultants are used.

- Departmental resistance to change, or to provide information.
- Reluctance to change traditional accounting methods.

Resource Consumption Model

Kaplan has argued that a ABC system is really a resource consumption model. Kaplan argues than an ABC System measure the cost of using resources and not the cost of supplying resources.

Kaplan (1994) used the following equation:

Cost of resources supplied = cost of resources used + cost of unused capacity

We can rearrange this formula to get:

Cost of resources supplied – cost of unused capacity = cost of resources used

C. Drury in *Management and Costing* argues that ABC will

"... measure the cost of using resources and not the cost of supplying resources. The difference between the cost of resources supplied and the cost of resources used represents the cost of unused capacity. The cost of unused capacity for each activity is the reporting mechanism for identifying the need to adjust the supply of resources to match the usage of resources. However, to translate the benefits of reduced activity demands into cashflow savings, management action is required to remove the unused capacity by reducing the spending on the supply of resources."

Management and Costing (p.396)

Kaplan and Cooper identified that unused capacity consists of:

1. Acquisition of equipment or employment of non piecework (committed resources)

   plus

2. Materials, unusual labour power, etc. continually adjust to match the exact demand. (Flexible resources – also known as variable cost)

Drury argues:

To translate benefits of reduced activity demands into cash flow saving, management action is required. They must permanently remove the unused capacity by reducing spending on the supply of resources.

The following information relates to the purchasing activity in a division of the Sahai Company for the next year. We will use Kaplan's formula in our calculations:

Data:

1. Number of employee = 10
2. Salary of each employee: £2,400
3. Cost driver is number of purchase orders.
4. Number of purchase orders each = 10,000 to be processed during the year.

Required: Calculate the cost of unused capacity.

Resources supplied

10 full-time staff at £24,000 per year (including employment costs	= £240,000 annual activity cost
Cost driver	= Number of purchase orders processed
Quantity of cost driver supplied per year: (Each member of staff can process 1200 order per year)	= 12,000 purchase orders
Estimated cost driver rate	= £20 per purchase order (240,000/12,000 orders)
Resources used:	
Estimated number of purchase orders to be processed during the year	= 10,000
Estimated cost of resources used assigned to parts and materials	= £200,000 (10,000 x £20)
Cost of unused capacity:	
Resources supplied (12,000) -Resources used (10,000) at £20 per order	= £40,000 (2,000 x £20)

ABC in service organisations

C. Drury in *Management Accounting for Business* says that in Kaplan and Cooper (1998) argue that service organisations are ideal for ABC since most of service organisations costs are indirect.

A UK survey by Drury and Talyes (2000) suggest that service organisations are more likely to implement ABC systems. They reported that 51% of the financial and service organisation surveyed, compared with 15% of manufacturing organisations, had implemented ABC.

REVIEW ACTIVITY

A company manufactures two products, A and B using the same equipment and similar processes. An extract of the production data for these products in one period is shown below.

	A	B	Total
Quantity produced (units)	6,000	7,000	13,000
Direct labour hours per unit	2	3	5
Machine hours per unit	4	2	6
Set-ups in the period	10	40	50
Orders handled in the period	15	60	75

Overhead costs	
Relating to machine activity	£320,000
Relating to production run set-ups	£40,000
Relating to handling of orders	£65,000
	£425,000

Required

Calculate the production overheads to be absorbed by one unit on each of the products using the following cost methods:

(a) A traditional costing approach using a direct labour hour rate to absorb overheads.

(b) An Activity Based Costing approach, using suitable cost drivers to trace overheads to products.

REVIEW ACTIVITY FEEDBACK

(a) Traditional costing approach

	Direct Labour (hours)
Product A = 6,000 units x 2 hour	12,000
Product B = 7,000 units x 3 hours	21,000
	33,000

Therefore, overhead absorption rate	= £425,000/33000
	= £12.88 per hour
Overhead absorbed would be as follows	
Product A 2 hour x 12.88	= £25.76
Product B 3 hours x 12.88	= £38.64

(b) ABC approach

Product A = 6,000 units x 4 hours	32,000
Product B = 7,000 units x 2 hours	14,000
	46,000

Using ABC the overhead costs are absorbed according to the cost drivers.

	£	
Machine-hour driver costs	320,000 / 22,000 m/c hours	= £14.55 m/c hour
Set-up driver costs	40,000 / 50 set-ups	= £800 per set-up
Order driven costs	65,000 / 75 orders	= £867 per order

Overhead costs are therefore as follows.

	A		B
Machine-driven costs (12,000 hrs x £14.55)	£174,000	(21,000 hrs x 14.555)	£305,550
Set-up costs 10 x 800	8,000	(40 x 800)	37,000
Order handling costs (15 x 867)	13,005	(60 x 867)	52,020
	£196,605		£389,570
Units produced	6,000		7,000
Overhead = cost per unit	£32.60		£55.65

These figures suggest that product B absorbs an unrealistic amount of overhead using a direct labour hour basis. Overhead absorption should be based on the activities which drive the costs, in this case machine hours, the number of production run set-ups and the number of orders handled for each product.

ACTIVITY

Which of the following is not a feature of Activity Based Costing?

a) It improves managers' understanding of costs.

b) It is quick and easy to implement.

c) It identifies the activities which drive costs.

d) It searches for a better way of overhead cost allocation.

e) None of the above.

ACTIVITY FEEDBACK

It is quick and easy to implement.

REVIEW ACTIVITY

Traditional Absorption Costing in a hospital

The following budget information relates to the general surgery and geriatric departments, which are two departments of many NHS hospitals, for the year ending 31/12/2008

	General Surgery	Geriatric
Number of in-patients	5,000	100
Average stay per in-patient	10 days	200 days
Cost analysis:		
Direct treatment services	£	£
Consultants	2,000,000	500,000
Junior doctors	500,000	1,000,000
Nurses	2,000,000	3,000,000
Direct medical supplies	500,000	1,500,000
Total hospital overheads		£
Hospital administration		6,000,000
Catering		2,000,000
Cleaning		1,500,000
Maintenance		1,000,000
Utilities/laundry		1,000,000

The total number of in-patients treated by the hospital has been budgeted at 10,000 for 2008 with an average length of stay of 25 days.

The hospital operates a traditional absorption costing system, calculating total costs per in-patient day as an absorption base.

Required

1. Calculate the budgeted hospital overhead absorption rate per in-patient day for 2008.

2. Calculate the total cost per in-patient day for the general surgery and geriatric departments. How could hospital management use these costs meaningfully?

3. Is cost ascertainment necessary in a hospital?

REVIEW ACTIVITY FEEDBACK

Traditional Costing in a Hospital

1. Total hospital in-patient days 25 x 10,000 = 250,000

   Total budgeted overhead
   £(600,000 + 200,000 + 150,000 + 100,000 + 100,000)
   = £11,500,000
   £11,500,000 / 250,000 = £46 per in-patient day

2.

	General	Geriatric
Direct costs		
Consultants	2,000,000	500,000
Junior Doctors	500,000	1,000,000
Nurses	2,000,000	3,000,000
Medical supplies	500,000	1,500,000
Total direct costs	5,000,000	6,000,000
In-patient days	5,000 x 10	100 x 200
	50,000	20,000
Direct costs per In-patient	100	300
Indirect costs at £46 per day	46	46
Total cost per in-patient day	146	346
Total in-patient days	50,000	20,000
Total indirect costs	2,300,000	920,000
Total costs	7,300,000	6,920,000

3. Comments:

   Would one expect geriatric treatment to be more expensive?

   Should all departments be allocated the same amount of overhead per in-patient day?

   How could the cost information be used?

   a) Attention directing, i.e. variances to budget investigated.

   b) Cost reduction generally.

   c) Cost comparison between departments and other hospitals.

Is cost ascertainment necessary?

Social vs financial/survival objectives

Emotional/ethical cultural conflict against cost reduction

How can one set averages over such a wide range of treatment?

Averages could be meaningless over such a range of patients, e.g. age/gender, etc.

What does one mean by controllable expenditure in the NHS?

It enhances control/stewardship of scarce resources.

Helps to provide value for money.

Identifies high and low cost ACTIVITIES.

This leads nicely into a discussion of the improvements ABC IS PURPORTED TO ACHIEVE.

REVIEW ACTIVITY

Smith Limited has recently introduced an Activity Based Costing system. It manufactures three products, details of which are set out below:

	Product A	Product B	Product C
Budgeted annual production (units)	100,000	100,000	50,000
Batch size (units)	100	50	25
Machine set-ups per batch	3	4	6
Purchase orders per batch			

Three cost pools have been identified. Their budgeted costs for the year ending 30 June 2008 are as follows:

Machine set-up costs	£150,000
Purchasing of materials	£70,000
Processing	£80,000

Required

Calculate the budgeted set-up cost per unit of product B.

ACTIVITY FEEDBACK

Budgeted number of batches per product:

A	=	1000 (100,000 / 100)
B	=	2000 (100,000 / 50)
C	=	2000 (50,000 / 25)
Total	=	5000

Budgeted machine set-ups:

A	=	3,000 (1000 x 3)
B	=	8,000 (2000 x 4)
C	=	12,000 (2000 x 6)
Total	=	23,000

Budgeted cost per set-up = £150,000 / 23,000 = £6.52

Budgeted set-up cost per unit of B = (£6.52 x 4)/50 = £0.52

REVIEW ACTIVITY

ABC costs are accumulated by activity using ... ?

REVIEW ACTIVITY FEEDBACK

Cost pools.

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Unit 4

Pricing Decisions

LEARNING OUTCOMES

At the end of this unit the student will know:

1. Pricing and economic theory
2. The role of cost information
3. Long and short term pricing
4. Product mix and pricing
5. Different pricing policies

Introduction

To a firm, pricing is important as the correct price for its product will enable the firm to compete, survive and be profitable.

Price also helps to differentiate and position a product and thus exploit business opportunities. While the topic of pricing covers quite a narrow area, it is key to the strategy of an organisation. The structure of this unit looks firstly at economic theory and pricing. Secondly, the role of cost information, long- and short-term pricing and, finally, different pricing policies. This unit examines the pricing policy of an organisation with regard to the external market. The topic of transfer or internal pricing, which looks at notional prices attached to goods and services within an organisation, is covered in a later unit.

Economic Theory and Pricing

Economic theory can assist in determining pricing decisions of a firm by looking at the demand for the product and also what level of output the firm should produce. We will now briefly consider each of the above.

Demand for a product can be **elastic** or **inelastic**.

Elastic demand means that a small increase/decrease in price causes a large decrease/increase in price. Demand is elastic when there are substitutes for the product.

Inelastic demand means that the quantity demand falls by a smaller percentage than the percentage increase in price.

An awareness of the concept of elasticity can assist management with pricing decisions.

How?

1. If inelastic demand exists, prices should be increased because revenues will increase and total costs will reduce.
2. If elastic demand exists, increases in prices will bring decreases in revenue, and decreases in price will bring increases in revenue.

Inelastic and elastic demand curves are shown below. In Figure 1 and Figure 2 respectively

Fig. 1

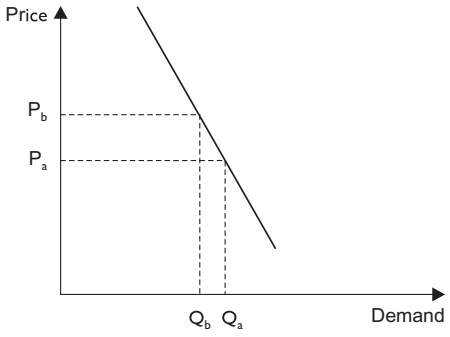
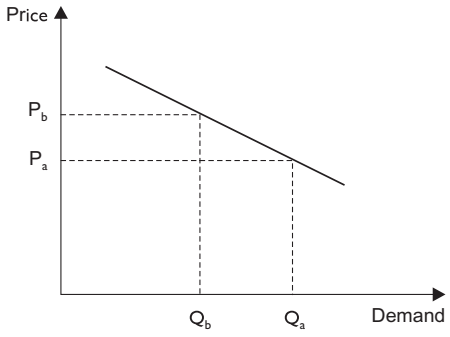


Fig. 2



ACTIVITY

a) What does price elasticity of demand measure?

b) Distinguish between elastic and inelastic demand.

ACTIVITY FEEDBACK

a) Price elasticity of demand is a measure of the extent of change in market demand for a good in response to a change in its price.

b) Where demand is elastic, demand falls by a larger percentage then the percentage rise in price. Where demand is inelastic the quantity demanded falls by a smaller percentage than the percentage increase in price.

At what output will a firm make a profit?

Microeconomic theory suggests that as output increases, the marginal cost per unit might rise (due to the law off diminishing returns) and whenever the firm is faced with a downward sloping demand curve, the marginal revenue per unit will decline.

Eventually, a level of output will be reached where the extra cost of making one extra unit of output is greater than the extra revenue obtained from its sale. It would then be unprofitable to make and sell that extra unit.

Profits will be maximised only at the output level **where marginal cost has risen to be easily equal to the marginal revenue** i.e. MC = MR

Difficulties with applying economic theory. It assumes:

1. That a firm can estimate a demand curve for its products. In reality this may be difficult as most companies may have many different products.
2. Price influences the quantity demanded. In practice, factors other than place may influence the quantity demanded, i.e. quality, advertising, etc.

The next activity tests whether or not you can deduce the profit maximising output by completing a table.

ACTIVITY

An organisation operates in a market where there is imperfect competition, so that to sell more units of output, it must reduce the sales price of all the units it sells. The following data is available for prices and costs.

Total output Units	Sales price per unit (AR) £	Average cost of output (AC) £ per unit
0	-	-
1	504	720
2	471	402
3	439	288
4	407	231
5	377	201
6	346	189
7	317	182
8	288	180
9	259	186
10	232	198

The total cost of zero output is £600.

Required

Complete the table below to determine the output level and price at which the organisation would maximise its profits, assuming that fractions of units cannot be made.

(Hint: Remember you are trying to find where MC = MR)

Units	Price £	Total revenue	Marginal revenue	Total cost £	Marginal cost £	Profit £
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

ACTIVITY FEEDBACK

The correct answer is that profit is maximised at seven units and a price of £317, where MR nearly equal to MC

Units	Price £	Total revenue	Marginal revenue	Total cost £	Marginal cost £	Profit £
0	0	0	0	600	-	(600)
1	504	504	504	720	120	(216)
2	471	942	438	804	84	138
3	439	1,317	375	864	60	453
4	407	1,1628	311	924	60	704
5	377	1,885	257	1005	81	880
6	346	2076	191	1134	129	942
7	317	2219	143	1274	140	945
8	288	2304	85	1440	166	864
9	259	2331	27	1674	234	357
10	232	2320	(11)	1980	306	340

The role of cost information in pricing decisions

The role of cost information will be important in determining whether companies are price takers or price setters in the market; i.e. whether firms can influence price or whether price is determined for them by the factors in the markets.

Price Taker – this is where firms have little or no influence over the prices of their products or services.

Price Setter – this is where firms have an input into the setting price of their product or services.

The situation of price taker and price setter is further complicated by the fact we may be discussing the short run or the long run. The following rules can be applied.

(i) Price setting firm in the short run

For short term decisions the incremental costs of accepting an order should be presented.

Short-term pricing decisions should meet the following conditions

(a) Spare capacity should be available.

(b) The bid price should represent a one-off price that will not be repeated.

(c) The orders will utilise unused capacity.

(ii) Price taker firm facing short run product mix decisions

Same conditions as for a price setter as stated in the previous example. i.e. for the short run.

(iii) Price setter long run pricing decisions

There are three approaches to pricing here:

1. In pricing customised products, it is important that the firm uses accurate costs. There is, therefore, a strong argument to use ABC. Activity Based Cost information provides a better understanding of cost behaviour.
2. Non customised products pricing based on direct negotiation with the customer.
3. Using target costing for non customised products. Here the selling price is the start of the costing process rather than the cost.

Approach of target costing:

1. Determine the target price which customers will be prepared to pay for the product.
2. Deduct a target profit margin from the target price to determine the target cost.
3. Estimate the actual cost of the product.
4. If estimated actual cost exceeds the target cost investigate ways of driving down the actual cost to the target cost.

(iv) A price taker firm facing long run product mix decisions

A price taking firm accepts the market price. It will, however, need to use activity based profitability analysis to evaluate each product's long run profitability.

Product Mix decisions

An illustration of hierarchical profitability analysis can be found in C. Drury *Management Accounting for Decision Makers* p.189

Low Cost Object		Products	Customers	Locations
Contribution after deducting unit-level costs	→	Product contributions	Customer contributions	Branch contributions
Contribution after deducting batch-level costs	→	Product contributions	Customer contributions	Branch contributions
Contribution after deducting individual product, customer or branch sustaining costs	→	Product brand contributions	Customer segment contributions	Branch contributions
Contribution after deducting product brand, customer segment and regional sustaining costs[1]	→	Product brand contributions	Customer segment contributions	Regional contributions
Profits after deducting higher level sustaining costs[2]	→	Product line profits	Distribution channel profits	Country profits
Contribution after deducting business unit- or facility-sustaining costs[3]	→	Business unit profits	Business unit profits	Business unit profits

Notes

1 Consists of expenses dedicated to sustaining specific product brands or customer segments or regions but which cannot be attributed to individual products, customers or branches.

2 Consists of expenses dedicated to sustaining the product lines or distribution channels or countries but which cannot be attributed to lower items within the hierarchy.

3 Consists of expenses dedicated to the business as a whole and not attributable to any lower items within the hierarchy.

ACTIVITY

Distinguish between a price taker and a price setter.

ACTIVITY FEEDBACK

Price taker – is a firm that have little or not influence over the prices of their product or service.

Price setter – firms that have some discretion over selling the selling price of their products or services.

ACTIVITY

What costs are likely to be relevant for a short run pricing decision?

ACTIVITY FEEDBACK

1. Extra materials
2. Extra labour
3. Extra energy

   In other words, incremental costs.

ACTIVITY

What role does cost information play in price taking firms in the short run?

ACTIVITY FEEDBACK

The cost information in price taking firms is no different than the cost information in price setting ones in the short run. The company must ensure the price at least covers the marginal or incremental costs attached to producing and delivering the goods and services.

Cost-based approaches to pricing

There are a variety of different costing bases. These include:

(i) Total cost + % for profit = selling price

(ii) Variable cost +% for profit = selling price

Example using full cost and pricing

Batchelor has begun to produce a new product. Product A, for which the following cost estimates have been made.

	£
Direct materials	10
Direct labour: 3 hrs at £5 per hour	15
Variable production overheads: machining, 1/2 hr at £6 per hour	3
	28

Production fixed overheads are budgeted at £350,000 per month and, because of the shortage of available machining capacity, the company will be restricted to 10,000 hours of machine time per month. The absorption rate will be a direct labour rate, and budgeted direct labour hours are 25,000 per month. It is estimated that the company could obtain a minimum contribution of £10 per machine hour on producing items other than product A.

The company wishes to make a profit of 20% on full production cost from product A.

Required

Ascertain the full cost-plus based price.

Answer

	£
Direct materials	10.00
Direct labour: 3 hrs at £5 per hour	15.00
Variable production overheads	3.00
Fixed production overheads (at $\frac{£350,000}{25,000}$ = £14 x 3 per direct labour hour)	42.00
Full production cost	70.00
Profit mark-up (20%)	14.00
Selling price per unit of product A	84.00

Now try the next Activity.

The only difference with this new activity and the previous activity is the introduction of opportunity cost in the calculation of total cost.

ACTIVITY

Samson plc has a product B with the following cost estimates

Direct materials	£30
Direct labour 2 hours at £3 per hour	6
Variable production ½ hr overheads at £18 per hour	9
	£45

Production overheads are £360,000 per month. The absorption rate will be a direct labour rate and budgeted direct labour hours are 36,000 per month. It is estimated that the company could earn a minimum contribution of £10 per machine hour on producing items other than product B.

ACTIVITY FEEDBACK

Direct materials	£30
Direct labour	6
Variable overheads	9
	45
Fixed overheads $\frac{360,000}{36,000}$	10
	55
Opportunity cost ½ hour @ £10	5
	60
Profit mark up 20%	12
Selling price	£72

Problems with full cost-plus pricing

(a) It fails to recognise that, since demand may be determining price, there will be a profit-maximising combination of price and demand.

(b) There may be a need to adjust prices to market and demand conditions.

(c) A suitable basis for overhead absorption must be selected, especially where a business produces more than one product

In practice, cost is one of the most important influences on price. Many firms base price on simple cost-plus rules (costs are estimated and then a mark-up added in order to set the price).

Marginal Cost-Plus Pricing

This method determines the sale price by adding a profit onto either marginal cost of production or marginal cost of sales.

Advantages

a) Simple and easy method to use.

b) The mark-up percentage can be varied

In practice, mark-up pricing is used in businesses where there is a readily identifiable basic variable cost.

Disadvantages

It gives fixed overheads in pricing.

Pricing Policies for New Products

Price skimming policy – an attempt to exploit sections of the market that are relatively insensitive to price changes. A skimming policy should not be adopted when a number of close substitutes are already being marketed. Circumstances when skimming is appropriate:

(a) A new or different product

(b) Firm can identify different market segments for the product

(c) Short life cycle

Penetration pricing policy – based on the concept of changing low prices initially with the intention of gaining rapid acceptance of the product. Such a policy is appropriate when close substitutes are available or when the market is easy to enter.

Circumstances when penetration price is appropriate:

(a) Pending new entrants

(b) Firm may want to enter the growth and maturity stage of the product life cycle and therefore reduces the initial stage

(c) Elastic demand exists

REVIEW ACTIVITY

Smith plc has recently spent some time on researching and developing a new product for which they are trying to establish a suitable price. Previously they have used cost plus 20% to set the selling price.

The standard cost per unit has been estimated as follows:

	£	
Direct materials		
Material 1	20	(8 kg at £2.50/kg)
Material 2	7	(1 kg at £7/kg)
Direct labour	12	(2 hours at £6/hour)
Fixed overheads	7	(2 hours at £3.50/hour)
	46	

Required:

Using the standard costs calculate two different cost-plus prices using two different bases and explain an advantage and disadvantage of each method.

REVIEW ACTIVITY FEEDBACK

Variable cost plus 20% = £39 x 1 .20 = £468

Total cost plus 20% = £46 x 1 .20 = £73.60

Advantages of variable costs include that it avoids arbitrary allocations, identifies short-term relevant costs, simplicity, and mark-up can be increased to provide a contribution to fixed costs and profit. The disadvantages are that it represents only a partial cost, it is short-term oriented and ignores price demand relationships.

Advantages of total cost include that it attempts to include all costs, reduces the possibility that fixed costs will not be covered, and simplicity. The disadvantages are that total cost is likely to involve some arbitrary apportionments and the price/demand relationship is ignored.

REVIEW ACTIVITY

Explain the limitations of cost-plus pricing.

REVIEW ACTIVITY FEEDBACK

Cost-plus pricing has three major limitations. Firstly, demand is ignored. Secondly, the approach requires that some assumption be made about future volume prior to ascertaining the cost and calculating the cost-plus selling prices. This can lead to an increase in the derived cost-plus selling price when demand is falling, and vice versa. Thirdly, there is no guarantee that total sales revenue will be in excess of total costs even when each product is priced above 'costs'.

REVIEW ACTIVITY

Describe the different cost-plus pricing methods for deriving selling prices.

REVIEW ACTIVITY FEEDBACK

Different cost bases can be used for cost-plus pricing. Bases include direct variable costs, total direct costs, total direct and indirect costs (excluding higher level facility/business sustaining costs) and total cost based on an assignment of a share of all organisational costs to the product or service. Different percentage profit margins are added depending on the cost base that is used. If direct variable cost is used as the cost base, a high percentage margin will be added to provide a contribution to cover a share of all of those costs that are not included in the cost base plus profits. Alternatively, if total cost is used as the cost base, a lower percentage margin will be added to provide only a contribution to profits.

Target costing is the reverse of cost-plus pricing. With target costing the starting point is the determination of the target selling price - the price that customers are willing to pay for the product (or service). Next, a target profit margin is deducted to derive a target cost. The target cost represents the estimated long-run cost of the product (or service) that enables the target profit to be achieved. Predicted actual costs are compared with the target cost and, where the predicted actual cost exceeds the target cost, intensive efforts are made through value engineering methods to achieve the target cost. If the target cost is not achieved the product/service is unlikely to be launched.

REVIEW ACTIVITY

Justify why cost-plus pricing is widely used.

REVIEW ACTIVITY FEEDBACK

There are several reasons why cost-plus pricing is widely used. First, it offers a means by which prices can be determined with ease and speed in organisations that produce hundreds of products. Cost-plus pricing is likely to be particularly applicable to those products that generate relatively minor revenues that are not critical to an organization's success. A second justification is that cost-based pricing methods may encourage price stability by enabling firms to predict the prices of their competitors.

REVIEW ACTIVITY

Sahai plc, a large labour contractor, supplies contract labour to building construction companies. Sahai plc has budgeted to supply 60,000 hours of contract labour. Its variable cost is £12 per hour and its fixed costs are £360,000 the general manager, has proposed a cost-plus approach for pricing labour at full cost plus 20%.

Required

1 Calculate the price per hour that Sahai plc should charge based on Manuel's proposal.

2 The marketing manager, has supplied the following information on demand levels at different prices:

Price per hour	Demand (hours)
£16	120,000
17	100,000
18	80,000
19	70,000
20	60,000

Sahai can meet any of these demand levels. Fixed costs will remain unchanged for all the preceding demand levels. On the basis of this additional Information, what price per hour should Sahai plc charge?

REVIEW ACTIVITY FEEDBACK

(a) Sahai plc full cost per hour of supplying contract labour is:

Variable costs	15
Fixed costs (£360000 + 60000 hours)	6
Full cost per hour	£21

Price per hour at full cost plus 20% = £21 x 1.20 = £25.20 per hour.

(b) Contribution margins for different prices and demand realisations are as follows:

Price per hour (1)	Variable cost per hour (2)	Contribution margin per hour (3) = (1) — (2)	Demand in hours (4)	Total contribution (5) = (3) x (4)
£16	£12	£4	120,000	£480,000
17	12	5	100,000	500,000
18	12	6	80,000	480,000
19	12	7	70,000	490,000
20	12	8	60,000	480,000

Fixed costs will remain the same regardless of the demand realisations. Fixed costs are therefore irrelevant since they do not differ among the alternatives. The table above indicates that Sahai plc can maximise contribution margin and hence operating profit by charging a price of £17 per hour.

REVIEW ACTIVITY

Naushaba plc cans fruit for sale to food distributors. All costs are classified as either manufacturing or marketing. Naushaba plc prepares monthly budgets. The budgeted absorption costing income statement is as follows

	£	
Sales (1000 crates x £100 a crate)	100,000	100%
Cost of goods sold	60,000	60
Gross profit	40,000	40
Marketing costs	30,000	30
Operating profit	10,000	10%

Normal mark-up percentage

£40,000 ÷ £60,000 = 66 7% of absorption cost

Monthly costs are classified as fixed or variable (with respect to the cans produced for manufacturing costs and with respect to the cans sold for marketing costs).

	Fixed	Variable
Manufacturing	22,000	45,000
Marketing	18,000	12,000

Naushaba has the capacity to can 1500 crates per month. The relevant range in which monthly fixed manufacturing costs will be 'fixed' is from 500 to 1500 crates per month.

Required

(a) Calculate the normal mark-up percentage based on total variable costs.

(b) Assume that a new customer approaches Naushaba to buy 300 crates at £55 per crate. The customer does not require additional marketing effort except for additional manufacturing costs of £3000 (for special order).

REVIEW ACTIVITY FEEDBACK

(a)

	£	£
Sales (1000 crates at £100 per crate)		100,000
Variable costs:		
Manufacturing	40,000	
Marketing	12,000	
Total variable costs		57,000
Contribution margin		43,000
Fixed costs		
Manufacturing	22,000	
Marketing	18,000	
Total fixed costs		40,000
Operating profit		3,000

Normal mark-up percentage: £43 000 ÷ £54 000 = 75.44% of total variable costs.

(b) Only the manufacturing-cost category is relevant to considering this special order; no additional marketing costs will be incurred. The relevant manufacturing costs for the 300-crate special order are:

Variable manufacturing cost per unit	£
£40 x 300 crates	12,000
Special packaging	3,000
	15,000

REVIEW ACTIVITY

Distinguish between cost-plus pricing and target costing.

REVIEW ACTIVITY FEEDBACK

In cost-plus pricing the cost is used as the starting point. In target costing the start is the selling price.

References

Atril, P. and Mclaney, E. *Management Accounting for Decision Makers*, Prentice Hall

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Unit 5

Budgets

LEARNING OUTCOMES

After studying this unit the student will know:

1. The various functions that budgets have in firm.
2. Conflicting budget objective.
3. The administration of budgets.
4. Budget components.
5. Activity-based budgets and Zero-based budgets.
6. Behavioural aspects of budgets.

Introduction

A budget is an organisation's plan for a forthcoming period, expressed in money terms.

Budgets are not prepared in isolation and are part of the budgeting planning and control system. This unit therefore looks firstly at the various functions of budgets and recognises the potential conflicts which can arise. The unit then looks at the administration of budgets and component budgets leading to the formation of the master budgets.

Other budgetary approaches are then investigated. Finally, the unit investigates the behavioural aspects of budgeting.

The Traditional Approach to Budgeting

Incremental budgeting is the traditional approach to budgeting and involves basing next year's budget on the current year's results plus an extra amount for estimated growth or inflation. This is the approach which is assumed in most of this unit.

The Multiple Functions of Budgets

The following are the various functions of a budget:

1. Planning
2. Co-ordinating
3. Communicating
4. Motivating
5. Controlling
6. Evaluation

1. Planning – Managers will be able to see the day to day activities that must be performed. A budget enables these features of planning to be done more effectively.
2. Co-ordination - Different points departments of the organisation will be able to bring together and reconcile the common plan. Budgets therefore forces management to examine their relationships and identify any possible conflicts.
3. Communication – All parties to the budget must be able to communicate and understand what is expected of them. The budget communicates the expectations of senior managers to junior managers.
4. Motivation – A budget influences and encourages managers to perform in line with the company's objectives. A budget can be a demotivating device if it is perceived as a threat. It may then be resisted by all concerned.
5. Control – By comparing the actual with the budgeted, control can be exerted when there is an adverse difference. The manager will pay attention only to the deviations from the planned which are significant and thus needs investigating. This process is called **management by exception**.
6. Performance Evaluation – The budget will enable the manager to assess his performance. The use of budgets as a method of performance evaluation also influences human behaviour. Of all the roles served by budgetary information it is its role in performance evaluation that is likely to be the most crucial, because it is this role that impacts most strongly upon the middle and junior managers being controlled by the budgetary system.

Possible conflicting roles in budgets

1) Planning and Motivation may conflict; e.g. demanding budgets may not be motivated

2) Motivation and performance evaluation may conflict; e.g. budgets are set in advance, and the performance evaluation may be between actual activity and the original budget.

ACTIVITY

Define the term budget.

Is it the same as a forecast?

ACTIVITY FEEDBACK

A budget can be defined as a financial plan for the future period. Thus it sets out the intentions which management has for the period concerned. Achieving the budget plans should help to achieve the long term plans for business. Achievement of long term plans should mean that the business is moving successfully towards its objectives.

A budget differs from a forecast in that a forecast is a statement of what is to happen without the intervention of management, perhaps because they cannot intervene, as with a weather forecast. A plan is an intentions to achieve.

Normally, management would take account of reliable forecasts when making its plans.

Administering Budgets

The procedures in administering a budget are important.

1. The Budget Manual

This is a collection of instructions governing the responsibilities of persons, and procedures forms and records relating to the preparation and use of budgetary data. It is an instruction/information manual about the way budgeting operates in a particular organisation.

2. Budget committee

The coordination and administration of budgets is usually the responsibility of a budget committee (with the managing director as chairman). The budget committee is assisted by a budget officer who is usually an accountant. Every part of the organisation should be represented on the committee, so there should be a representative from sales, production, marketing and so on. Functions of the budget committee include the following:

- Coordination of budget preparation, including the issue of the budget manual.
- Issuing of timetables for the preparation of functional budgets.
- Allocation of responsibilities for the preparation of functional budgets.
- Provision of information to assist in the preparation of budgets.
- Communication of final budgets to the appropriate managers.
- Comparison of actual results with budget and the investigation of variances.
- Continuous assessment of the budgeting and planning process.

ACTIVITY

Obtain a budget for any part of your organisation and talk to the budget holder.

Find out:

- The length of the budget period, and when it starts.
- When budget negotiations start and end.
- How useful the process is perceived to be by the budget holder.

ACTIVITY FEEDBACK

Your findings will be individual to your organisation. It is likely that the budget holders' perception of the usefulness of the budget will be affected by their involvement in the budget setting process. Those who are closely involved in the planning stages are likely to see themselves as having a clearer "ownership" of the final budget.

Budget Components (steps in budget preparation)

1. **Identification of the principal budget factor**

   The first task in the budgetary process is to identify the principal budget factor. This is also known as the key budget factor or limiting budgeting factor. (This is usually sales.)

2. **Sales budget**

   The units of each product and also in sales value.

3. **Finished goods stock budget**

   This budget decides the planned increase or decrease in finished stock levels.

4. **Preparation of a production budget**

   Stated in units of calculated production.

5. **Budgets of resources for production**

   a. Material usage budget

   b. Machine utilisation

   c. Labour budget

6. **Overhead cost budgets**

7. **Raw materials stock budget**

   This decides the planned increase or decrease of the level of stocks held.

8. **Raw materials purchase budget**

   After the raw material usage and stock budget, the purchasing department can prepare a raw materials purchases budget.

9. **Cash budget**

   Cash inflows and outflows.

10. **Master budget**

    A budgeted profit and loss account and balance sheet.

Preparing Budgets

When preparing production budgets you will have to use the equation:

Opening stock + units produced – sales = closing stock

Depending upon what you are being required to find you may be required to re arrange formula.

For example: If opening stock is 40 units, sales is 100 units and closing stock is 60, what is the production?

	units
Opening stock	40
Add production	?
Less sales	100
Closing stock	60

From rearranging the equation it is clear that the production is 120.

Calculation of the various budgets can be a little tricky and requires some thought. Try the next series of activities.

ACTIVITY

Information regarding products, costs and sales levels is as follows:

Product	**X**	**Y**
Materials required		
216(kg)	4	6
314(litres)	2	8
Labour hours required		
Skilled (hours)	8	4
Semi-skilled (hours)	2	10
Sales level (units)	2000	1500
Opening stocks (units)	100	200

Closing stock of materials and finished goods will be sufficient to meet 10% of demand. Opening stocks of material 216 was 300 kg and for material 314 was 1000 litres. Material prices are £20 per kg for material 216 and £9 per litre for material 314. Labour costs are £12 per hour for the skilled workers and £8 per hour for the semi-skilled workers.

Required

Produce the following budgets

(a) Production (units)

(b) Materials usage (kg and litres)

(c) Materials purchases (kg, litres and £); and

(d) Labour (hours and £)

ACTIVITY FEEDBACK

(a) Production Budget in units

This can be solved by re arranging the formula for production units

	X	Y
Sales	2000	1500
Add cl. Stock, 10% of sales	200	150
	2200	1650
Less opening	100	200
Produced	2100	1450

(b) Material Usage

	Materials	
	216 Kg	314 Litres
(2100 x 4) + (1450 x 6)	17100	
(2100 x 2) + (1450 x 8)		15800

(c) Material Purchase

Usage	17100	15800
Less opening stock	(300)	(1000)
	16800	14800
Add closing stock	1700	1600
	18500	32400
	X £20	X£9
	370,000	291,600

Material Closing Stock:

Material 216 (2000 x 4) + (1500 x 6) x 10%= 1700

Material 314 (2000 x 2) + (1500 x 8) x 10% = 1600

(d) Labour

	Skilled hrs	Semi hrs
(2100x8)+(1450x4)	22600	22900
(2100x4)+(1450x10)		
	X12	x8
	271,200	183,200

ACTIVITY

Each unit of product Echo takes 5 direct labour hours to make. Quality standards are high, and 8% of units are rejected after completion as sub-standard. Next month's budgets are as follows:

Opening stocks of finished goods	3,000 units
Planned closing stocks of finished goods	7,600 units
Budgeted sales of Echo	36,800 units

All stocks of finished goods must have successfully passed the quality control check.

Required

What is the direct labour budget for the month?

ACTIVITY FEEDBACK

Planned increase in stocks of finished goods	4,600 units
Budgeted sales	36,800 units
Budgeted production	41,400 units

Budgeted production = 100 / 92 x 41,000 = 45,000 units

Budgeted direct labour hours = (x 5 hrs per unit) £207,000

ACTIVITY

For a company that does not have any production resource limitations, in what sequence would the following budgets be prepared?

ACTIVITY FEEDBACK

A sales budget and budgeted changes in finished goods stocks are needed to prepare a production budget. The production budget and budgeted changes in raw materials stocks are needed to prepare a purchases budget for raw materials. A purchases budget is needed to prepare a cash budget.

ACTIVITY

Each unit of product Alpha requires 3 kgs of raw material. Next month's production budget for product alpha is as follows:

Opening stock:	
Raw materials	15,000 kg
Finished units of Alpha	2,000 units
Budgeted sales of Alpha	60,000 units
Planned closing stocks:	
Raw materials	7,000 kg
Finished units of Alpha	3,000 units

Required:

The number of kilograms of raw materials that should be purchased next month.

Remember: closing stock required + production requirements - opening stock = production requirements

ACTIVITY FEEDBACK

Increase in finished goods stock required	1,000 units
Budgeted sales of product Alpha	60,000 units
Production required	61,000 units
Raw materials usage budget (61,000 x 3)	183,000 kg
Decrease in raw materials stock budgeted (15,000 – 7,000)	8,000 kg
Raw materials purchase budget	175,000 kg

ACTIVITY

What is the name given to the method of budgeting whereby all activities are re-evaluated each time a budget is prepared, and the incremental costs of activities compared with their incremental benefits?

ACTIVITY FEEDBACK

Incremental budgeting is a term used to describe budgets prepared on the basis of last year's costs plus an extra percentage for inflation, etc. Rolling budgets describe the continuous preparation of budgets, such as annual budgets prepared monthly, with one extra month added at the end and the 'old' first month, now ended, taken off the beginning, each time a budget is prepared. Rolling budgets (or continuous budgets) are likely to be more accurate than 'traditional' annual budgets, especially in a period of high inflation.

The Cash Budget

The purpose of a cash budget is to protect the company from both deficit and surplus of cash.

You should try to layout your cash budget using the same format used in the example below.

(a) Present cash balance (including bank balance): £800

(b) Receipts from debtors will be : July £2,000, August £2,600, September £5,000, October £7,000, November £8,000, December £15,000.

(c) Payments will be: July £2,500, August £2,700, September £6,900, October £7,800, November £9,900, December £10,300.

This is then summarised.

	July £	Aug £	Sept £	Oct £	Nov £	Dec £
Balance at start of the month.	+800	+300	+200			
Deficit at the start of the month				-1,700	-2,500	-4,400
Receipts	2,000	2,600	5,000	7,000	8,000	15,000
	2,800	2,900	5,200	5,300	5,500	10,600
Payments	2,500	2,700	6,900	7,800	9,900	10,300
Balance at end of the month:	+300	+200				+300
Deficit at the end of the month			-1,700	-2,500	-4,400	

ACTIVITY

A cash budget for the six months ended 30 June 2008 is to be drafted from the following information.

(a) Opening cash balance at 1st January 2008 £3,200

(b) Sales: at £12 per unit: cash received three months after sale.

Units: 2007–2008

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
80	90	70	100	60	120	150	140	130	110	100	160

(c) Production: in units

2007–2008

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
70	80	90	100	110	130	140	150	120	160	170	180

(d) Raw Materials used in production cost £4 per unit of production. They are paid for two months before being used in production.

(e) Direct Labour. £3 per unit paid for in the same month as the unit produced.

(f) Other variable expenses, £2 per unit, 3/4 of the cost being paid for in the same month as production, the other1/4 paid in the month after production.

(g) Fixed Expenses of £100 per month are paid monthly.

(h) A motor van is to be bought and paid for in April for £800.

Schedules of payments and receipts are as follows:

PAYMENTS: (The month shown in brackets is the month in which the units are produced)

January		**£**	**February**	**£**
Raw Materials: 130(March) x£4		520	140(April) x £4	560
Direct Labour: 100(Jan)x£3		300	110(Feb) x £3	330
Variable:	100(Jan) x ¾ x £2	150	110(Feb) x ¾ x£2	165
	90(Dec) x ¼ x £2	45	100(Jan) x ¼ x £2	50
Fixed:		100		100
		£1,115		£1,205

March		**£**	**April**	**£**
Raw Materials: 130(May) x£4		600	140(June) x £4	480
Direct Labour: 100(March)x£3		390	110(April) x £3	420
Variable:	100(March) x ¾ x £2	195	110(April) x ¾ x£2	210
	90(Feb) x ¼ x £2	55	100(March) x ¼ x £2	65
Fixed:		100		100
Motor Van				800
		£1,340		£2,075

May		£	June	£
Raw Materials: 130(July) x£4		640	140(Aug) x £4	680
Direct Labour: 100(May)x£3		450	110(June) x £3	360
Variable:	100(May) x ¾ x £2	225	110(June) x ¾ x£2	180
	90(April) x ¼ x £2	70	100(May) x ¼ x £2	75
Fixed:		100		100
		£1,485		£1,395

RECEIPTS: (The month shown in brackets is the month in which the sale was made)

January	80	(October)	x£12	960
February	90	(November)	x£12	1,080
March	70	(December)	x£12	840
April	100	(January)	x£12	1,200
May	60	(February)	x£12	720
June	120	(March)	x£12	1,440

CASH BUDGET

	Jan £	Feb £	March £	April £	June £	July £
Balance from previous month	3,200	3,045	2,920	2,420	1,545	780
Add Receipts (per schedule)	960	1,080	840	1,200	720	1,440
	4,160	4,125	3,760	3,620	2,265	2,220
Less Payments (per schedule)	1,115	1,205	1,340	2,075	1,485	1,395
Balance carried to next month	3,045	2,920	2,420	1,545	780	825

ACTIVITY

On 1 January, the summary balance sheet of Smith Ltd was as follows:

	£		£
Share capital	60,000	Machinery: at cost	170,000
Reserves	64,250	Accumulated depreciation	(70,000)
Creditor for loan interest	3,750		
10% loan	50,000		100,000
Proposed dividend (payable 20 January)	20,000	Stocks	35,000
Overdraft	17,000	Debtors	80,000
	215,000		215,000

The following are expected during the next three months.

	Sales £	Purchases £	Expenses £
January	90,000	60,000	20,000
February	150,000	120,000	25,000
March	240,000	200,000	25,000

Sales and purchases figures are before deduction of discounts. The expenses figure includes depreciation on machinery of £2000 per month; the remaining expenses are all cash items and paid for in the month in which they are charged. Loan interest for a whole year is payable at the end of March. Overdraft interest should be ignored.

50% of sales are on credit, with payment after 1 month. 50% of sales are for cash, with a discount of 5% given for cash settlement. Payments for purchases are made in the month of purchase, to benefit from a 10% prompt settlement discount. Stock levels are expected to remain constant throughout the period.

ACTIVITY FEEDBACK

	January £000	Receipts in February £000	March £000
December sales	80,000 (1)		
January sales	42,750 (2)	45,000	
February sales		71,250 (3)	75,000
			114,000 (4)
March sales			
	122,750	116,250	189,000

Notes:

(1) Opening debtors must all be credit customers from December

(2) 95% of 50% of £90,000

(3) 95% of 50% of £150,000

(4) 95% of 50% of £240,000

Cash Budget	January £	February £	March £
Receipt from sales	122,750	116,250	189,000
Payments to suppliers	54,000	108,000	180,000
Payments for expenses			
(= expenses minus depreciation)	180,000	23,000	23,000
Dividend	20,000	-	-
Loan Interest	-	-	5,000
Total payments	92,000	131,000	208,000
Receipts less payments	30,750	(14,750)	(19,000)
Opening cash balance	(17,000)	13,750	(1,000)
Closing cash balance	13,750	(1,000)	(20,000)

Example of a Master Budget

As stated earlier the master budget is the final process in the budgeting process. Please work carefully through this example.

Sahai Ltd

Balance Sheet as at 31 December 2007

Assets Employed:

Fixed Assets	Cost £	Depreciation to date £	Net £
Machinery	4,000	1,600	2,400
Motor Vehicles	2,000	800	1,200
	6,000	2,400	3,600

Current Assets		
Stocks: Finished Goods (75 units)	900	
Raw Materials	500	
Debtors (2007 October £540+November £360 + December £450)	1,350	
Cash and Bank Balances	650	3,400
		£7,000
Less Current Liabilities		
Creditors for Raw Materials (November £120 + December £180	300	
Creditors for Fixed Expenses (December)	100	400
		£6,600
Financed by:		
Share Capital, 4000 shares of £1 each		4,000
Profit and Loss Account		2,600
		£6,600

The plans for the six months ended 30th June 2008 are as follows:

(i) Production will be 60 units per month for the first four months, followed by 70 units per month for May and June.

(ii) Production costs will be (per unit):

Direct Materials	£5
Direct Labour	£4
Variable Overhead	£3
	£12

(iii) Fixed overhead is £100 per month, payable always one month in arrears.

(iv) Sales, at a price of £18 per unit, are expected to be:

	January	February	March	April	May	June
No of units	40	50	60	90	90	70

(v) Purchases of direct materials (raw materials) will be:

January	February	March	April	May	June
£150	£200	£250	£300	£400	£320

(vi) The creditors for raw materials bought are paid two months after purchase.

(vii) Debtors are expected to pay their accounts three months after they have bought the goods.

(viii) Direct Labour are variable overhead are paid in the same month as the units are produced.

(ix) A machine costing £2,000 will be bought and paid for in March.

(x) 3,000 shares of £1 each are to be issued at par in May.

(xi) Depreciation for the six months: Machinery £450, Motor Vehicles £200.

The Calculations for a Master Budget

We must first of all draw up the various budgets and then incorporate them into the Master Budget.

Note: closing balances (in the balance sheet) in one period become opening balances in the next.

Materials Budget

	Jan	Feb	Mar	Apr	May	June
Opening Stock £	500	350	250	200	200	250
Add Purchases £	150	200	250	300	400	320
	650	550	500	500	600	570
Less Used in Production:						
Jan-April 60 x £5	300	300	300	300		
May and June 70 x £5					350	350
Closing Stock £	350	250	200	200	250	220

Production Budget (in units)

	Jan	Feb	Mar	Apr	May	June
Opening Stock (units)	75	95	105	105	75	75
Add Produced	60	60	60	60	70	70
	135	155	165	165	145	125
Less Sales	40	50	60	90	90	70
Closing Stock	95	105	105	75	55	55

Production Cost Budget (in £'s)

	Jan	Feb	Mar	Apr	May	June	Total
Materials Cost £	300	300	300	300	350	350	1,900
Labour Cost £	240	240	240	240	280	280	1,520
Variable Overhead £	180	180	180	180	210	210	1,140
	720	720	720	720	840	840	4,560

Creditors Budget

	Jan	Feb	Mar	Apr	May	June
Opening Balance £	300	330	350	450	550	700
Add Purchases £	150	200	250	300	400	320
	450	530	600	750	950	1,020
Less Payments £	120	180	150	200	250	300
Closing Balance £	330	350	450	550	700	720

Debtors Budget

	Jan	Feb	Mar	Apr	May	June
Opening Balances	1,350	1,530	2,070	2,700	3,600	4,320
Add Sales £	720	900	1,080	1,620	1,620	1,260
	2,070	2,430	3,150	4,320	5,220	5,580
Less Received £	540	360	450	720	900	1,080
Closing Balances £	1,530	2,070	2,700	3,600	4,320	4,500

Cash Receipts Schedule

	Jan	Feb	Mar	Apr	May	June
Debtors for goods sold three months previously £	540	360	450	720	900	1,080
Shares Issued £					3,000	
					3,900	

Cash Payments Schedule

	Jan	Feb	Mar	Apr	May	June
Creditors for goods bought two months previously £	120	180	150	200	250	300
Fixed overhead £	100	100	100	100	100	100
Direct Labour £	240	240	240	240	240	240
Variable Overhead £	180	180	180	180	210	210
Machinery £			2,000			
	640	700	2,670	720	840	890

Cash Budget

	Jan	Feb	Mar	Apr	May	June
Opening Balance £	+650	+550	+210			+1,050
Opening Overdraft £				-2,010	-2,010	
Received (see sched) £	540	360	450	720	3,900	1,080
	1,190	910	660	1,290	1,890	2,130
Payments (see sched) £	640	700	2,670	720	840	890
Closing Balance £	+550	+210			+1,050	+1,240
Closing Overdraft £			-2,010	-2,010		

When all the budgets are in harmony with one another they are summarised into a master budget consisting of a budgeted profit and loss account and balance sheet.

The Master Budget

Forecast Operating Statement for the six months ended 30 June 2008

				£
Sales				7,200
Less Cost of Goods Sold:				
Opening Stock of Finished Goods			900	
Add cost of Goods completed			4,560	
			5,460	
Less Closing Stock of Finished Goods			660	4,800
Gross Profit				2,400
Less:				
Fixed Overhead			600	
Depreciation:	Machinery	450		
	Motors	200	650	1,250
Net Profit				1,150

Forecast Balance Sheet as at 30 June 2008

		Cost £	Depreciation to date £	Net £
Fixed Assets				
Machinery		6,000	2,050	3,950
Motor Vehicles		2,000	1,000	1,000
		8,000	3,050	4,950
Current Assets				
Stocks:	Finished Goods		660	
	Raw Materials		220	
Debtors			4,500	
Cash and Bank Balances			1,240	6,620
				11,570
Less Current Liabilities				
Creditors for Goods			720	
Creditors for Overhead			100	820
				10,750
Financed By:				
Share Capital				7,000
Profit and Loss Account (2,600 + 1,150)				3,750
				10750

Criticisms of traditional budgeting

- Time consuming and costly.
- Major barrier to responsiveness flexibility and change.
- Adds little value given the amount of management time required.
- Rarely strategically focused.
- Makes people feel undervalued.
- Reinforces departmental barriers rather than encouraging knowledge sharing.
- Based on unsupported assumption and guesswork as opposed to sound – constructed performance data.
- Developed and updated infrequently.

Ways in which companies are adapting planning and budgeting processes

- Use of rolling forecasts.
- Separation of the forecasting process from the budget to increase speed and accuracy, and reduce management time.
- Focus on the future rather than past performance.
- Use of the balances scorecard.

Zero-based budgeting

Zero-based budgeting involves preparing one budget for each cost centre from a zero base. Every item of expenditure has then to be justified in its entirety in order to be included in the next year's budget.

Advantages of Zero-based budgeting

1. It avoids waste.
2. It can be motivational.
3. It removes inefficient or obsolete operations.

Disadvantages of Zero-based budgeting

1. Requires a degree of skill in its construction. Managers may need to be trained.
2. Requires a lot of management time.
3. All decisions well need to be made in the budgets.

Applications of zero-based budgeting

- Support expenses
- Service industries
- Not for profit organisations
- Discretionary costs
- Rationalisation measures
- Identifies and remove inefficient and/or obsolete operations
- Forces employees to avoid wasteful expenditure
- Leads to a more efficient allocation of resources
- Challenges the status quo
- Involves time and effort
- Can cause suspicion when introduced
- Costs and benefits of different alternative courses of action can be difficult to quantity
- Ranking can prove problematic: short term v long term trade-off

ACTIVITY

Identify areas in your organisation where a zero-based approach would be useful.

ACTIVITY FEEDBACK

Typically any area where the pattern of spending changes regularly, and where the incremental approach has been taken over a long time, where there are large changes in the budget, or where the manager is new

Activity-Based Budgeting (ABB)

The use of costs determined using ABC as a basis for preparing budgets. ABB involves the following steps:

1. Estimate the production and sales volume by individual products and customers.
2. Estimate the demand for organisational activities.
3. Determine the resources that are required to perform organisational activities.
4. Estimate for each resource the quantity that must be supplied to meet demand.
5. Take action to adjust the capacity of resources to match the projected supply.

Claimed results of using ABB:

(a) Different activity levels will provide a foundation for the base package and incremental packages of ZBB.

(b) The organisation's overall strategy and any actual or likely changes in that strategy will be taken into account because ABB attempts to manage the business as the sum of its interrelated parts.

(c) Critical success factors (an activity in which a business must perform well if it is to succeed) will be identified and performance measures devised to monitor progress towards them.

(d) The focus is on the whole of an activity, not just its separate parts, and so there is more likelihood of getting it right first time. For example, what is the use of being able to produce goods in time for their despatch date if the budget provides insufficient resources for the distribution manager who has to deliver them?

Behavioural Aspects of Budgeting

Budgets and motivation

You may have already seen, in other modules, that there are theories of motivation such as those proposed by Maslow and Hertzberg, which focus on the *factors* that motivate people. There are theories that perhaps have more relevance in the present context that concern motivational behaviour; these are termed process theories. They include theories of equity, expectancy and goal setting.

Under *equity theory* individuals compare themselves to others in terms of the effort that they have put into a task or the loyalty that they have shown to a firm and the rewards for that effort in terms of pay or status. If others receive greater rewards for the same or less effort, then the situation is unfair and acts to demotivate.

Expectancy theory relates motivation to the strength of desire for something; there is an expectancy of performance if effort is put into the task, and there is expectancy of a result if a task is performed.

Goal setting theory requires goals to be:

- Achievable
- Specific
- Acceptable

and the individual committed to seeing the goal achieved.

Budgets are intended to affect the behaviour attitudes of management. Attitudes can be affected in relation to

a) Setting budgets

b) Implementing budgets

c) Feedback of results.

It is the role of the strategic management accountants to design the budgetary planning and control system to motivate management employees.

Research by Hofstede (1968) indicated that if a budget were to be set at too easy a level, actual performance would be better than the budget but worse than if no budget had been set at all. If the level was too difficult, Hofstede found that performance would be worse than the budget than if no budget had been set.

Organisational culture

Targets, budgets and indeed organisational change of any kind will often reflect its the organisational culture. If the regime is autocratic, there is likely to be resistance to change especially if it involves radical changes to the master budget or trying out new ideas such as activity based costing. Traditional management accounting practices, as presented in this unit of the module, make certain assumptions about an organisation:

- Objectives exist for the organisation.
- They are clearly communicated to staff.
- Financial data is transmitted in the two-way process referred to earlier.

If we consider this from the standpoint of the organisation's culture, we need to ask:

- Who sets the objectives?
- How are the objectives interpreted?
- How are they checked and corrected?

You may have encountered Douglas McGregor's X and Y theory. He put the proposition that managers hold assumptions about their employees. On the one hand, managers may think people:

- Are motivated by rewards and punishment.
- Are lazy and need supervision.
- Have goals that conflict with those of the organisation.

This is theory X.

Another set of assumptions is that people are:

- Self-motivated.
- Mature and responsible, needing little supervision.
- Ambitious.

This is theory Y.

The manager who subscribes to theory X will want to keep employees at a distance, exerting strong control actions. They will be given personal responsibility for meeting financial targets, which will be imposed without consultation, and will be subject to sanctions if budget targets are not met. The theory Y manager will adopt a far more democratic

style, encouraging participation in the budget formulation. The budget targets are far less of a control tool.

This is a matter of personal experience and opinion. You may have had personal experience of aspects of one of these styles, but whatever your view, remember that they represent extremes.

A budget may motivate, but not if it is poorly designed or implemented. An effective budget will allow managers to fail without fear of recrimination. Much of management is a balancing act between freedom and scarce resources, and aspirations will be low if the budget is slack, high if it is tight, as we have seen in Hofstede's research.

Some of the less desirable behavioural aspects of budgets might be:

- Projection of blame onto other people, the computer, the system and so on.
- Short-termism.
- Disputes and confrontations.
- Budgetary slack (difference between the minimum necessary expenditure and the actual or budgeted expenditure): managers react against the pressure of tight targets by introducing slack as a cushion against future budget cuts.
- Empire building, where a larger budget indicates prestige.
- Evasion, where the importance of the budget is relegated.

So what is appropriate? What factors influence managements approach to budgeting?

There are three broad possible approaches that the management accountant can adopt in relation to budgets **Participative**, **Imposed** or **Negotiated**.

Participative budgets are seen as motivating and are developed by lower level managers who then submit the budgets to their superiors. In contrast, imposed budgets are developed from senior managers then submitted to the junior managers.

Negotiation budgets are usually agreed upon by different levels of management.

Each will now be considered in turn.

Participation in setting budgets

Allowing participation may bring benefits such as:

1. better co-ordination
2. the spread of work may mean less time taken in drawing up budgets
3. strategic plans are better identified in planned activities by those allowed to participate
4. greater ownership of the final budget
5. a greater assumption of responsibility from the recipients of the budget
6. the input of the expertise of the participants (who are often closest to the detail of the budgeted activity).

However, participation in target setting might bring problems.

Participation might not be effective if:

- It is pseudo-participation, where nothing can be achieved without approval from the top.
- The situation does not permit it, for example in an organisation where decisions have to be made instantly.
- People do not want it.
- There are cost implications of poorer performance if managers participate, and incorporate slack into budgets.

Participative Budgets

Advantages

1. Better moral and motivation
2. More co-ordination
3. Managers have both strategic and operational views of the organisation

Disadvantages

1. May take a lot of time
2. Some employees may engage in empire building

ACTIVITY

Explain the advantages of encouraging employee participating in budget setting.

ACTIVITY FEEDBACK

- An informed budget-setting process such that management are aware of the detail of budgeted activities as provided by the people who work daily within the budgeted activity.
- Reducing the adverse effect of budget imposition when difficult management decisions have to be made (e.g. staff reduction).
- Employees become aware and more involved in the management activities of the organisations.
- Co-ordination within an activity might be improved.
- Budgetary slack may be reduced as management become more aware of the operation activities within an activity.
- Budgets are more achievable.
- More likely that budgets will not be undermined by subordinate.

Imposed budgets

Sometimes the participation budgets are not as effective as imposed budgets. An imposed budget has been derived by senior management with little input from junior staff.

There are times when imposed budgets are effective: e.g.

1. Newly formed organisations.
2. Small business
3. When operational mangers have little budgeting skills

Disadvantages of imposed budgets

The main disadvantage of imposed budgets is that they affect motivation in the company. This is due to:

1. No team spirit
2. Low morale
3. Budgeted is seem positive

Negotiation style of budgeting

Here different levels of management often agree budgets by a process of negotiation. Thus, budgets are most likely to lie between what top management would like and what junior managers thank is feasible.

The impact of accounting information of management performance

The impact of an accounting system of management performance was studied by Hopwood who said there was three ways of using budgeting information to evaluate management performance.

1. A budget-constrained style. The manager's performance is primarily evaluated upon the basis of his ability to continually meet the budget on a short term basis.
2. A profit conscious style of evaluation. he managers performance is evaluated on the basis of his ability to increase the general effectiveness of his unit operators in the long term purpose of the organisation, and
3. A non-accounting style of evaluation. The budgeting information plays a relatively unimportant point in superiors' evaluation of managers performance.

Hopwood's results can be summarised in the following table.

	Budget constrained	Profit conscious	Non accounting
Involvement with costs	HIGH	HIGH	LOW
Job related tension	HIGH	MEDIUM	MEDIUM
Manipulation of accounting reports	EXTENSIVE	LITTLE	LITTLE
Relations with the superior	POOR	GOOD	GOOD
Relations with colleagues	POOR	GOOD	GOOD (see Unit 6 for Participation)

ACTIVITY

Assess the use of Zero-based budgeting as a tool that might be used to motivate employees.

ACTIVITY FEEDBACK

In this respect, ZBB has the following advantages:

- It ensures that only forward-looking objectives are addressed. This limits the potential for historical abuses in budget-setting to be established. Employees can be set targets that are consistent with the future objectives of the organisation.

- Building 'budget slack' is minimised because, in principle, the entire costs of an activity are reviewed at each budget-setting stage. Employees are then set realistic targets that relate to activity levels that are the most efficient.

- Managers are made to understand, as part of the ZBB process, the activity itself. This reduces tension between those who decide (management) and those who have to implement manager decisions. Claims that management do not really understand the nature of an activity are thus reduced.

- ZBB encourages flexibility in employees since they know that, potentially, activities may be stopped. Flexibility induces goal consistency by enabling incentive schemes to reflect activity. In other words, employees are more likely to be responsive to management directives if they are aware and trust that the budget setting process encourages and supports payments that are responsive to flexibility.

REVIEW ACTIVITY

A product manager has responsibility for a single product and is in the process of submitting data to be compiled into budgets for 2009. The manager has

performance targets set in relation to sales volume, profitability levels and a target cash surplus from the product.

Shown below are the agreed budgeted sales for the product for December 2008 to May 2009.

	Dec	Jan	Feb	Mar	Apr	May
Units	14,000	16,000	22,000	17,000	20,000	24,000

The company policy is that, at each month end, the closing stock of finished goods should be 25% of the following month's forecast sales and the stock of raw material should be sufficient for 10% of the following month's production. Stock levels currently conform to this policy. One unit of raw material makes one unit of finished stock. There is no wastage.

Raw material purchases are paid for during the month following the month of purchase. All other expenses are paid for as incurred. All sales are made on credit and the company expects cash receipts for 50% of sales in the month of sale and 50% in the following month.

The company operates an absorption costing system which is computed on a monthly basis. That is, in addition to direct costs it recovers each month's fixed and variable manufacturing overhead expenses in product costs using the budgeted production and budgeted expenditure in the month to establish an absorption rate. This cost is used to place a value on the stock holding. Opening stock is valued at the unit cost which was established in the previous month. At 1 January 2009 finished stock should be assumed at £40 per unit. A flow of cost based on FIFO is assumed.

Sales are made at a price o £58 per unit.

Estimated costs to be used in the budget preparation for the product are:

Manufacturing costs:

Material	£10.00 per unit produced
Variable overhead and labour	£16.00 per unit produced
Fixed overhead costs (including depreciation of £54,000 per month)	£210,000 per month

Selling costs:

Variable	£7,00 per unit sold
Fixed	£164,000 per month

Required:

(a) Compute the monthly budgeted production and material purchases for January to March 2009.

(b) Prepare a budgeted profit and loss account and a statement of cash receipts and payments for January 2009.

REVIEW ACTIVITY FEEDBACK

(a) Production budget (units)

	Dec	Jan	Feb	Mar	Apr
Sales	14,000	16,000	22,000	17,000	20,000
Closing stock	4,000	5,500	4,250	5,000	6,000
	18,000	21,500	26,250	22,000	26,000
Opening Stock	3,500	4,000	5,500	4,250	5,000
Production	14,500	17,500	20,750	17,750	21,000

Purchasing budget (units)

	Dec	Jan	Feb	Mar
Production	14,500	17,500	20,750	17,750
Closing stock	1,750	2,075	1,775	2,100
	16,250	19,575	22,525	19,850
Opening stock	1,450	1,750	2,075	1,775
Purchases	14,800	17,825	20,450	18,075

(b) Working: Product unit manufacturing cost for January

	£
Material	10
Variable overhead and labour	16
Fixed overhead	12
	38

Note: The fixed overhead rate for January is calculated using the budgeted monthly overhead and production: £210,000/17,500 = £12/unit

Budgeted profit and loss account January 2009 (FIFO stock valuation)

		£000	£000
Sales	16,000 x £58		928
Raw material usage	17,500 x £10	175	
Variable overhead and lab	17,500 x £16	280	
Fixed overhead	17,500 x £12	210	
Manufacturing cost	17,500 x £38	665	
Closing stock	(5,500 x £38)	(209)	
	12,000 x £38	456	
Opening stock	4,000 x £40 (cost given)	160	
Cost of sales			616
Gross profit			312
Selling costs			
Variable	16,000 units of sale x £7	112	
Fixed		164	
			276
Net profit			36

REVIEW ACTIVITY

Discuss four purposes of budgets.

REVIEW ACTIVITY FEEDBACK

Your answer should cover four purposes from the six provided below.

Planning

The budget is a major short-term planning device placing the overall direction of the company into a quarterly, monthly and, perhaps, weekly focus. It

ensures that managers have thought ahead about how they will utilise resources to achieve company policy in their area.

Control

Once a budget is formulated a regular reporting system can be established so that the extent to which plans are, or, are not, being met can be established. Some form of management by exception can be established so that deviations from plans are identified and reactions to the deviation developed, if desirable.

Co-ordination

As organisations grow the various departments benefit from the co-ordination effect of the budget. In this role, budgets ensure that no one department is out of line with the action of others. They may also hold in check anyone who is inclined to pursue his or her own desires rather that corporate objectives.

Communication

The construction of the budget can be a powerful aid to defining or clarifying the lines in horizontal or vertical communication within the enterprise. Managers should have a clearer idea of what their responsibilities are, what is expected of them, and are likely to work better with others to achieve it.

Performance evaluation

When budgets are 'tailored' to a department or manager they become useful tools for evaluating how the manager or department is performing. If sales targets are met or satisfactory service provided within reasonable spending limits then bonus or promotion prospects are enhanced.

Motivation

The value of a budget is enhanced still further if it only states expectations but motivates managers to strive towards those expectations. This is more likely achieved if a manager has had some involvement in the budget construction, understands its implications and agrees it is fair and controllable by him/her.

REVIEW ACTIVITY

Explain the behavioural factors that should be borne in mind in the process of budgeting and budgetary control.

REVIEW ACTIVITY FEEDBACK

Targets

It is generally agreed that the existence of some form of target or expected outcome is a greater motivation than no target at all. The establishment of a target, however, raises the question of the degree of difficulty or challenge of the target. If the performance standard is set too high or too low then sub-optimal performance could be the result. The degree of budget difficulty is not easy to establish. It is influenced by the nature of the task, the organisational culture and personality factors. Some people respond positively to a difficult target; others, if challenged, tend to withdraw their commitment.

Budgets and performance evaluation

The emphasis on achievement of budget targets can be increased, but also the potential for dysfunctional behaviour, if the budget is subsequently used to evaluate performance. This evaluation is frequently associated with specific rewards such as remuneration increases or improved promotion prospects. In such cases it is likely that individuals will concentrate on those items which are measured and rewarded neglecting aspects on which no measurement exists. This may result in some aspects of the job receiving inadequate attention because they are not covered by goals or targets due to the complexity of the situation or the difficulty of measurement.

Managerial style

The use of budgets in evaluation and control is also influenced by the way they are used by the superior. Different management styles of budget use have been observed, for example:

Budget constrained – placing considerable emphasis on meeting budget targets.

Profit conscious – where a balanced view is taken between budget targets, long term goals and general effectiveness.

Non-accounting – where accounting data is seen as relatively unimportant in the evaluation of subordinates.

The style is suggested to influence, in some cases, the superior/subordinate relationship, the degree of stress and tension involved and the likelihood of budget attainment. The style adopted and its implications are affected by the environment in which management is taking place. For example, the degree of interdependency between areas of responsibility, the uncertainty of the environment and the extent to which individuals feel they influence results are all factors to consider in relation to the management style adopted and its outcomes.

Participation

It is often suggested that participation in the budget process and discussion over how results are to be measured has benefits in terms of budget attitude and performance. Views on this point are varied, however, and the personality of the individuals participating, the nature of the task (narrowly defined or flexible) and the organisation structure influence the success of participation. However, a budget when carefully and appropriately established can extract can extract a better performance from the budgetee than one on which these considerations are ignored.

Bias

Budgetees who are involved in the process from which the budget standards are set are more likely to accept them as legitimate. However, they may also be tempted to seize the opportunity to manipulate the desired performance standard in their favour. That is, they may make the performance easier to achieve and hence be able to satisfy personal goals rather than organisational goals. This is referred to as incorporating 'slack' into the budget. In this context there may be a relationship between the degree of emphasis placed in the budget and the tendency of the budgetee to bias the budget content or circumvent its control.

REVIEW ACTIVITY

You are the management of a group of companies and your managing director has asked you to explore the possibilities of introducing a Zero-based budgeting system experimentally in one of the operating companies in place of its existing orthodox system. You are required to prepare notes for a paper for submission to the board that sets out:

What problems might be faced in introducing Zero-based budgeting?

REVIEW ACTIVITY FEEDBACK

The problems that might be faced in introducing a Zero-based budgeting scheme are:

(i) Implementation of Zero-based budgeting might be resisted by staff. Traditional incremental budgeting tends to protect the empire that a

manager has built. Zero-based budgeting challenges this empire, and so there is a strong possibility that managers might resist the introduction of such a system.

(ii) There is a need to combat a feeling that current operations are efficient.

(iii) The introduction of Zero-based budgeting is time-consuming, and management may lack the necessary expertise.

(iv) Lack of top-management support.

REVIEW ACTIVITY

Of the various functions of budgets, do you think any of them conflict with each other?

REVIEW ACTIVITY FEEDBACK

a) Motivation v control

b) Performance evaluation v planning

REVIEW ACTIVITY

Obtain a copy of the budgetary control report for your department. Find out:

- How frequently such reports are received.
- Who normally checks budgetary control reports.
- How significant variances are brought to the attention of budget holders.

ACTIVITY FEEDBACK

The frequency of the reports will depend upon your organisation, but more important than frequency is the timing. Reports must reach budget holders in time for them to act on them. Almost without exception these days budgetary control reports take the form of a computer printout. Such reports should be designed to ensure that significant variances cannot easily be overlooked. Reports, once received, should be immediately reviewed and discussed with senior management to explain the variation and to discuss the action to be taken as a consequence.

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Unit 6

Management Control Systems and Performance Management

This section covers two areas which are interlinked. Management control systems which are designed to enhance managerial direction and decision making, allocate responsibility and set required targets, and outcomes and performance management which assess the efficacy of the management system in achieving strategic goals within defined parameters such as division. As such, much of the focus of this unit will be towards large company management systems.

LEARNING OUTCOMES

At the end of this unit the student will be able to:

1. Critically understand and evaluate management accounting control systems.

2. Understand centres of responsibility.

3. Critically understand the models and concepts involved in the setting of financial targets.

4. Critically understand the need for performance management.

5. Critically understand the strategic importance of profit and investment centres.

6. Critically apply measures of divisional and managerial performance.

Part 1: Management Control Systems

Introduction

The aim of a Management Control System is to influence employees' behaviour in desirable ways in order to increase the probability that an organisation's objectives will be achieved.

This unit briefly explains the management control system by aid of a diagram and then examines in more detail control and various elements of a control system.

In particular, the unit describes a cybernetic control system, feedback and feed forward, a management accounting control system, centres of responsibility and, finally, the setting of financial targets.

A management control system is a means of gathering and using information to aid and co-ordinate the process of planning and control decisions within an organisation.

An examiner from an old ACCA syllabus used the following diagram to explain the management control system. The diagram serves to give you an overview of the management control process.

Phases of Management control

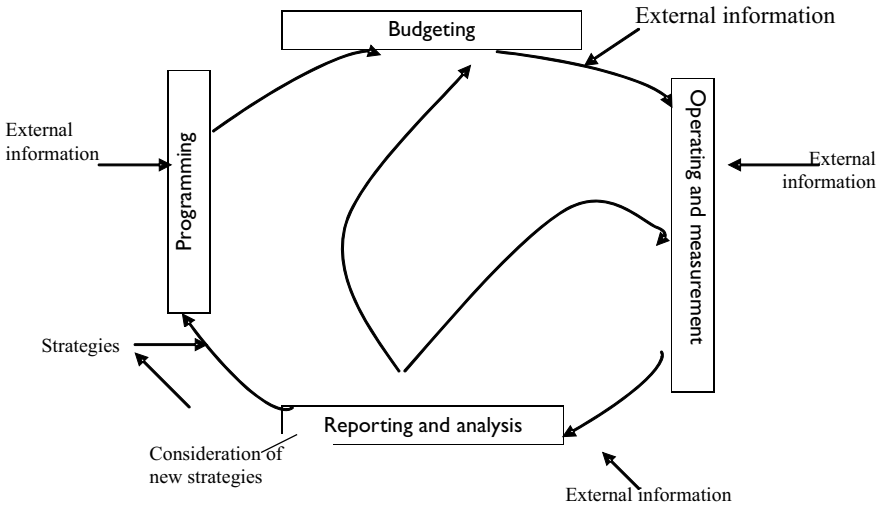

Figure 6.1 Phases of management control.

Definition of terms in Figure 6.1

Programming is the link with strategic planning. It identifies the product a company intends to develop, project which management intend to develop projects which management intend to pursue to meet organisations overall goals. Budgets are derived from these and are specifies in terms of a managers responsibility. Operating and measurement is the collecting of actual costs and outcomes identified to both programmes and responsibility centres. Finally, reporting and analysis takes place as a basis for control to the budget, for the co-ordination of activist and as a basis for future decisions perhaps to change the original plan.

The unit will now proceed to investigate control, cybernetic control, the Management Accounting system and the setting of financial targets.

Control

Control is the process of ensuring that a firm's activities conform to its plan and that its objectives are achieved.

The aim of management control is to influence employee behaviour.

C. Drury in *Management Accounting for Decision Makers* identifies different types of controls:

1. Action (or behavioural) controls
2. Personal and cultural (or clan and social) controls
3. Results (or output) controls

Each will be considered in turn:

1. Action controls focus on preventing undesirable behaviour and are the ideal form of control because their aim is to prevent the behaviour from occurring. Behavioural controls-involves observing the actions of individuals as they work.
2. Personal controls involve helping employees to do a good job by building on employees natural tendencies to control themselves. In addition to this control there are cultural and clan controls.

   Cultural controls are a set of values social norms and beliefs that are shared. Cultural controls are exercised by individuals over one another.

   Clan and social controls are based on the beliefs that by fostering a strong sense of solidarity and commitment towards organisational goals. A main feature of a clan is the high degree of employee discipline.

3. Results or Output controls involve collecting and reporting information about the outcomes of work effort. The major advantages of results controls is that Managers do not have to be knowledge about the means required to achieve the desired results or be involved in directly observing the actions of subordinate.

Resulting controls involve the following stages:

1. Establishing results (i.e. performance) measures that minimise undesirable behaviour.
2. Establishing performance targets.
3. Measuring performance.
4. Provided rewards of punishment.

For result measures to work effectively the individuals whose behaviours are being controlled must be able to control and influence the results.

Possible detrimental side effects of control

A major detrimental side effect is a lack of goal congruence within the organisation. A lack of goal congruence occurs when the organisational goals and individual goals are in conflict. It may be argued that controls may motivate behaviour which is not organisational desirable.

Another harmful side effect of controls is that they can cause negative attitudes towards the control system. That is if controls are applied too rigorously.

ACTIVITY

Identify and describe three different types of control mechanism used by companies.

ACTIVITY FEEDBACK

1. Action controls.
2. Personal and cultural controls.
3. Results controls.

Cybernetic Control systems

A cybernetic control system consists of the following

1. The process is continually monitored by an automatic regulator.
2. Deviations from a predetermined level are identity by the automatic regulator.
3. Corrective actions are started if the output is not equal to the predetermined level.

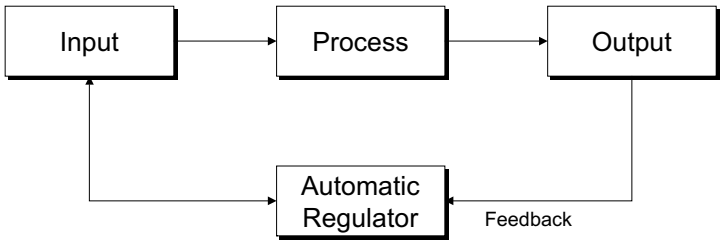

Figure 6.2. A cybernetic control system.

The cybernetic system is a good example as what is known as feedback control.

In *Management Accounting for Business*, C. Drury quotes Emmanuel *et al* who argue that if any of the conditions below are not met the process cannot be considered to be in control. Thus:

1. Objectives for the process being controlled must exist.
2. The output of the process must be measurable. Thus there must be some mechanism for accessing whether the process is attaining it objectives.

3. A predictive purpose of the process being controlled is required so that causes for non-attainment can be identified and proposed connived actions evaluated.

4. There must be a capability for taking action so that demands from objectives can be reduced.

ACTIVITY

Describe the elements of cybernetic control systems.

ACTIVITY FEEDBACK

Cybernetic control system is likened to a thermostat that controls a central heating system.

1. The process (the room temperature) is continually monitored.

2. Deviations from a predetermined level (the direct temperature).

3. Corrective actions are started if the output is not equal to the predetermined level.

The Management Accounting Control System

C. Drury in *Management Accounting for Decision Makers* has said that a management accounting control systems have two core elements. The first is formal planning process such as a budgeting and long-term planning. The second is responsibility accounting, which involves the creation of responsibility centres.

Responsibility centres enable accountability for financial results/outcomes to be allocated to individuals throughout the organisation. Responsibility accounting involves (a) distinguishing between those items which managers can control and for which they should be held accountable and those items which managers can control and for which they are not held accountable; (b) determining how challenging the financial targets should be; and (c) determining how much influence managers should have in the setting of financial targets.

Figure 6.3 below shows that responsibility centres might be a mixture of cost centres, profit centres and investment centres.

Type of responsibility centre	Manager has control over….	Principal performance measure
Cost centre	Controllable costs	Variable analysis
Profit centre	Controllable costs Sales volumes Sales prices	Profit
Investment centre	Controllable costs Sales prices Output volumes Investment in fixed and current assets	Return on investment residual income

Figure 6.3. Responsibilty centres.

Definition of terms:

1. Costs of expense centres are responsibility centres whose managers are normally accountable for only those costs that are under their control.
2. Revenue centres are responsibility centres where managers are accountable only for financial outputs.
3. Investments centres are responsibility centres whose managers are responsible for both sales, revenue and costs and, in addition have responsibility and authority to make working capital and capital investment decisions.

Guidelines for applying the controllability principle

C. Drury in *Management Accounting for Decision Makers* quotes the Report of the Committee of Costs Concepts and Standards in the United States in 1956 as a guide to controllability thus:

1. If a Manager can control the quality and price paid for a service then Manager is responsible for all expenditure incurred for the service.
2. If the Manager can control the quality of the service but not the price paid for the service but not the price paid for the service then only that amount of difference between actual and budgeted expenditure that is due to usage should be identified with the Manager.
3. If the Manager cannot control either the quantity or the price paid for the service then the expedititive is uncontrollable and should be identified with the Manager.

It is important to recognise, however, that there are uncontrollable factors:

Types of uncontrollable factors

1. Economic and competitive factors (e.g. changes in customer tastes)
2. Acts of Nature (fires and floods)
3. Interdependencies

In reality it may be difficult to apply the controllability concept because there may be areas that are not put into either controllable or uncontrollable.

ACTIVITY

What is meant by responsibility accounting?

ACTIVITY FEEDBACK

The objective is to accumulate costs and revenues for each individual responsibility centre so that the deviations from a performance target can be attributed to the individual who is accountable for the responsibility centre.

Thus responsibility accounting involves:

(a) distinguishing between those items which managers can control and for which they should be held accountable.

(b) determining how challenging the financial targets should be.

(c) determining how much influence managers should have in the selling of financial targets.

ACTIVITY

Describe four different types of responsibility centres.

ACTIVITY FEEDBACK

1. Cost or expense centres – more managers are normally accountable for only those costs that are under their control.

2. Revenue centres – here managers are accountable only for financial outputs in the form of generating sales revenues.

3. Profit centres – managers are accountable for both revenue and costs are called profit centres.

4. Investment centres – are responsibility centres whose managers are responsible for both sales revenues and costs.

Setting financial performance targets

There are three approaches that can be used to set financial targets:

1. Engineered targets – used when there are clearly defined and stable input and output relationships.
2. Historical targets – defined directly form the results of previously periods. The disadvantage of using historical targets is that they may not include past inefficiencies.
3. Negotiated targets – targets are set based on negotiation between superiors and subordinates.

Targets will have differing levels of difficulty and, therefore, have a significant effect on motivation and performance.

Arguments for setting achievable targets:

1. They can be motivated. C. Drury has argued that highly achievable budgets require managers to be consoling at a high level of effort.

2. There is a sense of achievement and self esteem.

The disadvantages of setting achievable targets:

1. Rewards such as bonuses, promotions, etc are linked to budget achievement. The greater the possibility of future the more management will be tempted to distort their behaviour so as to achieve rewards
2. Aspirations and performance may not be maximised.

Generally, participation in the budgeting and target setting process should be encouraged.

Advantages of participation

1. Individual is more likely to accept targets.
2. Individuals may be more motivated.

Vroom (1960) showed that personality variables can have an influence on effortioness of participation.

Vroom found that authorisation individuals with a low need for participation were unaffected by participation and that high participation was effusive only for individuals with low authorisation.

Limitation to participation

Personality traits of the individuals may lower the benefits of participation.

Participation is not enough to ensure commitment to standards.

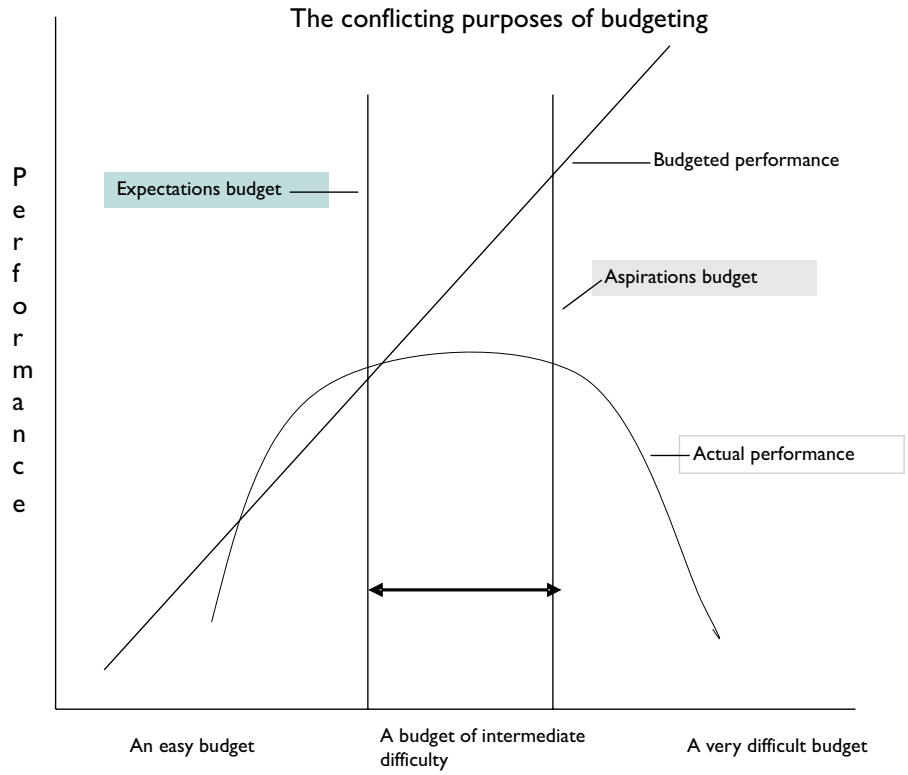

Figure 6.4. The effect of level of budget difficulty on motivation and performance by Vroom.

On the vertical axis is measured the performance of the individual and on the horizontal axis the level of difficulty. From the graph there comes a point where the level of difficulty makes the performance difficult to achieve and the aspirational level and performance level decline. In contrast, the budget that is expected to be achieved motivates a lower level of performance.

Therefore the conclusion is that to motivate the best level of performance, demanding budgets should be set and small variances should be regarded as a good sign.

REVIEW ACTIVITY

Describe three different types of uncontrollable factors.

REVIEW ACTIVITY FEEDBACK

1. Economic and competitive factors
2. Acts of nature
3. Interdependencies

REVIEW ACTIVITY

Outline possible problems which may be encountered as a result of the introduction of a system of cost control into an organisation.

REVIEW ACTIVITY FEEDBACK

Possible problems include:

(i) Difficulties in setting standards for non-repetitive work.

(ii) Non-acceptance of budgetees if they view the system as a punitive device to judge their performance.

(iii) Isolating variances where interdependencies exist.

REVIEW ACTIVITY

Identify and explain the essential elements of an effective cost control system.

REVIEW ACTIVITY FEEDBACK

(i) The need for a system of responsibility accounting based on a clear definition of a manager's authority and responsibility.

(ii) The production of performance reports at frequent intervals comparing actual and budget costs for individual expense items. Variances should be analysed according to whether they are controllable or non-controllable by the manager.

(iii) The managers should participate in the setting of budgets and standard.

(iv) The system should ensure that variances are investigated, causes found and remedial action is taken.

(v) An effective cost control system must not be used as a punitive device, but should be seen as a system that helps managers to control their costs more effectively.

Part 2: Performance Management

Introduction

The Need for Performance Management

Companies have adapted various organisational structures so as to manage the global competitive environment more effectively.

Such a structure may be a divisional structure. With such a structure comes the need for head office to assess the performance of the division and of the management.

This unit, therefore, examine three financial measures. These are:

- Return on Investment
- Residual Income
- Income Economic Value Added

In terms of assessing managerial performance it is essential that profit or net assets are controllable.

Divisionalisation and responsibility accounting

The overall aim of divisionalisation lies in the improvement of group operational efficiency with respect to increasing corporate profitability and attaining organisation objectives. However, the following advantages and disadvantages are claimed for divisionalisation.

Advantages of divisionalisation

1. Market information – through divisional contact know how and specialist knowledge. The division will have its "ear to the ground" and will therefore know the current market information.
2. Management motivation – divisional managers are likely to be more motivated as they have "ownership" of the problems.
3. Specialist knowledge – the divisional manager is likely to have built up specialist knowledge in the division.
4. Timely decisions – because the division is close to the decision it will not take unduly long to arrive at the decision which benefits the organisation.

ACTIVITY

Define and explain divisionalisation.

ACTIVITY FEEDBACK

A divisional organisation is one that divides itself into operating units in order to deliver its range of products or services. Divisionalisation is, in essence, an attempt to deal with the problems of size and complexity.

Disadvantages of divisionalisation

1. Goal conflict – there may be goal conflict between the division and the wider organisation as a whole or with other divisions.
2. Risk avoidance – the managers of the division may decide on not pursuing a course of action as the risk is too high for the division which, if pursued, would substantially increase the profits of the wider organisation as a whole.
3. Competition - divisions within the same business offering similar or substitute products may find themselves in competition with each other.

Profit and Investment Centres

Divisions tend to be categorised into either a **profit centre** or an **investment centre**. An explanation of each are given below

Profit Centre

A profit centre is an area of responsibility to which both costs and revenues are attributed for purposes of assessing profit performance. Divisionalisation within an organisation requires that profit centres be established, and furthermore that divisional managers be held responsible for both the costs and benefits resulting from their planning and control activities.

Investment Centre

An investment centre is an area of responsibility in which a divisional manager is held responsible not solely for profits, but also for the extent to which they reflect the efficient use of capital invested in that manager's division. Investment centres represent the furthest stage in the devolution of managerial control/planning authority and responsibility within divisionalised organisations.

Divisional managerial performance appraisal within investment centres is, therefore, based upon two element – profit and investment.

ACTIVITY

What are the benefit of autonomy?

ACTIVITY FEEDBACK

The benefit of allowing divisional managers autonomy include:

- Better use of market information
- Increase in management motivation
- Providing opportunities for management development
- Making full use of specialist knowledge
- Giving central managers time to focus on strategic issues
- Permitting a more rapid response to changes in market conditions

Measurement of divisional performance

There are three main techniques:

- Return on investment (ROI)
- Net residual income (NRI)
- Economic value added (EVA)

Return on Investment (ROI)

ROI can be calculated on both a primary and a secondary level:

(1) Primary level: $\text{ROI} = \dfrac{\text{Net profit}}{\text{Net investment in assets}} \times 100\%$

Where: 'net profit' is the level of return; and 'net investment in assets' is one of several possible bases for measuring the level of capital employed in an organisation/division.

The above primary ratio can be disaggregated into two subsidiary or secondary measures of divisional performance: (i) profit margin on sales; and (ii) asset turnover. The formula for the ROI statistic at this subsidiary level is as follows:-

(2) Secondary level: $\text{ROI} = \dfrac{\text{Net profit}}{\text{Sales}} \times \dfrac{\text{Sales}}{\text{Net assets}} \times 100\%$

ROI on both (i) primary level and (ii) secondary level given the following data.

Level of return (i.e. profit): £180,000

Level of asset investment (i.e. capital employed): £1.5million

Level of sales (i.e. turnover): £2.25 million

Answer

(i) Primary level

$$\text{ROI} = \frac{\text{Net profit}}{\text{Net investment}} = \frac{£180{,}000}{£1{,}500{,}000} \times 100 = 12\%$$

(ii) Secondary level

$$\text{ROI} = \frac{\text{Net profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Net assets}} \times 100$$

$$= \frac{£180{,}000}{£2{,}250{,}000} \times \frac{£2{,}250{,}000}{£1{,}500{,}000}$$

$$= \quad (0.08 \times 1.5] \quad \times \quad 100 = 12\%$$

ROI advantages

1. Return on the investment is a percentage.
2. Used extensively by managers.

ROI disadvantages

1. The principal drawback connected with the use of the ROI measure is that it can allow sub-optimal planning decisions to be taken by divisional managers. A manager whose performance is appraised on the basis of ROI will be unwilling to accept projects and opportunities which do not realise a rate of return at least equal to the current ROI being earned by that division. In order to maintain divisional performance levels, managers will reject investment opportunities that fall short of the required ROI because the effect of their acceptance would be to dilute or reduce the divisional manager's overall ROI.
2. Generally, ROI does not encourage goal congruence.

Net Residual Income (NRI)

RI is defined as controllable contribution less a cost of capital charge on the investment controllable by management.

The RI technique is an absolute income measure. Its basic decision rule is that all new investment opportunities which generate a positive return in excess of the organisation's cost of capital should be accepted by divisions within that organisation. Effectively, the RI technique works by charging divisions with an imputed (i.e. notional) interest charge, equal to the organisation's cost of capital, for their use of capital. Thus any new projects realising a surplus of income after being charged interest should be accepted for the financial benefit of the organisation as a whole.

Example of Residual Income

A division produced a profit of £200,000 and there was a divisional investment of £700,000 with a cost of financing this investment of 12% per year. The residual income would be as follows:

Divisional profit	£200,000
Less charge for capital Invested 12% x 700,000	84,000
Residual income	£116,000

Disadvantages of RI

1. It is an absolute measure.
2. Difficult to compare investments of different sizes.

In general ROI is preferred to RI. Why is ROI preferred over RI?

1. It can be used for inter-divisional and inter-firm comparisons.
2. ROI issued more externally by outside investors.
3. Managers prefer percentage measures as they are used to it.

Economic Value Added (EVA)

EVA	=	conventional divisional profit
	+	accounting adjustments
	–	cost of capital charge on divisional assets

EVA is more likely to encourage goal congruence in terms of asset acquisition decisions.

Managerial or Divisional Performance Financial Measures

All three financial measures can be used to evaluate either managerial or divisional performance. The following rule however may be followed:

1. If the purpose is to evaluate the divisional manager then only those items directly controllable by the manager should be in the profitability measure.
2. If, however, the purpose is to evaluate a division's performance many of the items that other divisional managers cannot influence, e.g. interest expenses, taxes and the allocation of central administrative staff expenses, need to be included in the calculation.

An alternative approach to RI/ROI/EVA is to use divisional profit measure

Alternative divisional profit measures

		£
	Sales to outside customers	XXX
	Transfers to other divisions	XXX
	Total sales revenue	XXX
	Less variable costs	XXX
1.	Variable short-run contribution margin	XXX
	Less controllable fixed costs	XXX
2.	Controllable contribution	XXX
	Less non-controllable avoidable costs	XXX
3.	Divisional contribution	XXX
	Less allocated corporate expenses	XXX
4.	Divisional net profit before taxes	XXX

Explanation of Terms

1. The short run variable contribution is in appropriate for managerial performance.
2. Controllable contribution provides an incomplete measure of the economic performance of a division since it does not include those costs that are attributable to the division but which are not controllable by the divisional manager. Best for measuring managerial performance.
3. Divisional contribution – useful for divisional performance but not for managerial since it includes items that are not controllable by divisional managers.

ACTIVITY

The following information applies to the budgeted operations of the Goodman division of the Telling Company:

	£
Sales revenue (50,000 units at £8)	400,000
Variable costs (50,000 units at £6)	(300,000)
Fixed costs	(75,000)
Divisional profit	25,000
Divisional investment	150,000

The minimum desired return on investment is the cost of capital of 20 per cent a year.

Required

Calculate:

(1) the ROI

(2) the residual income

ACTIVITY FEEDBACK

(1) $$\text{ROI} = \frac{\text{Division profit}}{\text{Divisional investment (asset employed)}} \times 100\%$$

$$= \frac{25{,}000}{150{,}000} \times 100\%$$

$$= 16.7\%$$

(2)

RI = Divisional profit	£25,000
Required return 20% x £150,000	(30,000)
Residual income (loss)	(5,500)

The results show that the ROI is less than the required return of 20 per cent and the residual income is negative. The results must therefore be considered unsatisfactory.

ACTIVITY

For each of the following explain

(1) controllable profit

(2) return on investment

ACTIVITY FEEDBACK

The controllable profit deducts all expenses (variable and fixed) within the control of the divisional manager when arriving at a measure of performance. This is viewed by many as the best measure of performance for divisional managers as they will be in a position to determine the level of expenses incurred. However, in practice, it may be difficult to categorise expenses as being either controllable or non-controllable. This measure also ignores the investment made in assets. For example, a manager may decide to hold very high levels of inventories, which may be an inefficient use of resources.

Return on Investment (ROI) is a widely used method of evaluating the profitability of divisions. The ratio is calculated in the following way:

$$\text{ROI} = \frac{\text{Division profit}}{\text{Divisional investment (asset employed)}} \times 100\%$$

The ratio is seen as capturing many of the dimensions of running a division.

When defining divisional profit for this ratio, the purpose for which the ratio is to be used must be considered. When evaluating the performance of a divisional manager, the controllable contribution is likely to be the most appropriate, whereas for evaluating the performance of a division, the divisional contribution is likely to be more appropriate. Different definitions can be employed for divisional investment. The net assets or total assets figure may be used. Additional assets may be shown at original cost or some other basis such as current replacement cost.

REVIEW ACTIVITY

Write the formula for EVA.

REVIEW ACTIVITY FEEDBACK

EVA	=	conventional divisional
	+	accounting adjustments
	–	cost of capital charge on divisional assets

REVIEW ACTIVITY

Division A makes a single product. Information for the division for the year just ended is:

Sales	30,000 units
Fixed costs	£500,000
Depreciation	£360,000
Residual income	£47,200
Net assets	£1,250,000

Head Office assesses divisional performance by the residual income achieved. It uses a cost of capital of 12% a year.

Required

Calculate Division A's average contribution per unit. (Note, work backwards to derive divisional contribution.)

REVIEW ACTIVITY FEEDBACK

Working backwards to determine the divisional contribution

Cost of capital	£150,000	(12% x £1.25m)
Residual income	£47,200	
	£197,200	
Depreciation	£360,000	
Fixed costs	£500,000	
	£1,057,200	

Therefore contribution per unit $\frac{£1,057,200}{30,000}$ = £35.24

REVIEW ACTIVITY

Samson uses residual income to appraise its divisions using a cost of capital of 12%. It gives the managers of these divisions considerable autonomy although it retains the cash control function at head office.

The following information was available for one of the divisions:

	Net profit after tax £000	Profit before interest and tax £000	Divisional net assets including cash £000	Cash £000
Division 1	47	69	104	21

Required

Calculate the controllable residual income.

REVIEW ACTIVITY FEEDBACK

Divisional managers do not control the cash function. Therefore, controllable net assets should exclude the cash. So controllable net assets are

104,000 - 21,000 =	83,000
Controllable residual income	69,000
Less cost of capital 12% x £83,000	9,960
	39,040

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Unit 7

Standard Costing and Variance Analysis

LEARNING OUTCOMES

After completion of this unit the student will be able to:

1. Explain the nature and purpose of standard costing.
2. Calculate and interpret a variety of cost variances.
3. Calculate and interpret performance measures.
4. Prepare a simple standard cost operating statement.
5. Identify the benefits and the disadvantages of a standard costing system.

What is standard costing?

During the course of this module you have encountered absorption and marginal costing, which are methods of calculating the actual cost of production of goods or services. *Standard* costing is not a costing method in that sense but a type of control system, often found in conjunction with budgetary control. The latter has a wide application in all sectors including non-profit making organisations. Standard costing has its origins in the production sector, the *standard cost* being the budgeted cost of a single unit of production, but is now often appropriate in service industries. Standard costing works by comparing the standard, pre-determined costs with the actual costs, and then analysing the reason for any variances, but in a more detailed way than in budgetary control. Note that this section uses the absorption costing approach.

According to the UK Chartered Institute of Management Accountants (CIMA), the purposes of standard costing are to:

- Provide a basis for performance measurement.
- Enable control by exception reporting.
- Provide a method for valuing stock.
- Provide a means for establishing the selling price of goods.

Why 'standard'?

The predetermined costs of materials and labour are the standards, derived from technical specifications, and as you will see these costs are detailed so the calculations must be accurate. CIMA defines two levels of standard in the calculation of costs:

The *ideal* standard: '…attained under the most favourable conditions with no allowance for normal losses, waste and machine downtime…'

The *attainable* standard: '…standard unit of work is carried out efficiently, a machine properly operated or a material properly used. Allowances are made for normal losses, waste and machine downtime…'

The attainable standard is obviously the more realistic one, since ideal conditions rarely prevail!

A standard costing system uses the concept of standard hours (or other time period).

ACTIVITY

A factory produces 800 units in a day, and works 8 standard hours. How many units are produced in a standard hour?

ACTIVITY FEEDBACK

This is a simple calculation since in a standard hour $\frac{800}{8} = 100$ units are produced. However, the calculation serves to show that in standard costing, a standard hour is not a measure of time but a measure of performance or production. It is a period during which a set amount of work is to be completed.

The standard cost of a unit of production consists of four elements, which, together with their bases of calculation, are:

- Direct materials = usage x price
- Direct labour = hours (or other time period) x rate of pay
- Variable overheads = hours x variable absorption rate per hour
- Fixed overheads = hours x fixed absorption rate per hour

ACTIVITY

Which individuals in a typical organisation do you think would provide details of the following?:

- Amounts of materials needed for production.
- Pay rates.
- Materials prices.

- Hours required for a particular task.
- Absorption rates.

ACTIVITY FEEDBACK

This activity serves to reinforce a point made in the previous section, that budgetary control or standard costing systems are not the responsibility of accountants. A lot of people are involved, as follows:

Amounts of materials needed for production	The production manager would supply this information.
Pay rates	The personnel department or human resources director would supply these.
Materials prices	The purchasing department would supply this information, although of course many firms may not be large enough to have a separate purchasing department, and the function may be carried out by the production manager.
Hours required for a particular task	In a large organisation the works study engineer will provide this information.
Absorption rates	This is the area where you would expect the management accountant to provide information.

In the second level module on Operations Management you will look at the tasks of a work-study or technical efficiency engineer. This function has a particular importance in determining standards.

In the next part we will go on to look at the elements of cost in some detail.

KEY POINTS

The key points so far are:

1. Standard costing is not a costing method but a type of control system often found in conjunction with budgetary control.

2. The standard cost is the budgeted cost of a single unit of production, and the standard is one that is attainable rather than ideal.

3. The standard cost will include elements of direct materials, direct labour, variable and fixed overheads.

4. A standard costing system will use the concept of the standard hour which is a measure of performance or production. It is a period during which a set amount of work is to be completed.

Variance analysis

A cost variance is the difference between a standard cost and the comparable actual cost incurred in a period. You have already encountered the idea of a variance in the previous section but here we are going to develop it by looking at the four standard cost elements in turn. First you need to revise the implications of a variance.

ACTIVITY

In the previous activity you found that a company's standard hour produced 100 units. The company works a 7½ hour day, and, according to the production records for last week:

800 units were produced on Monday

740 units were produced on Tuesday.

Calculate and comment on the variance in the standard hour for each day:

ACTIVITY FEEDBACK

The standard hour should involve production of 100 units so in a 7½ day the company should produce:

$$7½ \times 100 = 750 \text{ units}$$

On Monday 800 were produced so this is a variance of 800 – 750 = 50 units. The company has produced 50 units more than standard so this is a *favourable* variance.

On Tuesday 740 were produced so this is a variance of 740 – 750 = (10). The company has produced 10 units less than standard so this is an *adverse* variance.

The terms favourable and adverse should be thought of in terms of the effect on the firm's profits:

A *favourable* variance will increase profit, so favourable variances include producing more than the standard output or incurring costs less than standard.

An *adverse* variance reduces profit so these include producing less than standard or incurring greater costs than standard.

We will now concentrate on cost variances.

Direct materials cost variance

The direct materials cost variance is, as you might expect, the difference between the standard cost of materials required for the output achieved and the actual cost of those materials.

ACTIVITY

Bearing in mind the elements of the cost of direct materials, what do you think a cost variance could consist of?

ACTIVITY FEEDBACK

The elements of the cost of direct materials were noted above as usage x price, So a cost variance can consist of a variance in usage, a variance in price, or both.

Example:

A product has been costed to require 100kg of a raw material costing £10 per kilo. Thus the standard cost is:

$$\text{usage} \times \text{price} = 100 \times £10 = £1{,}000$$

ACTIVITY

In production, 110 kilograms of the raw material were used at a cost of £9 per kilo. What is the direct materials cost variance? Is it favourable or adverse?

ACTIVITY FEEDBACK

You need to calculate:

variance = standard cost – actual cost

= £1,000 – (110 × £9)

= £1,000 – £990

= £10

This is a favourable cost variance, since the total cost is less than standard.

The formal definition is:

$$\text{direct materials cost variance} = (\text{standard usage} \times \text{standard price}) - (\text{actual usage} \times \text{actual price})$$

This is, however, made up of two elements: price and usage. The cost of the material was £9 per kilo instead of £10, and 110 kilos were used instead of 100. The above formal definition of the total variance needs to be split.

The *usage* variance measures usage at the standard price and is given by:

usage variance = (standard usage for actual production – actual usage) × standard price

The *price* variance measures price at the actual usage and is given by:

price variance = (standard price – actual price) × actual usage

ACTIVITY

Check that the two variances, when added together, do give the direct materials cost variance.

ACTIVITY FEEDBACK

You should have the following:

usage variance + price variance = [(standard usage – actual usage) x standard price] + [(standard price – actual price) x actual usage]

= (standard usage × standard price) – (actual usage × standard price) + (standard price × actual usage) – (actual price × actual usage)

= (standard usage × standard price) – (actual price × actual usage)

= direct materials cost variance.

Do not worry if you found this manipulation a bit tricky! Try to follow the workings and establish for yourself that the total variance is made up of the usage and price variance.

ACTIVITY

You found from the details in an earlier activity that there was a favourable direct materials cost variance of £10. Calculate the individual variances and thus show how the £10 is made up.

ACTIVITY FEEDBACK

Usage variance = (standard usage for actual production – actual usage) × standard price
= (100 – 110) × £10
= (£100).

Price variance = (standard price – actual price) × actual usage
= (£10 – £9) × 110
= £110.

The total favourable variance of £10 is made up of:

an adverse usage variance	(£100)
a favourable price variance of	£110
Total	£10

The importance of this analysis lies in the different responsibilities within an organisation. Variances in price will be the responsibility of the purchasing manager, while variances in usage are the responsibility of the production manager. The management accountant using standard costing control methods will be able to determine whether more or less raw material has been used, or whether a different price has been paid. The next level of analysis is, of course, to look at why there has been a difference in material usage or price paid.

ACTIVITY

Fashion Fabrics Ltd makes curtains. A pair of curtains uses 6 metres of fabric that costs £3.10 per metre. On a production run, 50 pairs are made using 330 metres of fabric costing £2.50 per metre. Calculate the direct materials cost variances and suggest why these might have occurred.

ACTIVITY FEEDBACK

The production run of 50 pairs should have used 6 metres per pair so the standard usage is

50 × 6 = 300 metres. The calculations are as follows:

direct materials cost variance	=	(standard usage × standard price) – (actual usage × actual price)
	=	(300 × £3.10) – (330 × £2.50)
	=	£930 – £825
	=	£105

This is an overall favourable variance. This is made up of:

usage variance	=	(standard usage for actual production – (actual usage) × standard price
	=	(300 – 330) × £3.10
	=	(£93)
price variance	=	(standard price – actual price) × actual usage
	=	(£3.10 – £2.50) × 330
	=	£198

So the overall favourable variance of £105 comprises an adverse usage variance of £93, indicating that more fabric has been used than standard, and a favourable price variance of £198, indicating that the fabric was purchased at a cheaper price. We do not have enough information to form a concluded opinion but it could be that the fabric was cheaper because it was inferior, which in turn contributed to the adverse usage variance since more fabric was wasted in the production process. This is something that would then be investigated by management.

The last activity illustrates part of the purpose of management accountancy. The information provided about the variances shows the production and purchasing managers that there is a problem. They can now investigate this in order to arrive at a solution. The reasons for

materials cost variances will, in part, depend on the nature of the industry but some common reasons are:

- inferior materials causing wastage
- an inexperienced production team, also causing wastage
- theft or loss through damage of materials
- poorer quality materials
- a change in supplier affecting quality or price
- bulk orders reducing the price.

Direct labour cost variance

The principles that we have applied above are also applied to calculating and investigating labour cost variances. This time the elements of the cost are the time period and the pay rate. For convenience, we will refer to the time period in hours.

Thus the starting point is:

direct labour cost variance = (standard hours × standard rate) – (actual hours × actual rate)

ACTIVITY

The standard cost of a job is 5 hours at a wages rate of £4 per hour. The job, however, takes 4 hours to complete and the rate paid was £4.50 per hour. What is the labour cost variance?

ACTIVITY FEEDBACK

Using the formula above:

direct labour cost variance = (standard hours × standard rate) – (actual hours × actual rate)
= (5 × £4) – (4 × £4.50)
= £20 – £18
= £2.

There is an overall favourable variance of £2.

This variance can also be analysed and found to be composed of the following:

labour efficiency variance = (standard hours for actual production – actual hours) × standard rate

labour rate variance = (standard rate – actual rate) × actual hours

We will not repeat the manipulation of these to return to the direct labour cost variance, as we did with the materials cost variance, but if you were to try it for yourself, the principle is exactly the same.

ACTIVITY

Analyse the favourable labour cost variance of £2 that you found in the last activity, into the efficiency and rate variances.

ACTIVITY FEEDBACK

Labour efficiency variance = (standard hours for actual production – actual hours) × standard rate

= (5 – 4) × £4

= £4.

Labour rate variance = (standard rate – actual rate) × actual hours

= (£4 – £4.50) × 4

= (£2).

The favourable efficiency variance means that the job took less time than anticipated, but the adverse rate variance meant that it cost more.

The causes of these variances would have to be investigated, but some of the more usual reasons for efficiency and rate variances are:

- Unforeseen circumstances that cause delays.
- Use of more highly skilled labour, causing an adverse rate variance but may meaning that output is higher or faster.
- Use of less highly skilled labour, having the opposite effect: favourable rate variance, but the job may take longer.
- Pay rate rises.
- Unforeseen overtime being worked.

Variable production overheads variance

The elements of this cost are the hours and the overhead absorption rate. You may find that some writers on management accountancy state that this cost cannot be further analysed since expenditure varies directly with output. There can, therefore, be no efficiency variance. We have, however, analysed this cost into an expenditure and an efficiency variance as you will see.

The starting point is:

variable production overheads variance = (standard hours for the actual production × overhead absorption rate) – actual variable overheads

ACTIVITY

A company has budgeted for 10 standard hours to produce 1 unit. Its variable overhead absorption rate is £1 per direct labour hour. In 1,600 actual hours, 180 units are produced and the variable production costs incurred are £2,000. Calculate the variable production overheads variance.

ACTIVITY FEEDBACK

The actual production of 180 units should take 180 × 10 = 1,800 hours

variable production overheads variance = (standard hours for the actual production × overhead absorption rate) – actual variable overheads

= (1,800 × £1) – £2,000

= £1,800 – £2,000

= (£200).

There is an adverse variance of £200.

The variable production overheads variance can be sub-divided into:

efficiency variance = (standard hours for the actual production – actual hours worked) × overhead absorption rate

expenditure variance = (actual hours worked × overhead absorption rate) – actual variable overhead

ACTIVITY

Analyse the adverse variance of £200, found in the last activity, into the efficiency and expenditure variances.

ACTIVITY FEEDBACK

Your calculations should be as follows:

efficiency variance = (standard hours for the actual production – actual hours worked) × overhead absorption rate

= (1,800 – 1,600) × £1

= £200, which is favourable.

Fewer hours were worked to produce the 180 units than were budgeted for.

Expenditure variance = (actual hours worked × overhead absorption rate) – actual variable overhead

= (1,600 × £1) – £2,000

= (£400)

The overall adverse variance arises because the absorption rate of £1 per direct labour hour was predetermined and, since fewer units were produced than budgeted for, there is an under-recovery.

Fixed production overheads variance

This does not quite follow the pattern set by the variable production overheads variance in the same way that direct labour follows direct materials, since the analysis is more complicated. This time the starting point is:

fixed production overheads variance = (standard hours for the actual production × fixed overhead absorption rate) – actual fixed overheads

This is similar to the variance formula for the variable overhead.

ACTIVITY

If the production process referred to in the last activity used a fixed overhead absorption rate of £2 per direct labour hour, and fixed overheads were £3,200, calculate the fixed production overheads variance.

ACTIVITY FEEDBACK

The calculation should look as follows:

fixed production overheads variance =		(standard hours for the actual production × fixed overhead absorption rate) – actual fixed overheads
	=	(1,800 × £2) – £3,200
	=	£3,600 – £3,200
	=	£400, which is of course favourable.

This variance can be analysed into:

- Expenditure variance.
- Volume variance, which can be further analysed into:
  - Capacity variance.
  - Productivity variance.

Expenditure variance

This is simply the budgeted fixed overheads less the actual fixed overheads.

expenditure variance =	budgeted fixed overheads – actual fixed overheads

If, in the example above, the budgeted fixed overheads had been £4,000 the expenditure variance would be:

expenditure variance = budgeted fixed overheads – actual fixed overheads

= £4,000 – £3,200

= £800

Since actual expenditure was less than budget, the overhead absorption rate was higher than necessary.

Volume variance

The volume variance is:

volume variance = (standard hours for actual production × overhead absorption rate) – budgeted overhead

ACTIVITY

Write down whether you think the volume variance for our example will be favourable or adverse, then do the calculation to check your answer.

ACTIVITY FEEDBACK

The overall fixed overhead variance is a favourable one of £400, and since the expenditure component is also a favourable one of £800, we would expect the volume variance to be an adverse one of £400. The calculation is:

volume variance = (standard hours for actual production × overhead absorption rate) – budgeted overhead

= (1,800 × £2) – £4,000

= £3,600 – £4,000

= (£400) as predicted.

The volume variance is adverse because fewer units have been produced than budget, so less overhead has been absorbed.

The volume variance can be analysed into the capacity and productivity variances.

Capacity variance

This is:

capacity variance = (actual hours worked × overhead absorption rate) – budgeted fixed overhead

ACTIVITY

Using the figures from the same example, calculate this variance.

ACTIVITY FEEDBACK

You should have:

capacity variance = (actual hours worked × overhead absorption rate) – budgeted fixed overhead

= (1,600 × £2) – £4,000

= £3,200 – £4,000

= (£800)

The capacity variance is adverse because fewer hours than budget were worked. If the situation is the other way round, and more hours are worked, a capacity variance will be favourable because a firm has been able to use more hours than budgeted and should therefore be capable of producing more units.

Productivity variance

This is:

productivity variance = (standard hours for actual production – actual hours worked) × overhead absorption rate

ACTIVITY

Write down whether you think the productivity variance for our example will be favourable or adverse then do the calculation to check your answer.

ACTIVITY FEEDBACK

The volume variance is an adverse one of £400, and since the capacity component is also an adverse one of £800, we would expect the productivity variance to be a favourable one of £400. The calculation is:

productivity variance = (standard hours for actual production – actual hours worked) × overhead absorption rate

= (1,800 –1,600) × £2

= £400 as predicted.

Summary

We have covered quite a lot in the presentation of the variances and a summary of them is given below:

direct materials cost variance
= (standard usage × standard price) – (actual usage × actual price)

usage variance
= (standard usage for actual production – actual usage) × standard price

price variance
= (standard price – actual price) × actual usage

direct labour cost variance
= (standard hours × standard rate) – (actual hours × actual rate)

efficiency variance
= (standard hours for actual production – actual hours) × standard rate

rate variance
= (standard rate – actual rate) × actual hours

variable production overheads variance
= (standard hours for the actual production
× overhead absorption rate) – actual variable overheads

efficiency variance
= (standard hours for the actual production – actual hours worked)
× overhead absorption rate

expenditure variance
= (actual hours worked × overhead absorption rate)
– actual variable overhead

fixed production overheads variance
= (standard hours for the actual production × fixed overhead
absorption rate) – actual fixed overheads

expenditure variance
= budgeted fixed overheads – actual fixed overheads

volume variance
= (standard hours for actual production × fixed overhead
absorption rate) – budgeted overhead

capacity variance
= (actual hours worked × fixed overhead absorption rate)
– budgeted fixed overhead

productivity variance
= (standard hours for actual production – actual hours worked)
× fixed overhead absorption rate.

You should now try applying these to the information given in the next activity.

ACTIVITY

A company has budgeted for the following costs in manufacturing 1,000 units during the first quarter of 2007:

	£ per pair
Direct materials (3 metres @ £5 per metre)	15
Direct labour (4 hours @ £4 per hour)	16
Variable overheads (£5 per direct labour hour)	20
Fixed overheads (£5.50 per direct labour hour)	22
Total budgeted cost per unit	73

During the quarter 1,100 units were produced incurring the following costs:

Direct materials were 4 metres @ £4 per metre

Direct labour was 3 hours @ £5 per hour

Variable overheads were £20,000

Fixed overheads were £25,000

Calculate the direct materials cost variance, the direct labour cost variance, the variable overheads variance and the fixed overheads variance, with each one analysed into its component variances.

ACTIVITY FEEDBACK

The calculations are as follows:

direct materials cost variance = (standard usage × standard price) – (actual usage × actual price)

= (3 × 1,100 × £5) – (4 × 1,100 × £4)

= £16,500 – £17,600

= (£1,100)

Remember to calculate the standard usage of the actual units produced.

This adverse variance is made up of:

usage variance	=	(standard usage for actual production – actual usage) × standard price
	=	(3,300 – 4,400) x £5
	=	(£5,500)
price variance	=	(standard price – actual price) × actual usage
	=	(£5 – £4) × 4,400 = £4,400
direct labour cost variance	=	(standard hours × standard rate) – (actual hours × actual rate)
	=	(4 × 1,100 × £4) – (3 × 1,100 × £5)
	=	£17,600 – £16,500
	=	£1,100

This is a favourable variance that can be analysed into:

efficiency variance	=	(standard hours for actual production – actual hours) × standard rate
	=	(4,400 – 3,300) x £4
	=	£4,400
rate variance	=	(standard rate – actual rate) × actual hours
	=	(£4 – £5) × 3,300
	=	(£3,300)

variable production overheads variance = (standard hours for the actual production × overhead absorption rate) – actual variable overheads

	=	(1,100 × 4 × £5) – £20,000
	=	£22,000 – £20,000
	=	£2,000

This favourable variance can be analysed into:

efficiency variance = (standard hours for the actual production – actual hours worked) × overhead absorption rate

= (4,400 – 3,300) × £5

= £5,500

expenditure variance = (actual hours worked × overhead absorption rate) – actual variable overhead

= (3,300 × £5) – £20,000

= £16,500 – £20,000

= (£3,500)

fixed production overheads variance = (standard hours for the actual production × overhead absorption rate) – actual fixed overheads

= (4 × 1,100 × £5.50) – £25,000

= £24,200 – £25,000

= (£800)

This adverse variance can first of all be analysed into:

expenditure variance = budgeted fixed overheads – actual fixed overheads

= (4 × 1,100 × £5.50) – £25,000

= £22,000 – £25,000

= (£3,000)

volume variance = (standard hours for actual production × overhead absorption rate) – budgeted overhead

= (4,400 × £5.50) – £22,000

= £24,200 – £22,000

= £2,200

The favourable volume variance comprises:

capacity variance	=	(actual hours worked × overhead absorption rate) – budgeted fixed overhead
	=	(3,300 × £5.50) – £22,000
	=	£18,150 – £22,000
	=	(£3,850)
productivity variance	=	(standard hours for actual production – actual hours worked) × overhead absorption rate
	=	(4400 – 3300) × £5.50
	=	£6,050

We can summarise the variances as follows:

	£
Direct materials cost variance	(1,100)
Direct labour cost variance	1,100
Variable production overheads variance	2,000
Fixed production overheads variance	(800)
Total overall variance	£1,200

The overall favourable variance can be determined in a single calculation by comparing the standard and actual cost of the units produced:

	Standard cost of 1,100 units		Actual cost
Direct materials £15 per unit	16,500	£16 per unit	17,600
Direct labour £16 per unit	17,600	£15 per unit	16,500
Variable overheads £5 per direct labour hour (4,400)	22,000	actual	20,000
Fixed overheads £5.50 per direct labour hour	24,200	actual	25,000
Total costs of 1,100 units	80,300		79,100

This confirms the overall favourable variance of £1,200.

Performance measures

The information that you have used to calculate variances can also be used to calculate three measures of a firm's efficiency in its production. All are based on the direct labour hours and the standard hour.

Efficiency ratio

This is the basic ratio that compares the standard hour for the actual production with the hours worked, but expresses it as a percentage:

$$\text{efficiency ratio} = \frac{\text{standard hours produced}}{\text{direct labour hours worked}} \times 100$$

ACTIVITY

In the first two activities in this section you found that a firm had a standard hour of 100 units of production, and that on two particular days, 800 and 740 units were produced respectively. If, on both days, 7½ hours were actually worked, what is the efficiency ratio for each day?

ACTIVITY FEEDBACK

On the first day $\frac{800}{100} = 8$ standard hours are produced, so the efficiency ratio is:

$$\frac{8}{7.5} \times 100 = 106.67\%.$$

On the second day $\frac{740}{100} = 7.4$ standard hours are produced so the efficiency ratio is:

$$\frac{7.4}{7.5} \times 100 = 98.67\%.$$

The efficiency ratio measures whether the firm has produced units in more or less hours than were budgeted for. On the first day the firm has

been more efficient by producing more units that the time allowed for, whereas on the second day, the efficiency rate has fallen to below 100% because fewer units than would be expected in the time allowed, have been produced.

Capacity ratio

This compares the actual hours with the budgeted hours, to see whether all of the budgeted hours have been utilised.

$$\text{capacity ratio} = \frac{\text{direct labour hours worked}}{\text{budgeted hours}} \times 100$$

ACTIVITY

If the firm in the previous activity is budgeted to work 8 standard hours per day, calculate the capacity ratio for each day.

ACTIVITY FEEDBACK

The capacity ratios are the same for each day:

$$\text{capacity ratio} = \frac{\text{direct labour hours worked}}{\text{budgeted hours}} \times 100$$

$$= \frac{7.5}{8} \times 100$$

$$= 93.75\%.$$

The capacity ratio measures whether all the budgeted labour hours have been used in the actual production. In this case not all the budgeted hours have been used.

Production volume ratio

The third ratio compares the standard hours produced with the budgeted hours, giving a measure of whether the firm has been effective in utilising the budgeted hours:

$$\text{production volume ratio} = \frac{\text{standard hours produced}}{\text{budgeted hours}} \times 100$$

ACTIVITY

Calculate the production volume ratio for each day using the information from the previous activities.

ACTIVITY FEEDBACK

You should have found this straightforward.

$$\text{production volume ratio} = \frac{\text{standard hours produced}}{\text{budgeted hours}} \times 100$$

$$\text{first day} = \frac{8}{8} \times 100 = 100\%$$

$$\text{second day} = \frac{7.4}{8} \times 100 = 92.5\%.$$

This ratio is a measure of how effective the firm has been in using the budgeted direct labour hours.

ACTIVITY

Calculate the three performance measures for the firm referred to in the activity on page 187 and comment on the results.

ACTIVITY FEEDBACK

Your results should be as follows:

$$\text{efficiency ratio} = \frac{\text{standard hours produced}}{\text{direct labour hours worked}} \times 100$$

$$= \frac{4{,}400}{3{,}300} \times 100 = 133.33\%$$

$$\text{capacity ratio} = \frac{\text{direct labour hours worked}}{\text{budgeted hours}} \times 100$$

$$= \frac{3{,}300}{4{,}000} \times 100 = 82.5\%$$

$$\text{production volume ratio} = \frac{\text{standard hours produced}}{\text{budgeted hours}} \times 100$$

$$= \frac{4{,}400}{4{,}000} \times 100 = 110\%$$

The budget level of production was 1,000 units, each expected to take 4 hours of direct labour, so the total budget for direct labour hours was 4,000, but 1,100 units were produced each taking 3 hours, so the actual direct labour hours were 3,300. Thus the units were produced with greater efficiency, as shown by the 133.33% efficiency ratio, and not all the budgeted hours were needed, as shown by the capacity ratio.

KEY POINTS

The key points from the last few pages of this section are:

1. A series of variances can be calculated by comparison of standard, budgeted costs with the actual costs for a period. Favourable variances reflect an increase in profits while adverse variances reflect a reduction in profits.

2. The formulae for these variances have already been summarised for you on page 185.

3. In addition, three measures of performance can be calculated from the same data. These are:

$$\text{efficiency ratio} = \frac{\text{standard hours produced}}{\text{direct labour hours worked}} \times 100$$

$$\text{production volume ratio} = \frac{\text{standard hours produced}}{\text{budgeted hours}} \times 100$$

$$\text{capacity ratio} = \frac{\text{direct labour hours worked}}{\text{budgeted hours}} \times 100$$

The standard cost operating statement

The information that you have been working on up to now might seem as though it consists of an unconnected series of arithmetical calculations. The calculations are necessary, but an operating statement will be used to summarise all the variances that you have seen in order to present information to management This statement will also include sales variances.

Sales variances

You may think it odd to talk about sales variances in a section about standard costing, but their inclusion in an operating statement can give managers more information about the whole business of the firm and not just its production costs side. The inclusion of sales variances turns a costs statement into an operating statement.

The standard unit cost has been calculated on an absorption costing basis, with elements of direct materials and labour costs, variable and fixed overheads. For consistency, we will also use a calculation of sales variances on an absorption costing basis using the standard profit per unit, although a marginal costing basis can be used, with the standard contribution per unit.

Example:

A firm had budgeted for the production of 1,000 units but produced 1,100. Suppose that the budgeted selling price was £100 with a standard cost per unit of £70, while the actual selling price was £95.

This time we will build up the formula for the sales variance. There are two sub variances: selling price and sales volume profit.

price variance = (actual selling price – budgeted selling price) × actual quantity produced

ACTIVITY

Calculate the selling price variance for the example above.

ACTIVITY FEEDBACK

This is straightforward:

selling price variance	=	(actual selling price – budgeted selling price) × actual quantity produced
	=	(£95 – £100) × 1,100
	=	(£5) × 1,100
	=	(£5,500).

The sales volume profit variance uses the standard profit in the formula:

sales volume profit variance	=	(actual quantity – budgeted quantity) × standard profit

The standard profit is obtained by deducting the standard unit cost from the budgeted selling price. Do not worry about using the standard cost at this point because if there are any cost variances they will show up in the analysis of the cost variances that forms part of the operating statement.

ACTIVITY

Using the same information as before, calculate the sales volume profit variance.

ACTIVITY FEEDBACK

Standard profit	=	budgeted selling price – standard cost
	=	£100 – £70 = £30.
Sales volume profit variance	=	(actual quantity – budgeted quantity) × standard profit
	=	(1,100 – 1,000) × £30
	=	£3,000.

The sales variance, combining the two sub-variances is given by the formula:

sales variance	=	[(actual selling price per unit – standard cost per unit) × actual quantity] – (budgeted quantity × standard profit per unit)

ACTIVITY

Write down what you expect the sales variance to be, then check it using the above formula.

ACTIVITY FEEDBACK

The selling price variance was an adverse variance of £5,500 and the sales volume profit variance was a favourable variance of £3,000 so you would expect the sales variance to be an adverse variance of £2,500. The formula is:

sales variance	=	[(actual selling price per unit – standard cost per unit) × actual quantity] – (budgeted quantity × standard profit per unit)

= [(£95 – £70) × 1,100] – (1,000 × £30)

= [£25 × 1,100] – £30,000

= £27,500 – £30,000

= (£2,500) as anticipated.

Operating statements

There are no new techniques to learn in the production of an operating statement, since it simply brings together both the sales and the cost variances in order to reconcile the budgeted profit with the actual profit. There is no prescribed layout as there is with a set of financial accounts, but the pro-forma in the next activity should serve to explain the idea to you.

Example:

In the activity on page 187 you were given information about a company from which you calculated the series of cost variances. You now have the following additional information about sales:

All 1,100 units of production were sold for £130 per unit.

The budgeted selling price was £120 per unit.

ACTIVITY

Use the following pro-forma to calculate the actual margin on sales:

	£
Budgeted profit	
Sales volume profit variance	
Standard margin of actual sales	
Selling price variance	
Actual margin	

ACTIVITY FEEDBACK

The pro-forma should look like this:

	£	Comments
Budgeted profit	47,000	(£120 – £73) × 1,000
Sales volume profit variance	4,700	(1,100 – 1,000) × £47. Favourable, so it is added
Standard margin of actual sales	51,700	
Selling price variance	11,000	(£130 – £120) × 1,100. Again favourable, so added
Actual margin	£62,700	

The full operating statement will then extend this by summarising the variances.

ACTIVITY

Look back to the series of activities in which you calculated the variances, and use them to complete the operating statement shown below:

	£
Budgeted profit	47,000
Sales volume profit variance	4,700
Standard margin of actual sales	51,700
Selling price variance	11,000
Actual margin	£62,700

			£
Cost variances	**Favourable**	**Adverse**	
Materials price			
Materials usage			
Labour rate			
Labour efficiency			
Variable expenditure			
Variable efficiency			
Fixed expenditure			
Fixed capacity			
Fixed productivity			
Totals			
Operating profit			£63,900

ACTIVITY FEEDBACK

	£
Budgeted profit	47,000
Sales volume profit variance	4,700
Standard margin of actual sales	51,700
Selling price variance	11,000
Actual margin	£62,700

			£
Cost variances	**Favourable**	**Adverse**	
Materials price	4,400		
Materials usage		5,500	
Labour rate		3,300	
Labour efficiency	4,400		
Variable expenditure		3,500	
Variable efficiency	5,500		
Fixed expenditure		3,000	
Fixed capacity		3,850	
Fixed productivity	6,050		
Totals	20,350	19,150	1,200
Operating profit			£63,900

Benefits of standard costing

The benefits of standard costing are those associated with planning and the need for management decisions:

- It establishes standards with which the actual costs of production can be compared.
- In order to establish and maintain a standard costing system, an organisation's operation must be examined.

This examination may reveal existing problems that can be corrected.

- It enables management by exception, or investigation of areas where variances occur, which ought to lead to greater efficiencies. The analysis of the variances highlights the problem areas.
- It should enable cost control.
- It presents a series of production and cost targets at which employees and managers can aim.

ACTIVITY

What disadvantages do you think there might be with such a system?

ACTIVITY FEEDBACK

Some of the disadvantages are similar to those of budgetary control systems, so you may have thought of the following:

- It may be difficult and expensive to set up and maintain. A standard costing system certainly requires a great deal of record keeping.
- It will need regular updating. Costs rarely remain constant for very long, so costing periods are usually quite short. This has particular application if the firm is basing its selling price on its costs, as it would be foolish to base a selling price on out-of-date information.
- The information provided in a costing system needs to be easily understood by non-accountants, and this can often be difficult, as you have probably realised from calculating the above variances!

KEY POINTS

The key points from the last few pages are:

1. An operating statement can be compiled to bring together both sales and costs variances to show the effect of the variances on the budgeted profit.

2. The sales variance is given by the formula:

$$\textit{sales variance} = [(\text{actual selling price per unit} - \text{standard cost per unit}) \times \text{actual quantity}] - (\text{budgeted quantity} \times \text{standard profit per unit})$$

3. The sales variance can be sub divided into:

$$\textit{selling price variance} = (\text{actual selling price} - \text{budgeted selling price}) \times \text{actual quantity}$$

$$\textit{sales volume profit variance} = (\text{actual quantity} - \text{budgeted quantity}) \times \text{standard profit.}$$

We now leave the subject of costing in its various forms, budgeting and variance analysis. You should now try all the self-assessment questions before going on to the next section, which concerns the subject of capital investment appraisal techniques.

SELF-ASSESSMENT QUESTIONS

Question 1

Which of these best describes the standard cost?

a) The ideal cost that the firm should pay.

b) The budgeted cost of total production.

c) The budgeted cost of a unit of production.

d) The amount of work that should be produced under standard conditions.

Question 2

What does the standard cost of a unit of production include?

a) Direct materials and labour only.

b) Direct costs and variable overheads only.

c) Selling price less all budgeted costs.

d) Direct costs and variable and fixed production overheads.

Question 3

A firm produces 30 units a day, working 7.5 standard hours. Use this information to explain the meaning of a standard hour.

Question 4

A standard costing system has budgeted for the production of 2,000 units per month. Each unit uses 4 metres of wood @ £ 0.50 per metre and 20 screws @ £0.20 for 10. According to the actual results, 2,100 units were produced using 8,400 metres of wood @ £0.52 per metre and 41,000 screws @ £0.21 for 10. Calculate the direct materials cost variance, and show the analysis into the usage and price variances.

Question 5

The same costing system referred to in the last question also budgeted for 4 hours of cutting @ £4.50 per hour and 6 hours of finishing @ £5 per hour, for each unit. The actual results showed that production of the 2,100 units required 8,800 hours cutting @ £4.65 per hour and 12,100 hours of finishing @ £5.25 per hour. Calculate the direct labour cost variance, and show the analysis into the rate and efficiency variances.

Question 6

Using the same system again, the budgeted variable overheads are £3 per unit, while the budgeted fixed overheads, based on direct labour hours, are £3 per hour for cutting and £4 per hour for finishing. The actual results showed the variable overheads to be £6,400 and the fixed overheads to be £24,700 for cutting and £50,500 for finishing. What are the variable and fixed production overhead variances?

Question 7

Calculate the fixed overhead expenditure and volume variances using the information from the last question.

Question 8

All production is sold. The estimated selling price was £150 per unit and the actual selling price was £160 per unit. Calculate the sales variance and the subdivisions of this variance.

Question 9

From the variances that you have calculated over the last five questions draw up an operating statement to show the effect on the firm's budgeted profit. (You might find it helpful to work out the budgeted and the actual profit before you begin, as a check.)

Question 10

Calculate the performance ratios of the firm above, and use them to advise the management concerning its investigations into the firm's problems.

ANSWERS TO SELF-ASSESSMENT QUESTIONS

Answer 1

The correct answer is c, the standard cost is the budgeted cost of a unit of production.

Answer 2

The correct answer is d, the standard cost of a unit of production includes direct costs, and variable and fixed production overheads.

Answer 3

In standard costing a standard hour is not a measure of time but of performance, being the period during which a set amount of work is to be completed. If the firm in question produces 30 units in a 7.5 hour day its standard hour is 4 units of production.

Answer 4

The variances, calculated with reference to actual output of 2,100 units are:

direct materials cost variance = (standard usage × standard price) – (actual usage × actual price)

	=	[(2,100 × 4 × £0.50) + (2,100 × 20 × £0.02)] – [(8,400 × £0.52) + (41,000 × £0.021)]
	=	[£4,200 + £840] – [£4,368 + £861]
	=	£5,040 – £5,229
	=	(£189)
usage variance	=	(standard usage for actual production – actual usage) × standard price
	=	[(8,400 – 8,400) × £0.50] + [(42,000 – 41,000) × £0.02]
	=	0 + £20
	=	£20
price variance	=	(standard price – actual price) × actual usage
	=	[(£0.50 – £0.52) × 8,400] + [(£0.02 – £0.021) × 41,000]
	=	(£168) + (£41)
	=	(£209)

You may have calculated the variances for the wood and the screws separately, in which case you should have:

	Wood	Screws
Materials cost variance	(£168)	(£21)
Usage variance	Nil	£ 20
Price variance	(£168)	(£41)

Answer 5

The variances, again calculated with reference to actual output of 2,100 units are:

direct labour cost variance	=	(standard hours × standard rate) – (actual hours × actual rate)
	=	[(2,100 × 4 × £4.50) + (2,100 × 6 × £5)] – [(8,800 × £4.65) + (12,100 × £5.25)]

	=	[£37,800 + £63,000] – [£40,920 + £63,525]
	=	£100,800 – £104,445
	=	(£3,645)
efficiency variance	=	(standard hours for actual production – actual hours) × standard rate
	=	[(8,400 – 8,800) × £4.50] + [(12,600 – 12,100) × £5]
	=	(£1,800) + £2,500
	=	£700
rate variance	=	(standard rate – actual rate) × actual hours
	=	[(£4.50 – £4.65) × 8,800] + [(£5 – £5.25) × 12,100]
	=	(£1,320) + (£3,025)
	=	(£4,345)

Again, you may have calculated the variances for cutting and finishing separately, in which case you should have:

	Cutting	Finishing
Labour variance	(£3,120)	(£525)
Efficiency variance	(£1,800)	£2,500
Rate variance	(£1,320)	(£3,025)

Answer 6

The usual calculation, using an absorption rate, is:

variable production overheads variance
= (standard hours for the actual production × overhead absorption rate)
– actual variable overheads.

In this question you are told that the variable overheads are simply £3 per unit so you should have:

variable production overheads variance	=	(actual production × overhead absorption rate) – actual variable overheads
	=	(2,100 × £3) – £6,400
	=	£6,300 – £6,400
	=	(£100)
fixed production overheads variance	=	(standard hours for the actual production × overhead absorption rate) – actual fixed overheads
	=	[(8,400 × £3) + (12,600 × £4)] – (£24,700 + £50,500)
	=	[£25,200 + £50,400] – £75,200
	=	£75,600 – £75,200
	=	£400

Answer 7

The fixed production overheads variance was a favourable one of £400. This can be sub-divided into the expenditure and volume variances as follows:

Expenditure variance	=	budgeted fixed overheads – actual fixed overheads
	=	(4 × £3 × 2,000) + (6 × £4 × 2,000) – £75,200
	=	£24,000 + £48,000 – £75,200
	=	(£3,200)

Remember that the budgeted fixed overheads are based on production of 2,000 units.

Volume variance	=	(standard hours for actual production × overhead absorption rate) – budgeted overhead
	=	(4 × £3 × 2,100) + (6 × £4 × 2,100) – £72,000
	=	£75,600 – £72,000
	=	£3,600

The volume variance can be further sub-divided into:

Capacity variance	=	(actual hours worked × overhead absorption rate) – budgeted fixed overhead
	=	(8,800 × £3) + (12,100 × £4) – £72,000
	=	£26,400 + £48,400 – £72,000
	=	£2,800
Productivity variance	=	(standard hours for actual production – actual hours worked) × overhead absorption rate
	=	[(8,400 – 8,800) × £3] + [(12,600 – 12,100) × £4]
	=	(£1,200) + £2,000
	=	£800

Answer 8

The standard profit per unit is given as follows:

		£	
Selling price		150.00	
Less : standard costs			
4m wood @ 0.50	2.00		
20 screws @ 0.20 per 10	0.40		
4 hours @ £4.50	18.00		
6 hours @ £5	30.00		50.40
		99.60	
Variable overheads	3.00		
Fixed overheads 4 hours @ £3	12.00		
6 hours @ £4	24.00		39.00
Profit		60.60	

Sales variance	=	[(actual selling price per unit – standard cost per unit) × actual quantity] – (budgeted quantity × standard profit per unit)
	=	[(£160 – £89.40) × 2,100 – (2,000 × £60.60)

= [£70.60 × 2,100] – £121,200

= £148,260 – £121,200

= £27,060

This is made up of:

selling price variance = (actual selling price – budgeted selling price) × actual quantity

= (£160 – 150) × 2,100

= £21,000

sales volume profit variance = (actual quantity – budgeted quantity) × standard profit

= (2,100 – 2,000) × £60.60

= £6,060

Answer 9

The budgeted and actual profits are as follows:

	Budget			Actual	
	£	£		£	£
Sales 2,000 @ £150		300,000	2,100 @ £160		336,000
Less					
Material costs					
4m wood @ 0.50p	4,000		8,400m @ 0.52p	4,368	
20 screws @ 20p/10	800	(4,800)	41,000 @ 21p/10	861	(5,229)
Labour					
4 hours @ £4.50	36,000		8,800 @ £4.65	40,920	
6 hours @ £5	60,000	(96,000)	12,100 @ £5.25	63,525	(10,444)
Variable overheads		(6,000)	variable		(6,400)
Fixed overheads			fixed		
£3 ? 4 ? 2,000		(24,000)	cutting		(24,700)
£4 ? 6 ? 2,000		(48,000)	finishing		(50,500)
Profit		£121,200			£144,726

The operating costs statement should look like this:

Operating statement

	£
Budgeted profit	121,200
Sales volume profit variance	6,060 F
Selling price variance	21,000 F
	148,260

Cost variances	Favourable £	Adverse £	£
Materials wage	20		
Materials price		209	
Labour rate		4,345	
Labour efficiency	700		
Variable overhead		100	
Fixed expenditure		3,200	
Fixed volume	3,600		
	4,320	7,854	3,534 A
Actual profit			£144,726

Answer 10

You need to calculate the standard hours produced before working out the ratios. In the budget each unit was allowed 4 hours cutting plus 6 hours finishing so the standard hours of the actual production are:

$$(6 + 4) \times 2{,}100 = 21{,}000$$

The actual hours worked are: 8,800 cutting plus 12,100 finishing, a total of 20,900.

The performance ratio calculations are:

$$\text{efficiency ratio} = \frac{\text{standard hours produced}}{\text{direct labour hours worked}} \times 100$$

$$= \frac{21{,}000}{20{,}900} \times 100 = 100.48\%$$

$$\text{capacity ratio} = \frac{\text{direct labour hours worked}}{\text{budgeted hours}} \times 100$$

$$= \frac{20{,}900}{20{,}000} \times 100 = 104.5\%$$

$$\text{production volume ratio} = \frac{\text{standard hours produced}}{\text{budgeted hours}} \times 100$$

$$= \frac{21{,}000}{20{,}000} \times 100 = 105\%$$

Although there is an overall adverse variance of £3,534 on costs, these ratios demonstrate that the firm is working at average levels of efficiency and capacity, producing more than was budgeted for in less time. There is an adverse expenditure variance on fixed overheads that would repay investigation although this is balanced out by a favourable volume variance. The most pressing problem is the £4,345 adverse labour rate variance, which suggests that the firm is using a higher grade of labour than might be necessary for this production. The favourable labour efficiency variance does not compensate for this.

Unit 8

Working Capital Management

LEARNING OUTCOMES

At the end of this unit the student will be able to:

1. Differentiate between working and permanent capital.
2. Critically explain the effect of the cyclical flow of working capital.
3. Critically assess the components of the working capital cycle using ratios.
4. Strategically manage the balance between liquidity and profitability.

Introduction

The meaning of working capital

The capital of a business is represented by the amount invested in it. The term 'capital' covers not just share capital but also reserves, debentures and long term liabilities.

The capital of a company can be invested or used in two ways:

- As *permanent* capital, employed in fixed assets such as buildings, plant or vehicles.
- As *working* capital required because the company has to pay for goods and services before recovering the money from customers, and represented by the difference between current assets and current liabilities.

We can rewrite the equation:

fixed assets + current assets = total liabilities

as:

fixed assets + working capital = total capital employed

ACTIVITY

Here is a very simple balance sheet:

	£000	£000
Fixed assets		145
Current assets	840	
less: current liabilities	340	500
Total assets		645
Long-term liabilities		310
		335
Share capital		100
Reserves		235
		335

1. Use these figures to show that:

   Fixed assets + current assets = total liabilities.

2. How are the total liabilities made up?

3. Which of the total liabilities represent capital?

(If you have any difficulties, do refer to the level 1 module.)

ACTIVITY FEEDBACK

1. From the balance sheet:

   Fixed assets + current assets = £145 + £840 = £985

   Total liabilities = current liabilities + long term liabilities + share capital + reserves

   = £340 + £310 + £100 + £235 = £985

   So fixed assets + current assets = total liabilities.

2. The total liabilities are made up of:

   – the current liabilities, which as you know are always deducted from current assets in the balance sheet

   – long-term liabilities such as long-term loans and debentures.

   – owners' equity which includes share capital, share premium accounts and reserves.

3. You may have said that long-term liabilities and the owners' equity represent capital, but we will now develop the term capital to include the current liabilities.

ACTIVITY

Using the figures in the last activity to help you, show how the above equation is achieved.

ACTIVITY FEEDBACK

You should have:

Equation	Using figures from last activity
Fixed assets + current assets = total liabilities	£145 + £840 = £985
Fixed assets + current assets = current liabilities + long term liabilities + share capital + reserves	£145 + £840 = £340 + £310 + £100 + £235 = £985
Fixed assets + current assets – current liabilities = long term liabilities + share capital + reserves	£145 + £840 – £340 = £310 + £100 + £235
Fixed assets + working capital = total capital employed	£145 + £500 = £645

This clearly expresses the ways that the capital of a business can be represented, either in fixed assets that enable the business to trade and generate profit, or in the working capital equation of:

working capital = stocks + debtors + cash – creditors

Working capital, the excess of current assets over current liabilities or net current assets, represents the amount invested in assets expected to be realised within a year. As the name suggests it is not permanent and will be turned over many times during the year. It is used to finance production, invest in stock and provide credit for customers. It is financed by:

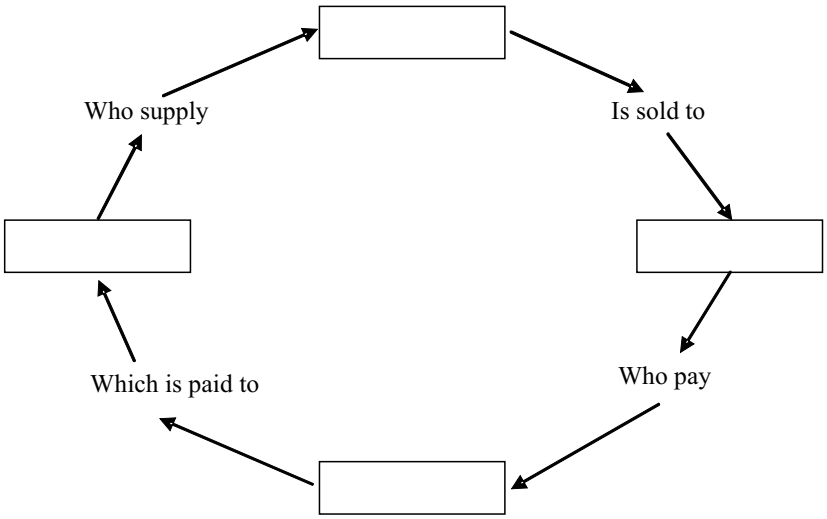
current liabilities or long term capital such as shares and debentures

As you know from your studies at level 1, the essential difference between fixed assets and current assets is their level of permanence. Fixed assets are bought for use in the business, to enable it to trade, while current assets are impermanent. Stock is sold and becomes cash or debtors, if sold on credit. Cash is used to pay current liabilities or creditors. This change in the nature of current assets is constant during the day-to-day running of the business, and part of a management accountant's task is to ensure that this flow change happens with consistency. This change or flow can be represented as a cycle.

The working capital cycle and its management

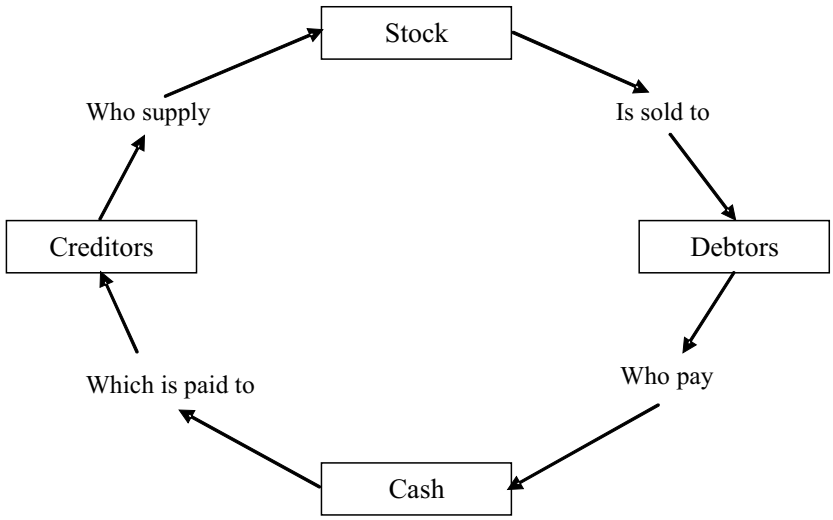
ACTIVITY

The diagram below, which you may recognise from the level 1 module, shows the working capital cycle of a business selling goods on credit, but with the components omitted. Complete the diagram by writing in the appropriate component. If you cannot remember what these are, look at section 6 of the level 1 module.



ACTIVITY FEEDBACK

Your completed diagram should look like the one below.

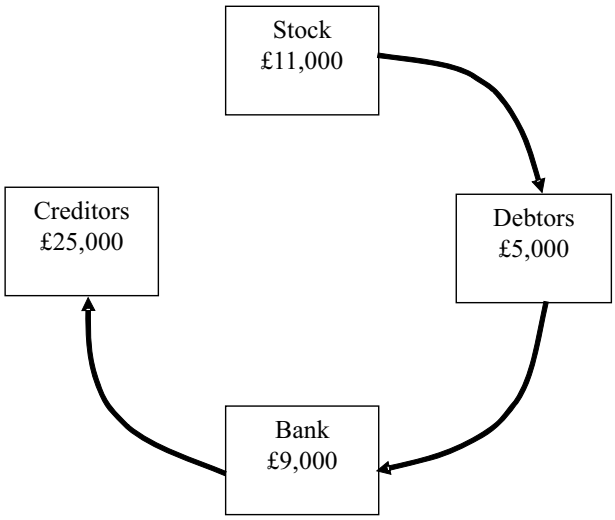


In describing the working capital cycle you can start at any point. If you take stock as the starting point, then the cycle is as follows:

- *stock* is held by the company until sold on credit to
- *debtors*, who after a period of time will pay
- *cash*, which will remain in the bank until used to pay
- *creditors*, who are owed money for the stock they supplied to the firm on credit.

ACTIVITY

A business has £11,000 stock, is owed £5,000 by its debtors, has £9,000 in the bank and owes £25,000 to creditors. It now ceases to trade, so no more stock is bought. The working capital cycle therefore looks like this, with no more stock being supplied:



Redraw the cycle after each of the following events:

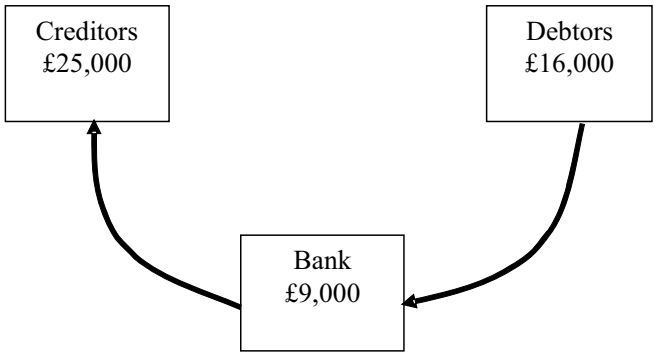
a) the remaining stock has been sold on credit

b) all the debtors have paid the firm

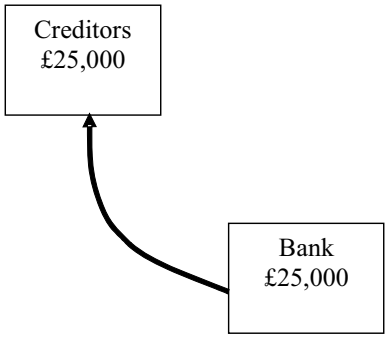
c) the firm has paid all the creditors.

ACTIVITY FEEDBACK

You should have two diagrams as follows:



All remaining stock is sold, and debtors have risen to £16,000.



All debtors have paid the company, and there is now £25,000 in the bank. When this is paid to the creditors there is no diagram to draw as the cycle has been extinguished.

The last activity used an ideal situation as an example. There was a decision to cease trading, stock was sold, debts collected and creditors were paid. There are several problems with this ideal situation, which we will come to later.

The effective management of working capital depends on achieving a balance between liquidity and successful (that is profitable) trading. There must be enough cash in the cycle to pay wages, creditors for supplies and expense creditors, and enough stock to enable a smooth flow of production to satisfy the needs of customers. So how much working capital does a firm need?

ACTIVITY

If a firm had unlimited working capital, so that there was plenty of stock to meet production needs, finished goods to meet customer needs and cash in the bank to pay creditors, how would this affect profitability?

ACTIVITY FEEDBACK

The firm is obviously keeping a larger holding of stock than necessary, incurring *extra holding costs*.

It would pay creditors promptly, losing potential *bank interest*. It may have encouraged debtors to pay promptly by giving *generous discounts*. These will all reduce the profitability of the firm.

A crude method of determining how much working capital a firm needs is to look at the ratio of its annual sales to the amount of working capital, at one point in time.

ACTIVITY

A company's year end balance sheet shows the following:

Stocks	£60,000
Debtors	£50,000
Cash	£10,000
Creditors	£40,000

The profit and loss account shows the turnover was £400,000. How many times did the working capital circulate round this firm during the year?

ACTIVITY FEEDBACK

The working capital was:

$$\text{stocks} + \text{debtors} + \text{cash} - \text{creditors}$$
$$= £60{,}000 + £50{,}000 + £10{,}000 - £40{,}000 = £80{,}000.$$

This circulated:

$$\frac{£400{,}000}{80{,}000} = 5 \text{ times during the year.}$$

In other words, working capital represented 20% of turnover.

The company in the last activity could say that it required working capital equivalent to 20% of its turnover, but the problem with this method is that the working capital situation at the year-end may not be typical of the situation throughout the year. Also the calculation only works if there are net current assets. This is one of the problems previously referred to.

You may have encountered a number of accounting ratios used to analyse sets of accounts in previous modules. Amongst these are the current and acid test ratios.

ACTIVITY

Look again at the figures given in the ideal situation of the working capital cycle in the previous activity.

1. What was the current ratio of the firm?

2. What did this ratio mean for the firm?

3. How would your answers have differed if the firm had owed its creditors £30,000?

If you cannot remember the ratios, look again at level 1 Accounting and Finance, section 6.

ACTIVITY FEEDBACK

1. You will recall from level 1 that the current ratio is given by a simple comparison of current assets to current liabilities. In this case the current assets are:

   stock + debtors + cash = £11,000 + £5,000 + £9,000 = £25,000.

   The current liabilities are £25,000 so the current ratio is 1:1.

2. A current ratio of 1:1 or above indicates that in the event of a company ceasing to trade, it can repay its current liabilities out of its current assets. You saw how this happened in an earlier activity, as the current assets were gradually turned into the £25,000 cash needed to pay the creditors.

3. If the company had owed £30,000 its current ratio would have been:

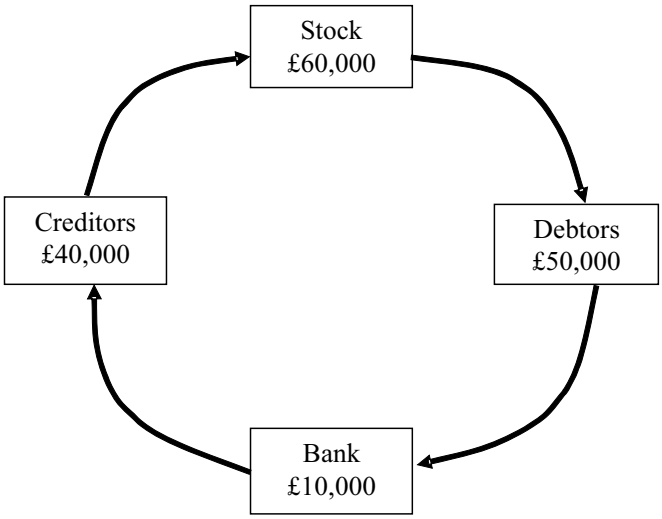
   £25,000: £30,000 or approximately 0.83:1.

   This is of course less than 1:1. A current ratio of less than 1:1 indicates that in the event of cessation, a company cannot pay its creditors from its current assets. In the above case the company would have realised £25,000 worth of current assets but would have been unable to repay all its creditors.

The current ratio and the acid test ratio, give some indication of whether there is sufficient working capital in a company. Many writers quote 2:1 as an acceptable current ratio, allowing for up to half the current assets to be held as stocks and not turned quickly into cash, leaving an acid test ratio of 1:1. However, many companies operate profitably with a ratio below this, especially those where stocks can be turned into cash before creditors need to be paid. This leads to consideration of another problem with the ideal situation: that events rarely happen in sequence.

ACTIVITY

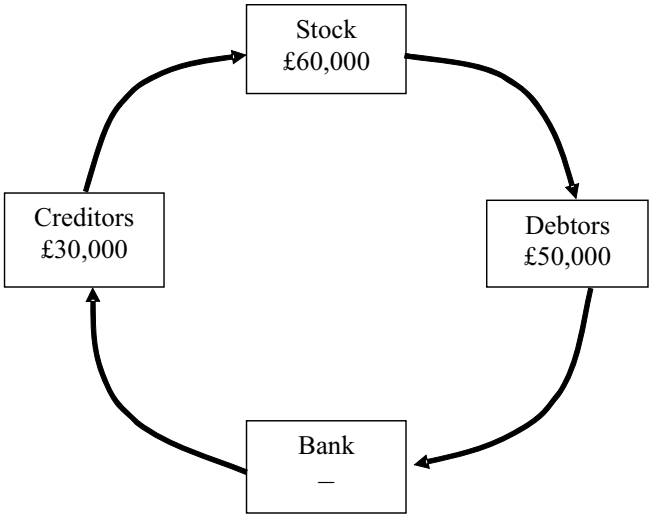
Look at the figures from the previous activity shown in the cycle of working capital:



Suppose that debtors are allowed 40 days in which to pay their debts, while creditors require payment after 30 days. Redraw the cycle, as it would look on day 30, assuming there are no movements in stock.

ACTIVITY FEEDBACK

Your diagram should look like this:



You can see that there is a problem. The amount of working capital has not changed, but its nature has. We now have:

$$\text{stocks} + \text{debtors} - \text{creditors} = £60{,}000 + £50{,}000 - £30{,}000$$

$$= £80{,}000.$$

There is no cash with which to pay the remaining £30,000 creditors who want their money now. The debtors will not pay for another 10 days. This raises a number of questions:

- Will the creditors wait?
- Will they charge interest?
- In such a situation how do you choose which creditors to pay?
- Will the debtors pay on time?

The management of the cycle is further complicated if the time taken for stock to turn around is introduced. In our simple example in the above activity we had a cycle lasting 10 days, that is:

debtors payment period – creditor payment period = 40 – 30 = 10 days.

The true length of the working capital cycle is given by the following:

working capital cycle = period goods held in stock + debtors payment period – creditors payment period

If the company is a manufacturer then the term 'goods held in stock' will expand to include the length of time raw materials are held, the production time and the length of time finished goods are held before sale.

The problem of timing is one of balancing the ideal situation against reality:

Ideally	But
Low amounts of stock should be held	This is not always practicable
Debtors will pay on time	They may delay payment
There is enough cash to pay creditors	There isn't, and the company requires an overdraft
Creditors wait for payment	They may charge interest on the debts

The basic problem is, therefore, within working capital management is therefore that of ensuring that there is enough money available to pay creditors out of current assets (liquidity) without having an adverse effect on profitability.

Look at the cycle again:

- *stock*, bought on credit, is held by the company until sold on credit to
- *debtors*, who after a period of time will pay
- *cash*, which will remain in the bank until used to pay
- *creditors*, who are owed money for the stock they supplied.

There are costs and income involved in this cycle apart from the value of the components themselves.

ACTIVITY

Complete the table below to show an example of income or expenditure potentially involved at each stage of the cycle, which would affect profitability. The first one has been done for you:

Component	Potential effect on profitability
Stock	Costs of storage and deterioration of stock, but sales may be lost if there is insufficient stock.
Debtors	
Cash	
Creditors	

ACTIVITY FEEDBACK

Here are our answers:

Component	Potential effect on profitability
Stock	Costs of storage and deterioration of stock, but sales may be lost if there is insufficient stock.
Debtors	If debtors delay payment, potential bank interest on the sums owed is lost but interest on the debts can be charged.
Cash	Interest paid to bank if the account becomes overdrawn but if debtors pay promptly, bank interest can be earned.
Creditors	Interest charged by creditors but there may be discounts for prompt payment.

There is a dilemma at each stage of the cycle:

- If the company invests in stock it will incur storage costs, but if it doesn't it may lose business through being unable to satisfy customers.
- If debtors are allowed generous credit terms, there is more chance of further business but the company has to wait for its money.
- Cash at the bank can earn interest if the account is not overdrawn, but the sums may not be significant.
- If the company pays creditors promptly its cash resources are reduced but it ensures continuation of supply. If it lags behind in its payments to creditors, cash is retained but the company's reputation may be harmed, discounts lost and interest incurred.

The current ratio and its more stringent form, the acid test ratio, measure whether there is enough cash to pay creditors at one point in time, but working capital management is an ongoing concept. We will now look at each of the components of working capital in turn, and at these dilemmas in more detail.

The working capital components

In the case of each component of the working capital cycle there is a ratio that can be used as a starting point. You covered these at level 1 but it is useful to revisit them.

Stock

Part of the assessment of a firm's efficiency is a consideration of its stock turnover ratio, which is:

$$\text{stock turnover ratio} = \frac{\text{cost of goods sold}}{\text{average stock}}$$

You could use the closing stock figure instead.

Example:

During the month of January, a clothing manufacturer sold goods costing £80,000. The opening stock was £18,000 and the closing stock was £22,000.

ACTIVITY

1. What is the stock turnover ratio?

2. How many weeks worth of stock does the company hold at any one time?

3. Why is the figure for cost of goods sold used in the calculation and not the sales value?

ACTIVITY FEEDBACK

1. The ratio is:

$$\text{stock turnover ratio} = \frac{\text{cost of goods sold}}{\text{average stock}} = \frac{£80{,}000}{£20{,}000} = 4 \text{ times.}$$

(The average stock is the average of the opening and closing stock figures.)

2. The ratio indicates that in January the company turned its stock over four times, so at any one point it held one weeks worth of stock.

3. The sales figure contains the profit element on trading, so its use would be inconsistent with the cost values used for the stock.

Alternatively, the ratio can be expressed in terms of the average age of the stock:

$$\text{stock turnover ratio} = \frac{\text{average or closing stock}}{\text{cost of sales per period}}$$

In the above example the cost of sales per week is:

$$\frac{£80{,}000}{4} = £20{,}000$$

so the average age of the stock is $\frac{£20{,}000}{£20{,}000}$ or one week.

This simple ratio provides a lot of food for thought. The company in the example was making clothes, so a turnover of four times a month is reasonable, but you would expect the stock turnover ratio to be higher, i.e. a faster turnover of stock, in a firm involved in, say, food retailing.

Successful stock management consists of keeping a balance between the holding of enough stock to avoid risks and the costs of that holding.

ACTIVITY

Think about this balance between risk and cost and write down at least three reasons why:

1. Stock, whether raw materials or finished goods, should be held.

2. Stock should not be held.

ACTIVITY FEEDBACK

1. Some reasons for holding stock, several of which are risk avoidance strategies, are:

   - to ensure a smooth production process
   - lead times may be long
   - to avoid stock-outs, that is having no stock left!
   - holding enough finished goods to satisfy customer orders
   - it may be cheaper to buy raw materials in bulk, especially to beat a price increase.

2. However, the costs involved in holding large amounts of stock include:

   - tying up part of the working capital and possibly causing cash-flow problems.
   - storage costs
   - insurance
   - risk of obsolescence or deterioration
   - order and delivery costs
   - risk of theft from warehouses.

   This means that both the time at which stock is ordered, and the amount ordered, are crucial to the management of working capital.

ACTIVITY

If you consider the benefits of holding stock against the costs, you may decide that the best time to order stock is at one of the points shown below. What are the dangers, if any, of each course of action?

Order point	Dangers
When stock runs out	
When you can obtain a discount	
When storage becomes available	
When stock levels look low	
In order to top up to a required level	
When remaining stock is sufficient to cover production until a new delivery is made	

ACTIVITY FEEDBACK

You would have to consider several factors such as the nature of the firm and the ease of obtaining supplies, but possible problems are:

Order point	Dangers
When stock runs out	This may disrupt production, and would be a disaster if further supplies could not be obtained easily.
When you can obtain a discount	This would mean that orders were placed reactively and indiscriminately. The firm could end up with too much stock in one period and no stock at all in another.
When storage becomes available	This is also a purely reactive response.
When stock levels look low	A subjective opinion of the state of a firm's stock may be an incorrect one. The low stock level may be adequate for production needs. Stock records are more reliable.
In order to top up to a required level	Traditionally, stock levels can be set for manufacturing industries but there are cost implications for holding the unused quantities.
When remaining stock is sufficient to cover production until a new delivery is made	Here, you are covering the anticipated production level and building in the time factor. Although these estimates may prove to be incorrect, this is probably the best method, but it is complicated by factors such as minimum order quantities required to obtain discounts.

As you have seen already in this module and will see again in the Operations Management module, it is possible with modern management techniques to carry very little stock if a 'just-in-time' approach is used. Retailers can use Electronic Point of Sale (EPOS) systems to control stocks. If neither of these options applies, and a company does have to store stocks of raw materials, work-in-progress or finished goods, then concepts of buffer stocks and economic order quantities must be considered. This topic will be covered in another module.

The underlying principle in working capital terms is to balance two factors:

- The need for continued production and customer satisfaction, both of which require stock to be carried.
- The costs of tying up working capital.

Increased profitability in terms of production and selling has to be balanced against the expenses involved.

Debtors

Nowadays there are very few non-retail sectors where sales of any volume are made for ready cash. Supermarkets, small high street retailers and service providers such as greengrocers and hairdressers will have virtually all their sales as cash or credit card sales. For the rest of the commercial and industrial sectors, whose sales are still made on credit, the management of debtors will form part of the management of working capital.

Debtors, unlike stock, are not excluded from the acid test ratio, being more easily converted to cash. However, any business selling goods on credit will need to encourage debtors to pay promptly in order to keep the working capital cycle flowing. The debtors ratio gives an idea of how well the credit control of the company is being managed.

The debt collection period in days is given by the formula:

$$\text{debt collection period in days} = \frac{\text{average trade debtors}}{\text{total credit sales}} \times 365$$

Alternatively, we can look at the average age of the debtors by using:

$$\text{average age of the debtors} = \frac{\text{average trade debtors}}{\text{credit sales per period}}$$

ACTIVITY

The details of a company's trading results for 2007 include the following:

Sales	£300,000
Opening debtors	£ 33,000
Closing debtors	£ 27,000

£20,000 worth of sales were made for cash.

Comment on the debt collection period.

ACTIVITY FEEDBACK

The average trade debtors is $\frac{£330,000 + £27,000}{2} = £30,000.$

You also need to adjust the sales figure for the cash sales. The debt collection period is therefore:

$$\frac{\text{average trade debtors}}{\text{total credit sales}} \times 365 = \frac{£30,000}{280,000} \times 365 = 39 \text{ days}$$

Using the alternative formula the credit sales per month are:

$$\frac{£280,000}{12} = £23,333$$

so the average trade debtors represent $\frac{£30,000}{23,333} = 1.3$ months.

In the absence of any information about what the company does, this seems to be an acceptable collection period, representing approximately six weeks. In some sectors this would be very efficient.

There are two broad aspects to the management of debtors: granting the credit and collecting the debts.

Granting credit

ACTIVITY

Imagine that you are in charge of the accounts department of a manufacturer of sports goods. A company called Gascoyne & Co. writes to you saying that they are about open a sports goods shop in London and they wish to buy stock from you on credit.

What would you want to know about Gascoyne & Co. before you made any decision?

How might you find out this information?

ACTIVITY FEEDBACK

You need to know whether the company will be able to pay its debts, so you would want to know:

- How long the company had been established.
- Whether it was a profitable company.
- How much it already owed to creditors, including its bank.
- Whether it paid its other creditors promptly.

The information can be obtained by asking the company itself for trade and bank references and taking these up, and by using the services of a credit agency to carry out a check. If the company was an established one then its past accounts would be filed at Companies Registry.

The period of credit may be a matter of form in the particular industry, to prevent competitors gaining advantage, but 30 days would be typical for many industries.

Collecting the debts

Factoring debts, passing on their collection to another company who make a charge but provide instant funds with the debtors as security, can be seen as a way of ensuring a flow of cash into the business. If this is not an option, and for many companies it isn't, then debt collection can be managed by strategies designed to persuade customers to pay promptly or early, and to avoid disputes.

ACTIVITY

How might a company persuade customers to pay more promptly?

ACTIVITY FEEDBACK

This way of improving the debt collection period might be done by offering discounts for prompt payment.

However, the offer of discounts brings us back to the problem of balance that we saw when managing stock.

ACTIVITY

What is the effect of offering discounts for early payment?

How would you decide whether it was economic to offer cash discounts?

FEEDBACK

Cash discounts are an expense of the business, to be charged to the profit and loss account, and therefore they will reduce profitability.

The effect of cash discounts on the company's profits could be compared with the cost of financing the bank overdraft facilities that could well be the alternative.

Regardless of whether discounts are offered, every company must come to terms with the fact some debtors are going to take a long time to pay and that some debtors are never going to pay. They may dispute the debt or they may have gone out of business. An effective credit control system will help this aspect of debtor management with a system of regular reminders and a clear strategy for action when it becomes apparent that a debt looks doubtful.

ACTIVITY

Your company has two debtors whose accounts are long overdue. In the case of A, the terms of the original sale contract are in dispute. In the case of B, you are aware that they cannot pay the debt. What options would you consider in these cases?

ACTIVITY FEEDBACK

In the case of A, you might consult with your company's solicitors as to whether legal action could be taken. This would, of course, involve further expense and you would have to balance this carefully against the likelihood of recovery. In the case of B, you have the option of writing the debt off to the profit and loss account or taking legal action to wind the debtor company up in the court. In either case, profitability would be affected and in the case of a winding up you would have to consider whether any of the debt would be recoverable.

The management of debtors presents a firm with the same tension as the management of stock. There is the dilemma of management wishing to increase sales, and thus profitability, by offering better credit terms than competitors, but at the potential cost of the effect on cash flow.

Cash

A business will need to hold some cash as part of its working capital, since as you have seen when looking at the cyclical nature of working capital, its sudden absence may cause problems. Cash is needed to pay creditors, and there are some expenses that must be met immediately, such as wages. It may also be needed as a safety measure, to guard against potential problems in the event of bad debts or an uncertain economic climate. But how much cash should a business hold?

ACTIVITY

What might determine the amount of cash that a business holds? Again, think of the problem of profitability versus costs.

ACTIVITY FEEDBACK

Some points to consider are as follows:

- There are costs in holding cash in the firm's bank account, which may bear interest, compared with the investment opportunities elsewhere.
- The speed with which the other current assets can be turned into cash is a factor. Reference has been made to the food-retailing sector, for example, where stock is turned over daily. A business of this nature will need to hold less cash than a manufacturing enterprise.
- There are costs in not being able to meet creditors demands for payments, in terms both of interest that may be charged and of loss of reputation resulting in cessation of supplies.
- The state of the economy is a factor, and whether there is a period of recession or inflation.
- The interest rates charged by the banks are relevant in the event of the firm having to borrow funds.

You have already encountered the main technique for managing cash: a budget showing cash flows. A monthly analysis of all cash inflows and outflows, showing the state of the bank account at the month end, is a vital source of information.

ACTIVITY

How is debtor and creditor payment built into a cash budget?

ACTIVITY FEEDBACK

Sales are shown as inflows in the month when the money is received, not the month when the sale takes place. In the same way, all payments for purchases, wages and expenses are shown in the month when the cash is paid out, not when the invoice is received.

In addition, the cash flow statement in a set of accounts gives an overview of changes in the working capital components between one year end and the next.

There is no accounting ratio directly concerned with the period that cash is held, but remember that you saw earlier the equation for the working capital cycle:

period goods held in stock + debtors' payment period
– creditors' payment period.

In effect, this is also the period of the cash flow.

While the management of a cash surplus may not present much of a problem, since the funds could be invested short term, a cash deficit may well be difficult to manage.

ACTIVITY

What solutions might there be to a short-term cash deficit? Try to write down at least three possibilities.

ACTIVITY FEEDBACK

You may have thought of some of the following:

- An extension of overdraft facilities at the bank.
- Reduction in stock levels.
- Delaying expenditure on capital items.
- Applying to creditors for extended credit terms.
- Reducing the periods of credit given to debtors.
- Reducing selling prices to attract customers.

The last one of these is a dangerous strategy since it will affect profitability and may send out the wrong signals to customers and competitors.

Creditors

The management of creditors is best understood by thinking about the management of debtors the other way round. If a creditor offers no discounts for prompt payment then it makes sense to wait until the full credit period is up before making the payment, but if a discount is offered, consider whether it is worth taking. Many businesses do, however, regard trade credit as a source of finance in the short term without considering the real costs.

You will recall from the level 1 module that the creditor payment period is similar to the debt collection ratio above. It is:

$$\frac{\text{average trade creditors}}{\text{total credit purchases}} \times 365$$

Alternatively:

$$\text{average age of creditors} = \frac{\text{average trade creditors}}{\text{credit purchases per period}}$$

You need to be careful in any calculations to exclude cash purchases, since they do not involve creditors at all.

ACTIVITY

The company referred to in activity 186 has annual purchases of £150,000 all on credit. The average trade creditors are £20,000. Calculate the creditors payment period and comment on this by comparing it to the debt collection period calculated in the former activity.

ACTIVITY FEEDBACK

The creditor payment period is:

$$\frac{\text{average trade creditors}}{\text{total credit purchases}} \times 365 = \frac{£20{,}000}{150{,}000} \times 365 = 49 \text{ days}$$

If the debt collection period was only 39 days, this would suggest that the company is managing this aspect of its working capital well, collecting debts in a shorter time than is taken to pay creditors.

A high average creditor payment period might indicate cash flow problems, not good management of the working capital cycle. But is it worthwhile for a firm to take steps to improve?

ACTIVITY

The creditor payment period in the last activity was 49 days. Suppose the suppliers offer a 2% discount for payment within 28 days. What will it cost the firm to change its policy with respect to its timing of creditor payments?

ACTIVITY FEEDBACK

Following the emphasis of this section, you are considering the cost of this aspect of managing working capital. If the discount is taken the firm can pay on day 28, but if it is not taken, an extra 21 days credit is obtained. The annual cost of this is approximately:

$$\frac{365}{21} \times 2\% = 35.8\%$$

This is extremely high considered more as an interest rate. It would be far more beneficial to pay within the 28 days.

A further aspect of the management of creditors is the decision as to which creditors are paid first.

ACTIVITY

With the management of debtors in mind, what do you think would aid the decision?

ACTIVITY FEEDBACK

In collecting debts you would consider the period of credit that you had allowed the debtor before collecting the debt. In the same way, the order of payment of creditors depends on their age, so the oldest debts are paid first. For both aspects of working capital management an aged listing is invaluable.

KEY POINTS

The key points from this section are as follows:

1. The capital of a company can be invested or used in two ways:

   – as *permanent* capital, employed in fixed assets such as buildings, plant or vehicles

   – as *working* capital represented by the difference between current assets and current liabilities.

2. Working capital flows in a cyclical manner:

   – *stock* is held by the company until sold on credit to

   – *debtors*, who after a period of time will pay

   – *cash*, which will remain in the bank until used to pay

   – *creditors*, who are owed money for the stock they supplied to the firm on credit.

3. The true length of the working capital cycle is given by the following:

   period goods held in stock + debtors payment period – creditors payment period.

4. The basic problem within working capital management is that of ensuring that there is enough money available to pay creditors out of current assets (liquidity) without having an adverse effect on profitability.

5. A number of ratios are useful in assessing working capital:

   – Annual circulation of working capital = $\frac{\text{turnover}}{\text{net current assets}}$

   – Current ratio = current assets: current liabilities

   – Acid test ratio = current assets less stock: current liabilities

   – Stock turnover ratio = $\frac{\text{cost of goods sold}}{\text{average stock}}$

   – Debt collection period = $\frac{\text{average trade debtors}}{\text{credit sales}} \times 365$

– Creditors payment period =

$$\frac{\text{average trade creditors}}{\text{credit purchases}} \times 365$$

6. For each component of the working capital cycle there will be costs associated with the decisions concerning the management of that component. Profitability will always have to be balanced with liquidity.

You should now try the self-assessment questions.

SELF-ASSESSMENT QUESTIONS

The first three questions are based on the balance sheet shown below. All the figures are in thousands:

	£	£	£
Fixed assets			350
Current assets			
Stock		135	
Debtors	170		
		305	
Less current liabilities			
Creditors	155		
Bank overdraft	130	285	
Net current assets			20
Total assets			370
Long term loans			110
			260
Represented by:			
Share capital			150
Reserves			110
		260	

Question 1

What is the amount of:

a) the permanent capital

b) the working capital

c) the current ratio

d) the acid test ratio.

Question 2

The balance sheet is that of a small hardware wholesaler. Comment on the liquidity.

Question 3

Using the following information, calculate the length of the working capital cycle.

Opening stock for the year was £145,000.

Sales of £450,000 were all on credit.

Cost of sales was £303,000.

Purchases were £293,000 (£3,000 for cash).

Question 4

What effect will the following have on the need for working capital?

a) Taking credit from suppliers.

b) Expanding sales.

Question 5

How might a firm reduce the risk of bad debts?

Question 6

What is the annual cost of foregoing a discount of 2% for cash in favour of an extra 35 days credit?

ANSWERS TO SELF-ASSESSMENT QUESTIONS

Answer 1

a) The permanent capital is that invested in fixed assets, i.e. £350,000.

b) The working capital is current assets less current liabilities, which is £20,000.

c) The current ratio is current assets: current liabilities or 305:285 (approx. 1.07:1).

d) The acid test ratio is current assets less stock: current liabilities or 170:285 (approx. 0.6:1).

Answer 2

While the current ratio is acceptable at just over 1:1, the acid test ratio is rather low at 0.6:1, which, given that the company is not involved in a sector where stock is turned into cash rapidly, is a source of concern. The overdraft is also high in relation to the trade creditors, which is a further indication of problems.

Answer 3

The working capital cycle is:

$$\text{period goods held in stock} + \text{debtors payment period} - \text{creditors payment period}$$

$$\text{period goods held in stock} = \frac{\text{average stock}}{\text{cost of sales}} \times 365 = \frac{140}{303} \times 365 = 169 \text{ days}$$

$$\text{debtors payment period} = \frac{\text{debtors}}{\text{credit sales}} \times 365 = \frac{170}{450} \times 365 = 138 \text{ days}$$

$$\text{creditors payment period} = \frac{\text{creditors}}{\text{credit purchases}} \times 365 = \frac{155}{290} \times 365 = 195 \text{ days.}$$

So the working capital cycle = 169 + 138 – 195 = 112 days.

Answer 4

a) Taking credit from suppliers will reduce the need for working capital because this is, effectively, borrowing in the short term from creditors in order to finance working capital.

b) A company wanting to expand its sales will have to increase its investment in working capital, because selling is more likely to require a higher level of stocks to meet increased customer requirements. It will also result in higher debtors.

Answer 5

The risk of bad debts may be reduced by any of the following:

- factoring debts
- obtaining credit references before granting credit
- setting sensible credit limits
- offering discounts
- sending regular statements and reminders with clear terms, invoicing promptly, using aged debtors lists to monitor debts
- penalties: interest on the debt, refusing supply
- threat of legal action.

Answer 6

The annual cost would be:

$$\frac{365}{35} \times 2\% = 20.86\%$$

Unit 9

Transfer Pricing

LEARNING OUTCOMES

At the end of this unit the student will be able to:

1. Critically evaluate the purpose of transfer pricing.
2. Critically apply various transfer pricing methods.
3. Critically understand negotiation and transfer pricing.
4. Understand international transfer pricing.

Introduction

Transfer prices create a mini economy within an organisation and spread the ultimate profit or value added throughout the production or service chain. They may be used to determine production levels, help with internal activity versus outsource decisions and, as transfer prices affect the profitability of each division, they can influence our perception of divisional and managerial performance.

Transfer Pricing

The selling and buying of goods by divisions within a single organisation is often done with a price attached to the good or service being transferrred. This price is called the transfer price.

C. Drury has stated that "goods transferred from the supplying division to the receiving division are known as intermediate products.

The products sold by a receiving division to the outside world are known as final products. The objective of the receiving division is to subject the intermediate product to further processing before it is sold as a final product to the outside world."

The purpose of transfer pricing is said to enhance:

1. Independence – divisional managers are independent. This encourages and motivates managers.
2. The assessment of divisional performance.
3. Promotion of the optimisation of profits.
4. Allocation of divisional resources.
5. Tax minimisation – where a business has operations in various countries, it may be beneficial to set transfer prices such that the bulk of profits are reported in divisions where the host country has low corporation tax.

Thus the various literature on transfer price argues that it should allow the following qualities:

(a) Promotion of decision making (goal congruence).

(b) Promotion of performance evaluation and (management effort).

(c) Promotion of autonomy.

Various Transfer Prices

These are different types:

Market-based Transfer Price

A price of a similar product externally may be chosen

Advantages of market-based transfer price

To the buying division:

1. Better quality of service
2. Greater flexibility

To both divisions:

3. Lower costs of administration, selling and transport
4. Better decisions that will be in both interest of the whole company.

Disadvantages

1. The market price may be temporary
2. There may not be an external market price available

3. There may be an imperfect external market for the transferred item, so that if the transferring division tried to sell more externally it would have to reduce its selling price.
4. Internal transfer are often cheaper than external sales. Therefore the buying division could expect a discount on the external market price.

ACTIVITY

What is the most important limitation of using market-based transfer pricing?

ACTIVITY FEEDBACK

An external market may not exit.

Full Cost Transfer Prices

Widely used in practice.

The major problem with full cost transfer prices is that it is derived from traditional costing systems which can provide poor estimates of long run marginal costs.

Full cost transfer does not promote an incentive for the supplying division to transfer goods and services internally because they do not include a profit margin.

- It is difficult to determine the actual amount of the mark-up.
- A full cost approach does not provide any incentive for divisional managers to keep costs down, since they can pass the costs onto the buying divisions.

A transfer price based on full cost plus a mark-up may lead to suboptimal decisions because it leads the 'buying' division to regard the fixed costs and the mark-up of the selling divisions as variable costs.

ACTIVITY

Why are transfer prices based on full cost widely used in practice?

ACTIVITY FEEDBACK

Managers view product-related decisions as long-run decisions and, therefore, require a measure of long run marginal cost

Negotiated Transfer Prices

These negotiated transfer prices are most appropriate in situations where some market imperfections exist for the intermediate product.

Negotiated transfer pricing works best where there is an external market for the goods supplied by the buying and selling divisions.

When there is excess capacity, the transfer range for negotiations generally lies between the minimum price at which the selling division is willing to sell (its variable costs) and the maximum price the buying division is willing to pay (the price at which the product is available from outside suppliers).

Negotiated transfer pricing is said to:

1. Help us achieve an organisation's strategies and goals.
2. Promote goal congruence.
3. Promote autonomy amongst the divisions.

Limitations

(1) The outcome of negotiated transfer prices may not be optimal because it is negotiated.

(2) Conflict may exist between divisions.

(3) Time consuming for managers.

P.Atrill *et al* has argued that in practice:-

(a) Market prices – usually best because they tend to represent the opportunity cost, but a market may not exist in practice.

(b) Full cost, usually plus a profit – rarely reflects the opportunity costs and tends to pass on inefficiencies.

(c) Negotiated prices – enable that division to act as an independent business but can be unfair.

Proposal for resolving transfer pricing conflicts

In the absence of a perfect market for the intermediate product there exists a number of conflicts with transfer prices.

To resolve the conflicts it has been argued that the following transfer pricing methods be adopted.

(i) a dual rate transfer pricing system.

(ii) a transfer at marginal cost plus a fixed lump sum face.

The Dual Transfer Price

A dual rate transfer pricing system uses two separate transfer prices to price each inter-divisional transaction.

Therefore, the receiving division should choose the output level at which the marginal cost of the intermediate product is equal to the net marginal revenue.

Problems with dual rate transfer prices in practice include:

1. The use of different dual transfer prices causes confusion.
2. Dual rate transfer prices are considered to be artificial.
3. Dual rate transfer prices reduce divisional incentives to compete effectively.

Marginal costs plus a fixed lump sum fee

Best used when an imperfect/non existent market occurs, also known as the two part-transfer pricing system. This involves transfers being made at the marginal cost per unit of output of the supplying division plus a lump sum fixed fee.

Advantages

1. Transfers are made at the marginal cost of the supplying division and both division should also be able to report profits from inter-divisional trading.
2. Receiving divisions are made aware and are charged for the full cost of obtaining intermediate products.

Which is the best transfer price?

There is sadly no one transfer price that leads to optimal decisions. Because the three criteria of goal congruence, management effort and sub-unit autonomy cannot all be met together. The following three points can, however, act as a guide in determining the best transfer price.

1. A perfectly competitive market and no idle capacity in an intermediate market. Then:

   minimum transfer price per unit
   = marginal cost per unit + opportunity costs per unit

2. Not a perfect competitive market. An intermediate market exists

   Minimum transfer price per unit = Marginal cost cost per unit

3. No market exists for the intermediate product. Transfer price should be the marginal cost.

Definition of Terms:

Marginal cost represents the additional costs that are directly associated with production and transfer of the product.

Opportunity costs may be deferred as the maximum contribution foregone by the supplying division of the products is transferred internally.

Drury argues:

In a perfectly competitive market, supplying division should supply as much as the receiving division requires at the current market price.

If the supplying division produces more of the intermediate product than the receiving division requires, the excess can be sold to the market at the current market price.

Application of rules

ACTIVITY

Johnson Ltd has been offered supplies of special ingredient Z at a transfer price of £18 per kg by Hampstead Ltd which is part of the same group of companies. Hampstead Ltd processes and sells special ingredient Z to customers external to the group at £18 per kg. Hampstead Ltd bases its transfer price on cost plus 25% profit mark-up. Total cost has been estimated as 75% variable and 25% fixed.

Required:

Discuss the transfer prices at which Hampstead Ltd should offer to transfer special ingredient Z to Johnson Ltd in order that group profit maximising decisions may be taken on financial grounds in each of the following situations:

(i) Hampstead Ltd has an external market for all of its production of special ingredient Z at a selling price of £18 per kg. Internal transfers to Johnson Ltd would enable £1.50 per kg of variable packing cost to be avoided.

(ii) Conditions are as per (i) but Hampstead Ltd has production capacity for 3500 kg of special ingredient Z for which no external market is available.

(iii) Conditions are as per (ii) but Hampstead Ltd has an alternative use for some of its spare production capacity. This alternative use is equivalent of 2000 kg of special ingredient Z and would earn a contribution of £6,000.

ACTIVITY FEEDBACK

(i) Method to adopt there is MC + opportunity cost

The proposed transfer price is £18

Cost x 1.25 = 18
Cost = 18/1.25
Cost = 14.4

VC	14.4 x .75	10.8
FC	14.4 x .25	3.6
	1.00	14.4

Lost contribution

Transfer price £18 – Variable cost 10.8 = 7.2

Marginal cost of the transfer is

Variable cost – packaging = marginal cost

10.8 – 1.5 = 9.3

Transfer price is:

Marginal cost + Opportunity cost (i.e. lost contribution)

9.3 + 7.2 = £16.50

This is equivalent to use the market price rule, i.e. external market price – selling

18 – 1.50 = £16.50

(ii) For 3500 kg where no external market is available the opportunity cost is the variable cost of £10.80. The remaining output should be transferred at £16.50.

(iii) The lost contribution for 2000 kg is £3 per kg (£6,000/2000kg) giving a transfer price of 3 + 10.80 = £13.80. The remaining 1000 kg transferred at £10.80 variable cost and the balance for which there is an external market transferred £16.50.

ACTIVITY

If there is no external market for the intermediate product. What is the optimal transfer price?

ACTIVITY FEEDBACK

The marginal cost per unit.

ACTIVITY

Why are marginal cost transfer prices not widely used in practice?

ACTIVITY FEEDBACK

The major reason for its low use is that when marginal cost is interpreted as being equivalent to variable cost it does not support the profit or investment responsibility structure because it provides poor information for evaluating the performance of either the supplying or receiving divisions.

International Transfer Pricing

International transfer pricing is concerned with the prices that an organisation uses to transfer products between divisions in different countries.

When supplying and the receiving divisions are located in different countries with different taxation rates, and the taxation rates in one country is much lower than that in the other, it would be in the company's interest if most of the profits were allocated to the division operating in the low tax country. A further complication can be double taxation relief. Double taxation relief is usually available in respect of the foreign tax suffered. Work carefully through the next example.

Example

Jason Plc is a multinational based in Beland. It has a subsidiary in Celand and in the UK. The UK subsidiary manufactures machinery

parts which are sold to the Celand subsidiary for a unit price of B$250 [250 Beland dollars], where the parts are assembled. The UK subsidiary shows a profit of B$60 per unit; 200,000 units are sold annually.

The Celand subsidiary incurs further costs of B$200 per unit and sells the finished goods on for an equivalent B$625.

All the profits from the subsidiaries are remitted to the parent company as dividends. Double taxation treaties between Beland, Celand and the UK allow companies to set foreign tax liabilities against their domestic tax liability.

The following rates of taxation apply:

	UK	Beland	Celand
Tax on company profits	25%	35%	40%
Withholding tax on dividends		12%	10%

Required

a) From the information given above calculate the revenues and taxes in Beland dollars using transfer pricing.

b) Recalculate part (a) above by showing the tax effect of increasing the transfer price between the UK and Celand subsidiaries by 25%. Briefly comment on the result.

Answer to Question 1

(a) Current Situation

Revenues and taxes in local currency

	B$(000) UK	B$(000) C	B$(000) Total
Sales	50,000	125,000	175,000
Prod. Costs	(38,000)	(90,000)	(128,000)
Taxable profits	12,000	35,000	47,000
Tax 1 25% / 40%	(3,000)	(14,000)	(17,000)
	90,000	21,000	30,000
Withholding Tax2 10%		2,100	2,100
	-	-	-

Revenues and taxes in Belland

Dividends	9,000	21,000	30,000
Add back foreign tax paid	3,000	14,000	17,000
	12,000	35,000	47,000
Beland Tax due 35%/35%	4,200	12,250	16,450
Foreign tax credit	(3,000)	(12,250)	(15,250)
Tax paid to Belland3	1,200	-	1,200
Total tax 1+2+3	4,200	16,100	20,300

(b) 25% increase in transfer price

Revenues and taxes in local currency

	B$(000) UK	B$(000) C	B$(000) Total
Sales	62,500	125,000	187,500
Production cost	(38,000)	(102,500)	(140,500)
Taxable profit	24,500	22,500	47,000
Tax 25% / 40%	6,125	9,000	15,125
Dividend in Belland	18,375	13,500	31,875
Withhold Tax 10%	-	1,350	1,350
	-	-	-

Revenues and Taxes in Belland

Dividend	18,375	13,500	31,875
Add back foreign tax paid	6,125	9,000	15,125
Taxable Income	24,500	22,500	47,000
Belland Tax 35%/35%	8,575	7,875	16,450
Tax Credit	(6,125)	(7,875)	14,000
Total Paid 3	2,450	-	2,450
Total Tax 1+2+3	8,575	10,350	18,925

Total tax payable is reduced by 1,375,000 (20,300 - 18,925)

However, tax laws operating in many countries will seek to prevent this kind of profit manipulation.

Workings

Current Situation

Sales

UK	B$250 x 200,000	=	B$50,000,000
C	B$625 x 200,000	=	B$125,000,000

Product Costs

UK	B$190 x 200,000	=	B$38,000,000
C	B$(200+250) x 200,000	=	B$90,000,000

Taxable Profits

	25% x 12,000,000	=	3,000,000
	40% x 35,000,000	=	14,200,000

25% increase in transfer price

Sales

UK	(B$250, 1.25) x 200,000	=	B$62,500,000
C	same as above)		

Production costs

C	(250 x 1.25) + 200) x 200,000	=	B102,500,000

Now try this:

ACTIVITY

Adams Plc is a multinational based in Jeland. It has a subsidiary in Keland and in the UK. The UK subsidiary manufactures machinery parts which are sold to the Keland subsidiary for a unit price of J$250 [250 Jeland dollars], where the parts are assembled. The UK subsidiary shows a profit of J$60 per unit; 200,000 units are sold annually.

The Keland subsidiary incurs further costs of J$200 per unit and sells the finished goods on for an equivalent J$625.

All the profits from the subsidiaries are remitted to the parent company as dividends. Double taxation treaties between Jeland, Keland and the UK allow companies to set foreign tax liabilities against their domestic tax liability.

The following rates of taxation apply:

	UK	Jeland	Keland
Tax on company profits	25%	35%	40%
Withholding tax on dividends		12%	10%

Required

(a) Calculate the current position showing the revenue and taxes in the local currency and the revenues and taxes in Jeland.

(b) Recalculate part (a) above in showing the tax effect of increasing the transfer price between the UK and Jeland subsidiaries by 25%. Briefly comment on the result.

ACTIVITY FEEDBACK

(a) Current Situation

Revenues and taxes in local currency

	J$(000) UK	J$(000) K	J$(000) Total
Sales	50,000	125,000	175,000
Prod. Costs	(38,000)	(90,000)	(128,000)
Taxable profits	12,000	35,000	47,000
Tax 1 25% / 40%	(3,000)	(14,000)	(17,000)
	900,000	21,000	30,000
Withholding Tax2		2,100	2,100
	-	-	-

Revenues and taxes in Jeland

Dividends	9,000	21,000	30,000
Add back foreign tax paid	3,000	14,000	17,000
	12,000	35,000	47,000
Jeland Tax due 35%/35%	4,200	12,250	16,450
Foreign tax credit	(3,000)	(12,250)	(15,250)
Tax paid to Belland3	1,200	-	1,200
Total tax 1+2+3	4,200	16,100	20,300

(b) 25% increase in transfer price

Revenues and taxes in local currency

	J$(000) UK	J$(000) K	J$(000) Total
Sales	62,500	125,000	187,500
Production cost	(38,000)	(102,500)	(140,500)
Taxable profit	24,500	22,500	47,000
Tax 1 25%/40%	6,125	9,000	15,125
Dividend in Jelland	18,375	13,500	31,875
Withhold Tax 10%	-	1,350	1,350
	-	-	-

Revenues and Taxes in Jelland

Dividend	18,375	13,500	31,875
Add back foreign tax paid	6,125	9,000	15,125
Taxable Income	24,500	22,500	47,000
Jeland Tax due 35%/35%	8,575	7,875	16,450
Tax credit	(6,125)	(7,875)	14,000
Tax paid3	2,450	-	2,450
Total tax 1+2+3	8,575	10,350	18,925

Total tax payable is reduced by 1,375,000 (20,300 - 18,925)

Workings

	Current Situation		
Sales			
UK	J$250 x 200,000	=	J$50,000,000
K	J$625 x 200,000	=	J$125,000,000
Product Costs			
UK	J$190 x 200,000	=	J$38,000,000
K	J$(200+250) x 200,000	=	J$90,000,000
Taxable Profits			
	25% x 12,000,000	=	3,000,000
	40% x 35,000,000	=	14,200,000

25% increase in transfer price

Sales			
UK	(J$250, x 125) x 200,000	=	J$62,500,000
K	same as above)		
Production costs			
K	(250 x 1.25) + 200) x 200,000	=	J102,500,000

REVIEW ACTIVITY

Jojoba Industries makes two component parts, A and B. It supplies A to the Division to be used in the manufacture of car engines and supplies B to the P Division to be used in the manufacture of car gearboxes. When transfers are made in-house, Jojoba Industries transfers products at full cost (calculated using an activity-based cost system) plus 10%. The unit cost information for A and B is as follows:

	A	B
Variable costs per unit	£13	£6
Allocated fixed costs per unit	£17	£15

The division feels that the price for A is too high and has told Jojoba that it is trying to locate an outside vendor to supply the part at a lower price. Jojoba division argues to reduce the transfer price they will have to change the fixed cost allocation in order to decrease the transfer price to £27.99.

Required

1 Calculate the transfer prices for A and B.

2 Calculate the fixed cost per unit that Jojoba would have to allocate to A to enable Jojoba to transfer A at £27.99 per unit.

REVIEW ACTIVITY FEEDBACK

1 Transfer prices for A and B follow:

	A	B
Variable costs per unit	13	6
Allocated fixed costs per unit	17	15
Full costs per unit	30	11
10% of full costs per unit	3	1
Transfer price per unit	33	12

2. For A to have a transfer price of £27.99 per unit, its full cost would have to be £27.99 ÷ 1.10 = £25.45, because the transfer price per unit is determined by adding 10% to the full costs per unit.

Full costs per unit of A	£25.45
Add 10% of full costs per unit	2.545
Transfer price per unit	£27.99

Fixed costs per unit that that the management Accountant would have to allocate to A can be calculated as follows:

Full costs per unit of A	£25.45
Deduct variable costs per unit	13.00
Fixed costs per unit to be allocated	£12.45

REVIEW ACTIVITY

Sahai has two divisions, X and Y, which manufacture calculators. Division X produces and manufactures the frame and Division Y assembles the components. There is a market for both the sub-assembly and the final product. Each division has been designated as a profit centre. The transfer price for the sub-assembly has been set at the long-run average market price. The following data are available to each division:

Estimated selling price for final product	305
Long-run average selling price for intermediate product	205
Incremental costs for completion in Division Y	155
Incremental costs in Division X	125

The manager of Division Y has made the following calculation:

Selling price for final product		£305
Transferred-in costs (market)	205	
Incremental costs for completion	155	360
Contribution (loss) on product		(55)

Required

1 Should transfers be made to Division X if there is no excess capacity in Division Y? Is the market price the correct transfer price?

2 Assume that Division X's maximum capacity for this product is 1005 units per month and sales to the intermediate market are now 805 units. Should 205 units be transferred to Division Y? At what transfer price? Assume that for a variety of reasons, X will maintain the £205 selling price indefinitely; that is, X is not considering lowering the price to outsiders even if idle capacity exists.

REVIEW ACTIVITY FEEDBACK

This problem explores the 'general transfer pricing guideline' discussed in the chapter.

1 No, transfers should not be made to Division Y if there is no excess capacity in Division X.

An incremental (outlay) cost approach shows a positive contribution for the company as a whole.

Selling price of final product		£305
Incremental costs in Division X	£125	
Incremental costs in Division Y	155	(280)
Contribution (loss)		£25

However, if there is no excess capacity in Division X, any transfer will result in diverting products from the market for the intermediate product. Sales in this market result in a greater contribution for the company as a whole. Division Y should not assemble the calculations

since the incremental revenue Sahai can earn, £100 per unit (£305 from selling the final product — £205 from selling the intermediate product) is less than the incremental costs of £155 to assemble the computer in Division Y.

Selling price of intermediate product	£205
Incremental (outlay) costs in Division X	125
Contribution (loss)	£80

Correct transfer price

Minimum transfer price = Additional incremental costs per unit incurred up to the point of transfer + Opportunity costs per unit to the supplying division

= £125 + (£205 —£125)

= £205, which is the market price

Market price is the transfer price that leads to the correct decision; that is, do not transfer to Division Y unless there are extenuating circumstances for continuing to market the final product. Therefore, Y must either drop the product or reduce the incremental costs of assembly from £155 per computer to less than £105.

2 If (i) X has excess capacity, (ii) there is intermediate external demand for only 800 units at £200, and (iii) the £205 price is to be maintained, then the opportunity costs per unit to the supplying division are £0. The general guideline indicates a minimum transfer price of: £125 + £0 = £125, which is the incremental or outlay costs for the first 200 units. Y would buy 200 units from X at a transfer price of £125 because Y can earn a contribution of £25 per unit [£305 — (£125 + £155)]. In fact, Y would be willing to buy units from X at any price up to £155 per unit because any transfers at a price of up to £155 will still yield Y a positive contribution margin.

Note, however, that if Y wants more than 200 units, the minimum transfer price will be £205 as calculated in requirement 1 because X will incur an opportunity cost in the form of lost contribution of £80 (market price, £205 — outlay costs of £125) for every unit above 200 units that are transferred to Y.

The following schedule summarises the transfer prices for units transferred from A to Y.

Units	Transfer price
0—200	£125 — £155
200—1000	£205

For an exploration of this situation when imperfect markets exist, see the next exercise.

REVIEW ACTIVITY

If an external, perfectly competitive market exists for an intermediate product, what should be the transfer price?

REVIEW ACTIVITY FEEDBACK

In most cases, where a perfectly competititive market for an intermediate product exists, the transfer price will be set at the market price.

REVIEW ACTIVITY

Explain the four purposes for which transfer pricing can be used.

REVIEW ACTIVITY FEEDBACK

1. To provide information to motivate.
2. To evaluate the managerial and economic performance.

3. To move profits between divisions.

4. To ensure divisional automy.

REVIEW ACTIVITY

Distinguish between intermediate products and final products.

REVIEW ACTIVITY FEEDBACK

Goods transferred from the supplying division to the receiving division are known as intermediate products. Products sold by a receiving division to the outside world are known as final products.

REVIEW ACTIVITY

JBC plc has two divisions: Division X and Division Y. Division X produces a product which it transfers to Division Y and also sells externally. Division Y has been approached by another company which has offered to supply 3000 units of the product or £35 each.

The following details for Division X are available:

Sales revenue	
Sales to Division Y @ £50 per unit	£500,000
External sales @ £45 per unit	£270,000
Less:	
Variable cost @ £20 per unit	£320,000
Fixed costs	£100,000
Profit	£350,000

Required

a) If Division Y decides to buy from the other company, the impact of the decision on the profits of Division X.

b) Impact on the whole company.

REVIEW ACTIVITY FEEDBACK

a) The loss of contribution in division X from lost internal sales
(50 x 20) x 3000 = £90,000

b) The impact on the whole company
(3000 x £35) = £105,000

Incremental cost of manufacture
(3000 x £20) = £60,000
Company worse off by £45,000

REVIEW ACTIVITY

Nana Ltd as been offered supplies of special ingredient Y at a transfer price £20 per kg by Help Ltd which is part of the same group of companies. Help Ltd processes and sells special ingredient Y to customers external to the group at £20 per kg. Help Ltd bases its transfer price on cost plus 24% profit mark-up. Total cost has been estimated as 75% variable and 25% fixed.

Required:

Calculate the transfer price under each case below in order to maximise group profit.

(i) Help Ltd has an external market for all its production of special ingredient Y at a selling price of £20 per kg. Internal transfers to Nana Ltd would enable £1.50 per kg of variable packing cost to be avoided.

(ii) Conditions as per (i) but Help Ltd has production capacity for 2500 kg of special ingredient Y for which no external market is available.

(iii) Conditions are per (ii) but Help Ltd has an alternative use for some of its spare production capacity. This alternative use is equivalent to 2000 kg of special ingredient Y and would earn a contribution of £4,000.

REVIEW ACTIVITY FEEDBACK

(i) £20 transfer price is based on cost,

Therefore cost x 1.24%	=	£20
Cost	=	£20 / 1.24
Cost before mark-up	=	£16.13
Variable cost 16.13 x .75	=	12.0975
Fixed cost 16.13 x .25	=	4.0325
		16.13
Therefore there is a lost contribution of	=	20 – 12.10
	=	7.90 from transferring internally

(this is the opportunity cost)

The marginal cost of the transfer is (External variable cost – packaging)

12.10 – 1.50 = 10.5975
10.60 + 7.90 = 18.50

(i.e. MC + opportunity cost)

An alternative approach would be:

Market price – selling costs
20 – 1.50 = £18.50

(ii) For the 2500 kg, where no external market is available, the opportunity cost will not apply and transfers should be at the variable cost of 12.0975. The remaining output should be transferred at the transfer price of £18.50.

(iii) The lost contribution for the output of 2000 kg is £2 per kg, i.e. (£4,000/2000 kg) giving a transfer price of £14.10 (£12.10 variable cost + £2 opportunity cost). The remaining 500 kg for which there is no external market should be transferred at £12.10 variable cost and the balance for which there is an external market at £18.50.

REVIEW ACTIVITY

Is there a conflict between any of the well-known transfer pricing objectives stated in this unit?

REVIEW ACTIVITY FEEDBACK

Yes, there may be a conflict between the objectives.

Reference

1. Atril, P. & Mclaney, E. *Management Accounting for Decision Makers*, Prentice Hall

2. Drury, C. *Management Accounting for Business*, 3rd Edition. Thomson

3. Horngren, T. et al *Management and CostiAccounting*, Prentice Hall

Unit 10

Foreign Exchange and Derivatives

LEARNING OUTCOMES

At the end of this unit the student will be able to:

1. Differentiate and critically apply spot and forward exchange rates.
2. Critically explain the types of risk associated with foreign exchange.
3. Discuss in depth methods of managing exchange rate risk within the company.
4. Explain and discuss derivatives: methods of managing exchange rate risk externally.

Introduction

Foreign Exchange and Derivatives

In this unit we will look at aspects of strategic management accounting that involve foreign currency and the management of the risks associated with foreign exchange. These factors have become a necessary part of strategic management because of the increase in international trade.

International trade

We are increasingly reminded that we live in an age of globalisation in the sense that information and communication technologies, together with air travel, have caused our sense of distance from other states and nations to shrink. Wherever you live, you will also be aware of some companies that seem to have a presence in many parts of the world: Microsoft, McDonald's and the Ford motor company are examples of this. However, many much smaller companies now engage in some kind of international trade, and it may be that you work for one of them.

ACTIVITY

Give one example for each of the following of how the company you have dealt with has engaged in activity that involved business contact with another country.

- Importing goods or services
- Exporting goods or services
- Agency
- Joint venture or partnership
- Subsidiaries

ACTIVITY FEEDBACK

While your answer to this activity is unique to you, the items that you listed might include the following:

- Importing goods or services. The company may have foreign suppliers, both of materials and services such as banking and insurance.
- Exporting goods and services. The company may sell its products abroad.
- Agency. The company may have an agency or franchise arrangement in another country, or license a foreign company to sell its products.
- Joint venture or partnership. The company may be in a trading relationship with foreign companies where resources are pooled, perhaps on a specific international project.
- Subsidiaries. On a more permanent basis, the company may have a foreign subsidiary or itself be the subsidiary of a foreign company.

There will, however, be risks attached to any form of international trade.

ACTIVITY

Write down an example of each of the following types of risk that your company, or one that you know of, runs in its international trading activities:

- Political risk
- Control risk
- Financial risk

ACTIVITY FEEDBACK

Again your answer may be specific to your industry sector, but generally the risks are as follows:

- Political risks: the possibility of civil unrest or war, unstable government, changing legislation and so on.
- Control risks: more remote operations, people, markets and supply sources are less easy to control.
- Financial risks: international trade means trade in another currency and as you will see there can be considerable risk attached to this.

It is the financial risks that we will concentrate on for the rest of this unit, beginning with the problem of exchange rates between currencies.

Exchange rates

The importance of foreign exchange or *forex* and its management can be seen from a simple example.

ACTIVITY

A company manufactures furniture in the UK, buying raw materials from a variety of countries. Its products are sold in the UK and Europe, but it has a growing market in America and is considering setting up retail outlets there. Use the headings below to give examples of how forex might have an impact upon the company's current and potential activity:

- Imports
- Exports
- Asset values
- Investment

ACTIVITY FEEDBACK

Areas of impact that you may have identified include:

- Imports. Purchases of raw materials from overseas are imports into the UK. If, for example, the company imports timber from North America, the company will have to consider the exchange rate between sterling and the dollar. There will inevitably be a time lag between ordering the timber and payment becoming due. The rate of exchange may fluctuate between those dates, either to the benefit or detriment of the company.

- Exports. Sales of the company's products in Europe and the USA are exports, involving income to be received in the future in a foreign currency. Again, the time lag between invoiced sales and receipt of income may involve a rise or fall in the exchange rate.

- Asset values. If the company sets up a retail outlet in the USA, it will have to consider the potential problems of having an overseas subsidiary, and owning assets and incurring liabilities in a foreign currency. The balance sheet values of assets and liabilities will be subject to change and uncertainty.

- Investment. The company may need to borrow funds overseas, and if the American outlet is a success, may consider further

overseas investment. The company's investment appraisal techniques will, therefore, have to be extended to include consideration of forex.

Exchange rate risk has increased over the past few decades, along with an increasing globalisation of trading activity. Many more companies are now involved in forex transactions, so the management of exchange rate risk has become vital. If the risks are not managed properly, adverse movements can mean that profits made overseas are lost.

An example of how exchange rates fluctuate can be seen in the variation between 1985 and 2008 in the dollar. During this period, the exchange rate ranged between 1.5$:£ and almost 2$:£. There are some basic concepts contained within this statement that you need to understand before we progress. These concern the way that exchange rates are expressed. An exchange rate is simply the price of one currency expressed in terms of another currency. The units of one currency are expressed per single unit of another currency. In the above example, we are saying that between 1985 and 2008 the cost of £1 could be anywhere between $1.5 and $2.

ACTIVITY

In the same period, how did the cost of $1 vary?

ACTIVITY FEEDBACK

If the exchange rate was $1.5:£ then $1 cost:

1/1.5 = £0.67

and if the rate was $2:£ then $1 would cost:

1/ 2= £0.50

We expressed the rate from the UK viewpoint. From the American viewpoint, the dollar varied between £0.50:$ and £0.67:$. The activity also helped to highlight another aspect of exchange rates: as the dollar rose against the pound, the pound fell against the dollar. A change in the exchange rate between two currencies is a rise, or strengthening, from one view and a fall, or weakening, from the other. If the exchange rate moved from 1.5$:£ to 2$:£ the dollar weakened against the pound and the pound strengthened against the dollar.

ACTIVITY

At the time of writing, the exchange rate between the dollar and the pound is 1.96$:£. If in one month's time the rate was expected to be 1.86$:£ and you were importing goods from the USA on one month's credit terms, would you be pleased or worried?

ACTIVITY FEEDBACK

From the UK point of view the pound is falling or weakening against the dollar, because in one month's time fewer dollars can be bought with £1. As an importer, you would be worried because the goods you import at today's invoiced dollar price will have to be paid for one month later, when it will cost you more to buy the required amount of dollars.

You will find that in the financial press, exchange rates are expressed in a little more detail that we have used up to now. In the UK newspaper, the Financial Times:

- Forex rates are usually given to four decimal places.
- Two rates are given: the spot rate and the forward rate.

Spot and forward rates

An example of a spot rate using the Australian dollar (A$) is :

A$ spot rate 2.1768 - 2.1797

The *spot rate* is the rate at which transactions are settled immediately. The lower figure in the range is the *buy* or *bid* rate, at which Australian dollars can be bought from a bank. The higher figure is the *sell* or *offer* rate, at which Australian dollars can be sold to the bank. The difference between the figures is the *spread*.

ACTIVITY

Using the above spot rate:

(a) How much would it cost to buy A$500,000?

(b) How much would you receive if you sold A$500,000?

ACTIVITY FEEDBACK

(a) To calculate the cost of the Australian dollars, use the bid rate:

A$500,000/2.1768 = £229,695

(b) To find out how much you would receive, use the offer rate:

A$500,000/2.1797 = £229,389

Forward rates will also be listed in the Financial Times, for example:

1 month A$ forward rate	2.1736
3 month A$ forward rate	2.1652

The forward rates are used for transactions to be settled at a specific date in the future, usually in either one month's or three months' time. They can be at a discount or a premium to the spot rate. In our example, the rates are at a premium to the spot rate; the forex markets are therefore expecting the Australian dollar to rise, or appreciate, against the pound. You would, therefore, obtain fewer dollars for each pound in the future.

Most world currencies have a quotation in the forex spot market, whereas some may not be quoted in the forward market.

Risks associated with forex

The fluctuation in exchange rates means that forex management is a matter of risk management. The risk may be one of three types:

- Transaction
- Translation
- Economic

Transaction risk

This type of risk can be illustrated using details from the previous activity. Suppose that a company exporting goods to Australia sells A$500,000 worth of goods on one month's credit terms. The company will expect to receive, using the spot rate of A$2.1797:£, the sum of £229,389 that you calculated in the activity.

ACTIVITY

(a) Calculate the effect if, in one month's time, the exchange rate is:

A$2.19:£

A$2.16:£

(b) Suggest how the company might mitigate any potential loss.

ACTIVITY FEEDBACK

(a) If the rate in one month's time is A$2.19:£ the company will receive:

A$500,000/2.19 = £228,311 which is £1,078 less than expected

If the rate is A$2.16:£ the company will receive:

A$500,000/2.16 = £231,481 which is £2,092 more than expected.

(b) There is a risk that the company could lose money, but there is also the possibility of making a gain. To mitigate the potential loss, the company could agree to settlement of the transaction using the 1 month forward rate of A$2.1736:£, thus receiving:

A$500,000/2.1736 = £230,033 which is £644 more than expected.

Thus, the use of forward rates is one method of mitigating the risk in foreign currency transactions arising from the effect of fluctuations in the exchange rates. We will look at other methods in more detail later.

The type of risk illustrated above is called *transaction risk*, and involves the risk of the exchange rate moving against a company on transactions already in place. It is the risk importers and exporters run because they expect to pay or receive amounts of foreign currency in the future. In the example above, the company was exporting goods to Australia, so to guard against the possibility of sterling, the domestic currency, appreciating against the Australian dollar, they could use the forward rate. *Importers* would have the opposite concern: the possibility of the domestic currency depreciating against the foreign currency.

Translation risk

ACTIVITY

The exporter that we referred to above borrows A$1 million to set up a retail outlet in Sydney for its products. At the time of borrowing the exchange rate is A$2.16:£. A year later the exchange rate is A$2.21:£. What effect will this have on the company's assets and liabilities? (Assume that no repayments of the loan are made for a year.)

ACTIVITY FEEDBACK

The value of the assets funded by the borrowings was originally A$1 million/2.16 = £462,963. This value will fall to A$1 million/2.21 = £452,489. There is no effect on the liabilities of the company, since it still owes A$1 million at the end of the year.

This situation, which will occur if a company has assets and/or liabilities overseas in the form of operations and subsidiaries, is called

translation risk. The balance sheet values of the overseas assets and liabilities will be expressed in the domestic currency (translated) for inclusion in the consolidated accounts, and the domestic holding company may experience a loss or gain on this translation.

Note that translation risk does not apply to flows of money in reality. It only occurs as a paper transaction, but it could have an adverse effect on the balance sheet position of a company if exchange rates fluctuate dramatically, and thus deter potential investors.

Economic risk

The third type of exchange rate risk is economic risk that is more general in nature. Adverse movements in exchange rates may cause any company to be less competitive, thus affecting the long-term value of an overseas investment.

Both translation and transaction risks can be avoided by any company if it is not engaged in foreign currency transactions or does not operate with overseas subsidiaries! Economic risk is impossible to avoid, even for those companies not involved in foreign trade. For example, suppose there are two UK companies, in the same industry sector in direct competition, but one imports goods while the other does not. If sterling appreciates against foreign currency, the cost of the imported goods is reduced because, as sterling strengthens, more foreign currency can be obtained for the same amount of sterling. The company sourcing domestically will therefore, in time, lose its competitiveness. Imports become cheaper and exports more expensive, so profits decrease if the pound is strong. If sterling weakens less foreign currency can be purchased per £ sterling, so imports become expensive.

ACTIVITY

Consider the three types of risk that we have discussed. Which do you think is the most important to mitigate?

ACTIVITY FEEDBACK

Translation risk does not involve cash flows so is less important than economic or transaction risk. Economic risk involves long term, unavoidable risk to the present value of an investment and is difficult to mitigate. It is most important to try to mitigate transaction risk because it does involve cash flows in foreign currency.

The mitigation of transaction risk is called **hedging**.

Managing exchange rate risk internally

The following strategies for managing or hedging exchange rate risk are all internal to a company in that they depend on the company's own policies for borrowing, invoicing or accounting. They include:

- Passing the risk on.
- Matching and netting.
- Leading and lagging.
- Accepting the risk.

Passing the risk on

We said earlier that the both translation and transaction risks can be avoided by any company if it is not engaged in foreign currency transactions. This may seem a bit drastic, but a company can, even though it has foreign transactions, use a version of this approach. Return to the example earlier of the UK company exporting goods to Australia.

ACTIVITY

The company had sold goods invoiced at A$500,000. It could avoid worrying about spot and forward rates by invoicing its Australian customers in sterling. What do you think are the advantages and disadvantages of this policy?

ACTIVITY FEEDBACK

The company will avoid transaction and translation risks, passing them on to the Australian customers, by invoicing them in sterling. However, the danger of this course of action is that the customers may not want to bear the currency risk, and might transfer their orders to companies that invoice them in their own currency.

Using this strategy the risk has not actually disappeared; the exporter has passed it on.

Matching and netting

These are two versions of the same principle: inflows and outflows of funds are matched according to currency type as far as possible so that only unmatched portions need to be hedged on the forex markets. The UK company could export goods to Australia, invoicing in Australian dollars and match this risk exposure by using an Australian supplier. If exports were A$1 million and imports A$900,000 it would only need to hedge against the risks involved in A$100,000.

ACTIVITY

How could the company apply this principle to the translation risk involved in its plan to set up a retail outlet in Sydney funded by borrowings?

ACTIVITY FEEDBACK

To mitigate translation risk the company should borrow funds in Australian dollars and match the term of the loan to the expected life of the assets involved. As the exchange rate varies, the translated values of the assets and of the liability will vary together.

Netting is a version of matching used within companies having overseas subsidiaries or by companies large enough to be able to centralise enough transactions. The different transactions are matched or netted against each other within the organisation and the net amount is hedged externally.

Leading and lagging of payments

This method of hedging involves simply making payments in foreign currency, either earlier than the due date (leading), or later (lagging), depending on the company's expectations of directions in the exchange rate movements. The policy can be applied by exporters to foreign customers, encouraging early or late payment as the case may be.

Accepting the risk

It is worth noting that a company could choose not to attempt to hedge exchange rate risk at all, by accepting the spot rate at the time of the exchange. This means that the company runs the risk of losing on the transaction, but it may be worth it.

ACTIVITY

In what circumstances might a company be prepared to accept the exchange rate risk in transactions?

ACTIVITY FEEDBACK

It may be worth a company accepting the risk if the transaction is an isolated one, and small in comparison with turnover generally.

It could be argued that in the long term, forex fluctuations cancel each other out, but it may be in the very long term, unfortunately!

Managing exchange rate risk externally

The choice of external hedging methods has increased greatly over the last 20 years, and we will look first at hedging in the money markets, then at derivatives.

The money markets

Hedging against exchange rate risk in the money markets consists of borrowing in the relevant currency and investing those borrowings. Suppose that our exporter to Australia has invoiced a customer for payment of A$500,000 in three month's time, and the current exchange rate is A$2.17:£. The exporter is worried that the pound will strengthen against the Australian dollar over the next three months, so s/he borrows a sum in dollars that, together with the interest, will equal the expected amount. We have:

Sum borrowed now	+	interest accrued	=	Amount to be received in the future
(available for investment now)		(netted off against the interest paid on the borrowings)		

The sum borrowed can be thought of as an advance cash inflow, available for investment. In the future, the amount received will liquidate the debt.

If the sum to be borrowed is X, then:

$$X + X(\text{interest rate}) = \text{Amount to be received}$$

or

$$X(1 + \text{interest rate}) = \text{Amount to be received}$$

ACTIVITY

In the case of the example above, we have:

$$X(1 + \text{interest rate}) = A\$500{,}000$$

If the interest rate on the borrowings over the three month period is 10% how much would the exporter need to borrow?

ACTIVITY FEEDBACK

The equation becomes:

$$X(1 + 0.10) = A\$500{,}000$$

So $X = A\$500{,}000/1.1 = A\$454{,}545$

This is then converted to sterling at the current exchange rate, giving:

$$A\$454{,}545/2.17 = £209{,}468$$

and the sterling amount is invested so that it earns interest. In three month's time, when the customer pays A$500,000, the liability is repaid.

You can also see that the matching principle operates here, because the liability for the borrowed principal plus interest, is matched by the expected receipts from sales in three month's time. The procedure is a little like factoring, and it should be noted that it is not cost-free because there will be costs involved in arranging the loan.

ACTIVITY

How would borrowing in the money markets work if a UK company was importing goods from Australia?

ACTIVITY FEEDBACK

The UK importer would borrow the required sum in sterling and convert it to Australian dollars before investing it. When the time for payment is due, the sum remitted will be matched by the borrowings plus the interest.

Derivatives

In addition to hedging by borrowing and lending in the money markets, there are several methods grouped under the term 'derivatives'. This term is applied to a variety of financial instruments, which are pieces of paper stating that the holder owes money, or that money is owed to the holder. The most familiar form of financial instrument that you will have encountered is the cheque. The value of financial instruments that are collectively known as derivatives is derived from an underlying asset. They are used to mitigate adverse movements in exchange rates

There is a problem with derivatives in that while they are part of risk management strategies in the short term, they can increase risk if they are mismanaged. A well-known example of such mismanagement was seen in the activities of Nick Leeson, whose trading in derivatives brought about the collapse of the UK merchant bank Barings in 1995.

Derivatives have uses in areas other than foreign exchange, and we will only be looking at the main types. They all have the same basis: an initiating party wishes to manage a risk (for example, the belief that the pound will strengthen against the dollar), and finds someone with the opposite view, a *counter party*.

The basic analogy here is with insurance or the spreading of risk. The counterparty is prepared to 'insure' the risk for the initiating party that exchange rates will change.

The most important derivatives are:

- Forward exchange contracts
- Futures
- Swaps
- Options.

Forward exchange contracts

We mentioned the use of forward currency rates earlier when looking at transaction risk. A forward exchange contract, in general terms, is one where the parties agree to an exchange at a future date but at a rate agreed now, rather like a credit sale agreement. For example, the UK exporter receiving Australian dollars may agree with a financial institution such as a bank to receive payment in one month's time at an agreed rate of A$2.18:£, whatever the forward rate may be at the time.

Forward contracts are created to meet the requirements of the company using them, and are therefore unique. They cannot be traded in a secondary market, unlike some other derivatives. They also have the advantage of needing only an initial arrangement fee; no premiums are payable.

ACTIVITY

What do you think might be the disadvantage of forward exchange contracts as a hedge against exchange rate risk?

ACTIVITY FEEDBACK

Their disadvantage lies in their status as binding contracts, which means that a company cannot trade them or get out of them in any other way, so if the exchange rate moves favourably, that could mean that the company will not gain from their use.

Futures

Futures are also contracts defined as:

> agreements to buy or sell a standard quantity of a specific financial instrument or a foreign currency at a future date at an agreed price.

Futures differ from forward exchange contracts in two important respects. First, they are negotiable. Futures are traded on exchanges by dealers, and can be bought and sold before maturity. In the UK, futures were traded on the London International Financial Futures Exchange (LIFFE), but LIFFE later merged with the London Traded Options Market to form a single exchange for derivatives. Futures can now only be bought on the Chicago Mercantile Exchange (CME) or on the Singapore exchange.

The second respect in which futures differ from forward contracts is that they are standardised. The CME trades in futures contracts in a range of currencies, but each contract is for a specific period, for a fixed amount and cannot be split, so only multiples can be bought or sold. A single sterling contract is for £62,500. To buy one futures contract is to agree to pay dollars in return for £62,500. To sell one futures contract is to receive dollars in return for a payment of £62,500. Expected losses on forex are offset by gains made on the futures contracts. The next activity illustrates how futures work, and also highlights their main disadvantage.

ACTIVITY

An American company is exporting goods to the UK, expecting to receive £200,000 in three month's time. The spot rate at the time of the transaction is $1.55:£ but in three months' time it is expected to be $1.45:£.

1. What is the expected loss on the contract in dollars?

2. How many futures contracts will be needed?

ACTIVITY FEEDBACK

1. The expected loss will be £200,000 x ($1.55 - $1.45) = $20,000

2. The number of contracts needed will be:

   £200,000/62,500 = 3.2 which means either three or four.

   If the company sells three contracts to offset the loss it will make a gain as follows:

3 contracts sold now	3 x £62,500 x $1.55 = $290,625
3 contracts bought in 3 months	3 x £62,500 x $1.45 = $271,875
Gain	$18,750

   This does not quite offset the loss made on the original forex transaction, but if four contracts had been bought, the company would have over-hedged.

The money is deposited in a margins account, which the futures dealer will manage by making up losses and withdrawing profits as the exchange rate fluctuates over the three month period. Futures have the advantages of requiring no premium to be paid, unlike options as you will see later, and any favourable movements in exchange rates are immediately credited to the margins account. However, as you can see, it is difficult to find a perfect hedge because the contracts are standardised.

Swaps

A swap is, as the name suggests, an exchange between two companies. A broker brings the companies together, and they agree to swap cash flows. When used as a hedge against exchange rate risk, the parties agree to exchange the cash flows arising from borrowed funds, both principal and interest payments, in different currencies over a period of time. Each company raises funds in a currency in which they can borrow relatively cheaply, then swap with a company borrowing in the currency required. Each company will gain the use of funds in a foreign currency but will avoid exchange rate risk on the future repayments. Note that the companies are not swapping the underlying debt, but the obligation to pay the interest charges. The legal obligation to pay the debt remains with the original company.

Swaps can be thought of as a netting and matching exercise, but it is external rather than internal. A simple example of a swap is as follows:

A UK company has a supplier in America and normally pays them in dollars. An American company has a UK supplier and normally pays them in sterling. The two companies agree to a swap of the debts, and the UK company pays the UK supplier in sterling, while the American

company pays the American supplier in dollars. Only the net difference between the two has to be accounted for in currency.

ACTIVITY

What general advantages might a swap have over futures?

ACTIVITY FEEDBACK

The swap allows a company to hedge its exchange rate risk for a long time, and is more flexible than other forms of derivatives. Swaps do not require the same level of frequent monitoring as futures, for example.

Swaps, however, do have disadvantages:

- They prevent a company from benefiting from favourable movements in exchange rates.
- If the initiating company defaults on the agreement, the counterparty would then be liable for the interest payments.

Options

The final method of hedging exchange rate risk is that of options. We have looked at futures, which are contracts, and swaps, which are exchanges; options can be thought of as rights. Using options is similar to paying a deposit to secure something, in that they convey the right to buy or sell something at an agreed rate, in this case currency at an agreed exchange rate. There are two types of currency option:

put options = convey the right to sell currency

call options = convey the right to buy currency

Options are rights which may be exercised but which do not have to be exercised.

ACTIVITY

The currency option holder, therefore, has the right, but not the obligation, to buy or sell foreign currency at a specific exchange rate. Would you expect an option to be a more expensive or a cheaper means of hedging than a forward contract?

ACTIVITY FEEDBACK

The option is conferring rights, whereas a forward contract is conferring an obligation. This means that options are more expensive than forward contracts, since they convey more freedom. They enable the holder to take advantage of favourable exchange rate movements. The price of this flexibility is an option premium.

The principle of the option is as follows. Suppose that a UK exporter to America expects to receive $500,000 in three months' time. The forward exchange rate is $1.56:£ so s/he could enter into a forward contract, and receive:

$500,000/1.56 = £320,513 in three months' time.

However, if the exchange rate was $1.5:£ in three months' time, they would have lost on the transaction. By purchasing a put option (at a premium of, say 2% on the invoice price) to sell at $1.56 in three months' time, the exporter buys the right to exercise that option. If the dollar does fall to $1.5:£ they will not exercise it, as they would receive more, in fact:

$500,000/1.5 = £333,333.

ACTIVITY

What would the exporter do if the spot rate was actually $1.61:£ in three months' time?

ACTIVITY FEEDBACK

They would exercise the option and receive £320,513 instead of:

$500,000/1.61 = £310,559

ACTIVITY

What would the company have done if it had been an importer?

ACTIVITY FEEDBACK

If the company had been importing goods, it would have bought call options, giving it the right to buy dollars and sell sterling at $1.56:£.

Options can be bought from financial institutions and can be tailored to a company's requirements by specifying a principal amount, the time period over which the option runs and the particular currency rate. They may take the form of **caps**, **floors** or **collars**, depending on the nature of the limit that the institution guarantees:

Caps: the institution pays the excess if the exchange rate exceeds a predetermined level. If, for example, the above company bought an exchange rate cap they would be guaranteed a rate of exchange of $1.56:£. If the rate increases to $1.66:£ the company still exchanges at $1.56.

Floors: this works in the opposite way. The institution pays the company the difference if the exchange rate falls below a predetermined level. Floor options benefit companies when the domestic currency depreciates against the foreign currency.

Collars: this combines the cap and the floor. The exchange rate is guaranteed between an upper and lower limit, for example $1.56 and

$1.66. The company buys at $1.56 and sells at $1.66. Any surplus over $1.66 is paid to the institution.

Options may also be traded, in a standardised contract form in three-month cycles, specifying the principal amount and the maturity date. The world's largest secondary market for traded options is the Chicago Board Options Exchange.

A variety of factors affect the price of options, which can typically be 3-4% of the value of the contract, and more expensive options will involve

- A higher pre-determined exchange rate in a put option.
- A lower pre-determined exchange rate in a call option.
- More volatile exchange rates.
- A longer period until the option expires.

The option method of hedging is an advantage to a company tendering for overseas contracts, which may not actually occur, and in times of uncertainty over exchange rate movements. They are relatively expensive, especially if they are created specifically to match the company's needs.

Now that you have looked at various external hedging strategies against exchange rate risk, draw up some comparisons between them in the next activity.

ACTIVITY

Complete the table below to show some comparisons between external hedging strategies:

	Money markets	FECs	Futures	Swaps	Options
Does it use financial instruments?					
Can it be tailored to the company's needs?					
Can it be traded?					
Is there a premium?					

ACTIVITY FEEDBACK

Your table should look as follows:

	Money markets	FECs	Futures	Swaps	Options
Does it use financial instruments?	No	Yes	Yes	Yes	Yes
Can it be tailored to the company's needs?	Yes	Yes	No	Yes	Yes
Can it be traded?	No	No	Yes	No	Yes
Is there a premium?	No	No	No	No	Yes

You should now read the key points below before trying the self-assessment questions.

KEY POINTS

The key points from this unit are as follows:

1. An exchange rate is the price of one currency expressed in terms of another:

   – Spot rates are the rates at which transactions are settled immediately, usually expressed as a range. The higher figure is the offer rate at which currency is sold; the lower rate is the bid rate at which currency is bought.

   – Forward rates are used for transactions to be settled at a specific date in the future.

2. Foreign exchange or forex has three associated risks:

   – Transaction risk: the exchange rate may move to the detriment of a company, on transactions already in place.

- Translation risk: this applies when the balance sheet values of assets and liabilities of an overseas operation are expressed in the domestic currency. It does not involve flows of cash.

- Economic risk: adverse movements in exchange rates may cause companies, whether involved in foreign trade or not, to be less competitive and lose value in the long term.

3. Transaction risk can be managed, or hedged, internally by:

   - passing the risk on to customers by invoicing them in the domestic currency.

   - matching and netting transactions.

   - leading and lagging payments.

   - accepting the risk, and exchanging using spot rates.

4. External methods of hedging include borrowing and investing currency in the money markets or using derivatives. Derivatives are types of financial instruments: they are written statements of monies owed by or to the holder.

5. The derivatives used to hedge exchange rate risk include:

   - Forward contracts: agreements on a future exchange at a rate agreed now.

   - Futures: agreements to buy or sell standard quantities of currency at a future date at an agreed price.

   - Swaps: exchanges of cash flows in different currencies between two parties.

   - Options: the right, which may or may not be exercised, to sell (put option) or buy (call option) currency in the future. They take the form of caps, collars or floors, depending on the nature of the limit guaranteed.

SELF-ASSESSMENT QUESTIONS

Question 1

The spot rate for the Australian dollar is quoted in the Financial Times as A$2.1773 - 2.1785. How much does it cost:

(a) to buy A$1 million?

(b) to sell A$500,000?

(c) to buy £250,000?

(d) to sell £50,000?

Question 2

The same copy of the Financial Times quoted forward rates for the Australian dollar as 'one month A$2.1785, 3 months A$2.1881':

(a) What are the markets expecting to happen to the Australian dollar?

(b) If you were importing goods from Australia would you be pleased with the situation?

Question 3

What are the three main types of risk traditionally associated with foreign exchange management?

(a) Transaction, financial and translation

(b) Financial, specific and translation

(c) Transaction, specific and economic

(d) Transaction, economic and translation

Question 4

What kind of forex risk is being faced in each of these situations?

(a) A UK company supplies goods to the UK market only, but its main competitor is an American company. Sterling is expected to weaken against the dollar.

(b) An American company imports goods from Australia. The American dollar is expected to weaken against the Australian dollar.

(c) A UK company has a subsidiary in Australia. Sterling is expected to appreciate against the Australian dollar.

Question 5

XYZ plc imports components from the USA and agreed to pay £10,000, when the exchange rate was $1.56:£. At the same time, the company agreed to export goods to an Australian company for £11,800, when the exchange rate was A$2.64:£. Since then, the US dollar has strengthened against the pound by 10% and the Australian dollar has weakened by 10%. The monies have been paid and received. How much does XYZ plc have left?

(a) £1,800

(b) £1,590

(c) £863

(d) £150

Question 6

XYZ plc imports components from the USA and agreed to pay $20,000, when the exchange rate was $1.56:£. At the same time, the company agreed to sell the goods to an Australian company for £16,000, when the exchange rate was A$2.64:£. Since then the US dollar has strengthened against the pound by 10% and the Australian dollar has weakened by 10%. The monies have been paid and received. How much does XYZ plc have left?

(a) £3,180

(b) £1,755

(c) £1,726

(d) £300

Question 7

What is the difference between matching and netting, used as an internal method of hedging exchange rate risk?

Question 8

ABC plc is expecting to pay an American supplier $420,000 in three months' time. It expects sterling to depreciate against the dollar from the current exchange rate of $1.61:£. If the dollar deposit rate over three months is 8%, how can ABC plc hedge its exchange rate risk using the money markets?

Question 9

What is the function of derivatives for a company involved in forex?

(a) They provide evidence of foreign monies owed to the company.

(b) They allow the company to deal in commodities on the international market.

(c) They allow a company to buy and sell goods using Euros.

(d) They reduce the risk associated with transactions that can be affected by factors outside the company's immediate control.

Question 10

If a currency is fluctuating against sterling and a UK company wants to purchase goods in that currency, which of the following could it do to protect itself against adverse exchange rate movements?

(a) Purchase a put option.

(b) Purchase a call option.

(c) Do nothing.

(d) Open a bank account in that currency.

ANSWERS TO SELF-ASSESSMENT QUESTIONS

Answer 1

(a) To buy A$1 million would cost A$1 million/2.1773 = £459,284

(b) To sell A$500,000 would cost A$1 million/2.1785 = £459,031

(c) To buy £250,000 would cost £250,000 x 2.1785 = A$544,625

(d) To sell £50,000 would cost £50,000 x 2.1773 = A$108,865

Answer 2

(a) The forward rates are at a discount to the spot rates so the markets are expecting the Australian dollar to fall against the pound in the next three months.

(b) The expected fall in the dollar against the pound means that in the future the stronger pound will purchase more Australian dollars. If you were importing goods from Australia you would be pleased with this situation, because it implies that imports in the future will be cheaper.

Answer 3

The correct answer is (d). The three main types of risk traditionally associated with foreign exchange management are transaction, economic and translation risks.

Answer 4

(a) This is an example of economic risk, because the UK company will be affected by exchange rate movements even though it does not import goods, because its competitor is an American company.

(b) This is transaction risk, because the weaker American dollar means more expensive imports.

(c) This is translation risk. If sterling appreciates, the value of the subsidiary will decrease when expressed in sterling for incorporation into the group accounts.

Answer 5

The correct answer is (a) £1,800. Both deals were agreed and invoiced in sterling, so XYZ plc has sold goods for £11,800 and bought goods for £10,000, making a profit of £1,800.

Answer 6

The correct answer is (b) £1,755. The goods were sold for £16,000 and bought for $20,000. If the dollar has strengthened by 10% the exchange rate is now $1.404:£ so the company will pay $20,000/1.404 = £14,245, making a profit of £1,755.

Answer 7

Matching means linking inflows and outflows of funds according to currency type so that only the unmatched portions need to be hedged in the forex markets. For example, a UK company exporting to America would try to match the expected inflow of dollars with monies owed in dollars to an American supplier. Netting uses this technique but within the same company, matching flows of cash from and to overseas subsidiaries, for example.

Answer 8

ABC plc should obtain a sum in dollars and put it on deposit, in order to pay the liability when the debt is due. The required sum, X, will be:

$X(1 + 0.08) = \$420,000$

$X = \$388,889$ which will cost $\$388,889/1.61 = £241,546$

Answer 9

The correct answer is (d). Derivatives reduce transaction risk.

Answer 10

The correct answer is (a) the company should purchase a put option.

Unit 11

Company Failure

LEARNING OUTCOMES

At the end of this unit the student will be able to:

- Critically evaluate models of predicting company failure.
- Discuss in depth qualitative approaches to the symptoms of company failure.
- Discuss in depth quantitative approach to forecasting company failure.
- Critically understand the limitations of the models and concepts under discussion.

Introduction

You may wonder why we are ending the module with a unit about something as negative as failure, especially if your career to date has involved working for successful companies.

ACTIVITY

Think about a successful company, either the one that you currently work for or another one that you know of. What makes it successful?

ACTIVITY FEEDBACK

Your answer will, of course, be unique to you but you might have mentioned any one of a number of factors such as producing a good product, increasing its

market share, being well managed or having good financial control. There may have been more than one factor that made the company a success.

Companies may view failure in different ways: as inability to meet objectives, as losing independence by being taken over by another company, as failing to secure an important contract, and so on. We are concerned with failure when it is reflected in financial difficulties, although it is a function of other variables. If you are working in a successful company, you might feel that a lot of this unit will not be of practical use. However, we want you to be aware of the potential for failure, and to be able to recognise it in other companies.

What is failure?

When we asked at the beginning of the module why companies exist, we did not address the legal structures of business: the sole trader, the partnership and the limited company. Similarly, in this final unit we are not concerned with the different forms of insolvency such as administration, Company Voluntary Arrangements, receivership and liquidation. These are legal distinctions that only have relevance in England and Wales. Our concern is more with the underlying factors, the nature and causes of corporate failure itself.

ACTIVITY

If you look back through the module you will note our emphasis on one particular theme; the reason for the existence of a company. In the various units we have talked about courses of action which might or might not be compatible with this.

Why do companies exist? (Look at Unit 1.)

Suggest, using the material in other units, at least two reasons why a company might fail.

ACTIVITY FEEDBACK

1. A key tenet of financial theory is that the prime objective of the company is to maximise shareholder wealth. Therefore, any course of action that does not do this could lead to the failure of the company.

2. Some courses of action, not maximising shareholder wealth, and possibly leading to failure are:

   - making investments that do not show a positive net present value.
   - making investments without regard to the specific risks involved, using too expensive a source of finance, having too high a gearing level.
   - having a dividend policy that does not reward shareholders or attract new investors.
   - mis-management of working capital.
   - inappropriate restructuring of the company by merger or takeover.
   - failure to manage the risks involved in foreign exchange.

Any of these could lead to a company failing to maximise shareholder wealth, and as a result not achieving other corporate goals, failing to attract investment, perhaps being taken over and, in the worst case, becoming insolvent.

Rather than referring to 'insolvency' we will base our definition of 'corporate failure' in the notion of financial difficulty. Many companies that do have difficulties, of course, recover. There are, in the research literature, two broad approaches to this topic:

The first is a qualitative approach, looking at the causes of failure by identifying the common features of failed companies. It is sometimes difficult to determine whether this approach is concerned with the causes or the symptoms of failure. The works of Argenti (1976) and Clutterbuck & Kernaghan (1990) are typical of this approach.

The other is a quantitative approach, which attempts to predict the likelihood of failure using existing numerical data. Such an approach provides a benchmark for assessing the risk of failure rather than

seeking to identify the underlying causes. We will look mainly at the work of Altman (1968) on Z scores as typical of this approach.

Qualitative approaches: the symptoms of failure

There is no scope in this module for a discussion of the differences between qualitative and quantitative research, which, to be truly constructive, must be set in the context of the subject. For the purposes of this unit, we will label as qualitative research those approaches that have concentrated on the phenomena observable in companies, such as management styles, employee attitudes and responses to change. Quantitative approaches look at the numerical data of the financial information, including accounting ratios. Interestingly, in discussions of research methods generally there is debate about the compatibility of the two approaches, and as you will see, Argenti, using a qualitative approach, did attempt to impose a numerical scoring system upon his qualitative data.

Cause or symptom?

In the previous activity, you listed courses of action that might lead a particular company to failure.

ACTIVITY

Do you think that failure must always be the result of actions taken by the company? If you think not, give an example of when failure might result from external causes.

ACTIVITY FEEDBACK

There is evidence that the failure of particular companies coincides with general or macro economic factors such as economic recession, changes in interest rates, government action or inflation. You may have used these examples, or perhaps referred to changes in technology or in consumer tastes and demands. If, for example, a company produced typewriters and found that, with the advent of wordprocessors, customer demand for its product declined rapidly, it might fail.

Using changing technology as an example, it could be suggested that one cause of corporate failure is a product or a production process becoming obsolete through advances in technology.

ACTIVITY

Returning to the example of the typewriter company, how could it avoid failure?

ACTIVITY FEEDBACK

If people no longer want typewriters but do want word processors, the company can change its strategies and produce word processors instead. In other words, we can view the decline in demand for the product as a potential cause of failure. The company will fail if it displays the symptom of not keeping up-to-date with changes in technology, society and customer demand.

Research by Houston (1989) found that commercial misjudgement and the economic cycle itself were major factors in corporate failure. However, probably the best known attempt to analyse the causes is that of Argenti (1976). He based his findings on evidence from failed companies and on interviews with experts from accountancy and banking. He found a three-stage process could lead to failure, and we will look at these stages in detail. They are:

- Inherent defects are apparent in the company.
- A major mistake is made.
- Symptoms of failure appear.

Defects

Argenti found that failed companies tended to share defects that he grouped into three areas: defective management, defective information and accounting systems, and failure to respond to change.

ACTIVITY

What examples of poor management have you come across or think might contribute to a potentially failing company?

ACTIVITY FEEDBACK

Some of the factors that you may have thought of are:

- A dominant, perhaps domineering chief executive - such a person may not want to listen to managers with different ideas.
- A chief executive who is also the company chairman and whom people see as being the manifestation of 'the company'.
- A weak board of directors who may be unable to stand up to the chairman or who may have only limited business skill.
- Poor management skills in the company generally.
- Poor financial management.

Argenti identified all of these factors. He said that they led in turn to defective information and accounting systems, including poor budgetary control, poor management of working capital, inadequate forecasts and lack of information about product costs, creditors or asset values. In addition, failed companies were found to respond badly to change, failing to recognise when products and production techniques, for example, were out-of-date.

Mistakes

Argenti's second stage occurred when one or more of these defects led to a mistake.

ACTIVITY

One mistake was referred to as 'the big project'; a mistake that, if big enough, could bring the company down. This is almost a synonym for something that we have already looked at in this module. Give an example of something that might fall under the heading of the 'big project'.

ACTIVITY FEEDBACK

If a company is dependent on a single project, product, customer or supplier then it is at risk from Argenti's 'big project' syndrome, which in other words is putting all the company's eggs in one basket. The 'big project' could also be something that the company rushes into, without planning or forethought, such as an ill-advised takeover bid or a badly directed research and development programme.

Argenti also highlighted two other areas where mistakes could be made:

- Over-gearing – i.e. having too great a level of debt compared to equity as the source of the company's finance.
- Overtrading – i.e. increasing trade rapidly without the supporting finance to cope with the time lag between paying for increased consumption on input resources and receiving payment for the sale of the outputs of such activities.

Both arise from poor financial advice or failure to listen to sound financial advice.

Symptoms

Argenti's research then found a series of events that might typically occur when the mistake had been made:

- The financial situation of the company, as shown by its ratios, begins to deteriorate, which may in turn lead to

- Creative accounting, or the unusual or different accounting treatment of transactions, assets and liabilities in order to make the company's paper position look better: an example might be revaluing assets by changing the depreciation policy.
- Cutting expenditure; for example on capital projects, management salaries and overheads, typically on service and quality control.
- Senior staff leaving, rumours about the company beginning to circulate and writs from creditors arriving.

You may feel that by the time the symptoms appear, it is too late to rescue the company from failure.

ACTIVITY

Think about one of Argenti's defects that you have witnessed or read about in a business organisation. Did it lead to any of the mistakes or symptoms?

ACTIVITY FEEDBACK

Your answer will be unique to you, but the analysis may seem to be an accurate reflection of your experience in business. You may be able to think of examples of well-known and less well-known businesses with dominant chief executives, poor managers, reliance on an out-of-date product or obsessed with a particular project, and they may all have failed.

However, the following criticisms have been directed at this research:

1. The three-stage process can be difficult to test because it depends on qualitative concepts. By definition, anything qualitative is open to interpretation in different ways by different people. For example, Argenti defines an autocratic chief executive as one who dominates colleagues, ignores their views and recruits them as merely skilled 'yes-men'. However, this can be difficult to assess if you have no personal knowledge of the company or of the chief executive's management style.

2. The research found these defects, mistakes and symptoms in failed companies, but it could not establish that the reverse was true; that is, that if a company displayed such defects, mistakes and symptoms it would necessarily fail.

3. The research could not prove that these were the only causes of failure in companies. There could be other factors that Argenti did not find.

4. The factors that Argenti found are not necessarily independent. For example, the presence of a dominant chief executive could in itself be the cause of weakness in the board of directors or of 'big project' syndrome.

In his later work, Argenti (1977) developed his theme to extend to typical profiles of companies that failed. There were three of these:

1. The company that never really gets off the ground; it fails after a short period during which its results are poor.

2. The company that experiences spectacular growth in sales and profitability to begin with.

ACTIVITY

This profile should remind you of a potential problem that we discussed in Unit 9. What is it?

ACTIVITY FEEDBACK

This is the profile of a company that is overtrading. It may have a single product, perhaps a high fashion item or something in the technological field for which there is a great demand. It cannot keep up with production because of lack of working capital.

3. The third of Argenti's profiles is that of the established, profitable company which goes into decline. This profile would of course, follow the three-stage process.

In summary, we can say that Argenti's research usefully provides valuable insight into the features of failure, and may pick up the danger

signals pointing to failure at an early stage, but it is not a perfect tool for forecasting failure.

It is worth noting that Argenti tried to impose a numerical model onto his qualitative work. To each of his defects, mistakes and symptoms he allocated a possible points score:

	A-scores/Points
Defects	
Management	
Autocratic chief executive	8
Chief executive is also chairman	4
Imbalance of knowledge	2
Passive board	2
Weak finance director	2
Lack of managers below board	1
Accounting systems	
Budgetary control	3
Cashflows	3
Costing systems	3
Response to change	
Products, processes, markets, etc.	15
Total possible score (danger mark = 10)	43
Mistakes	
Overtrading	15
Gearing	
Overdrafts and loans too high	15
'Big project'	
Project failure jeopardising company	15
Total possible score (danger mark = 15)	45
Symptoms	
Financial	
Deteriorating ratios	4
Creative accounting	4
Non-financial signs	
Declining quality, morale etc.	3
Terminal signs	
Writs, rumours, resignations	1
Total possible score	12
Total overall possible score	100
Danger mark total = 25	

The points, or A-scores, would only be awarded if the factor existed, so if the chief executive was autocratic, the company gained 8 points, if not, they gained no points, and so on. There were no intermediate scores.

Argenti said that if the points scored were greater than 25 the company was likely to fail within 5 years. If it gained over 10 points in the defects section this was a warning that it was in danger of making a mistake, and if it scored fewer than 10 in defects, but over 15 points for mistakes the company was at risk.

Attitudes

Other work in the qualitative field was done by Clutterbuck and Kernaghan (1990) who compared samples of failed companies and non-failed companies in order to identify different attitudes of both employees and management. They found that positive attitudes to the following were a feature of companies that survived:

- Management team, leadership, staff roles and communications.
- Customers.
- Winning and losing.
- Learning.
- Investors.

The last point is interesting because it reflects Argenti's work. Clutterbuck and Kernaghan found that companies run by individuals, with entrepreneurial flair failed if they did not create good working relationships with investors and banks.

The main problem with the qualitative studies is the difficulty of measurement. It is easy to say, for example, that failure can be ascribed to lack of budgets, plans and forecasts, but what represents a lack of planning to one person may be flexibility and readiness to respond to change to another. These studies do not tend to be able to identify the potential for failure, but provide a guideline of those areas that management must address if the company is to succeed. For example, Stradling's (1998) SCAM model uses the areas of:

- Strategic
- Control
- Accounting and finance
- Management

ACTIVITY

For each of these areas draw up a table using the grid below of the features that we have already seen, and adding any more that you think might be relevant. One example of each has been included for you:

Strategic	Control	Accounting and finance	Management
'Big project syndrome'	Poor forecasting	Overtrading	Weak management

Which do you think is the most important?

ACTIVITY FEEDBACK

We would summarise the factors as follows:

Strategic	Control	Accounting and finance	Management
'Big project syndrome'	Poor forecasting	Overtrading	Weak management
Developing a bad product	Ineffective or weak management and accounting information systems	Over-gearing	Power centralised in chief executive
Inability to respond to change	Fraud!	Creative accounting	Incompetence
Relying on a single product		Lack of control over aspects of working capital	Poor staff morale

Although there is no right or wrong answer here, it seems that a poor management team is responsible for all the other causes of failure.

Quantitative approaches: forecasting failure

Z scores

Altman (1968) who used a technique called Multiple Discriminant Analysis pioneered quantitative methods in this field. This is similar to linear regression, which you looked at in the Business Decision Making module. Basically, accounting ratios are set in pairs against each other, such as debtors against cash or stock against fixed assets, to test for a relationship between them. Having selected five pairings, Altman then weighted them and added the weightings to give what he called the Z score for the company. The five significant pairs of ratios were:

R_1 working capital/total assets

R_2 retained earnings/total assets

R_3 earnings before interest and tax/total assets

R_4 market value of shares/book value of total debt

R_5 sales/total assets.

ACTIVITY

Comparing these with the accounting ratios that you are used to from your level 1 studies, you should notice that none of them is a standard accounting ratio.

1. Which one of Altman's ratios restricts the application of the model and why?

2. Are there any ratios that you might have expected to be there that are not?

ACTIVITY FEEDBACK

1. R_4, based on market value of shares, restricts the model to quoted companies. This also indicates that a mixture of internal and external information is to be used.

2. Neither of the ratios that you have used before to test liquidity is in the list: the current and acid test ratios. It might be thought that in a discussion of corporate failure, these would be relevant.

Altman then developed an additive formula as follows:

$$Z = 1.2R_1 + 1.4R_2 + 3.3R_3 + 0.6R_4 + R_5$$

ACTIVITY

The score with the greatest contribution is R3, earnings before interest and tax/total assets. Comment on this.

ACTIVITY FEEDBACK

This ratio refers to the current profitability of the company so it is not surprising that it receives the greatest weighting. It helps to emphasise the importance of considering liquidity and other ratios in a dynamic context. A company may have problems but, if it is profitable, funds should flow in if working capital is managed properly.

Altman forecast that if a company had a Z score over three it would be safe, but if the score was below 1.8 it was 95% likely to fail. We have already seen that the model is limited and that it uses some unusual ratios but there is another problem with the use of limits like this.

ACTIVITY

You are a manager in a bank or financial institution that has been approached by a company for finance. You have been given sufficient information to enable you to use Altman's Z score model and you calculate the company's Z score as 1.79. Would you lend the company money?

ACTIVITY FEEDBACK

There are really two problems here. The first is that you have a number that is so close to the cut-off point that it should provide a measure of doubt in your mind. Had the score been 1.2 you would have had greater confidence that the company would fail. If it had been 3.6 you would have been confident about lending the company money. The second problem is that if you are a believer in Altman's model and you refuse the funding, that refusal itself may be the final factor contributing to the company's failure. In other words, the model has proved to be a self-fulfilling prophecy.

Other problems with the Z score method are:

- It was developed by concentrating on established firms.
- It takes no account of factors such as the age of the company, the industry sector or the size.
- It uses accounting data, which although verifiable is historical and may not display current asset values.

Models like this reject the qualitative approach of Argenti as being subjective, and use financial ratios based on published accounts. While these figures are objective, they are only so in the sense of being verifiable by inspection and calculation. This does not make the model an accurate one. Companies can recover from financial problems because they are composed of people, and people can adapt to changing situations if they want to. Managers can read the signs that point to failure and take corrective action.

Others followed the research of Altman. In the UK, Taffler (1982) found a similar list of ratios which he said were useful as failure predictors, of which the first two were the most important:

- earnings before interest and tax/total assets, (measuring the earnings flowing into the company)
- total liabilities/net capital employed, (external claims on the company)
- quick assets/total assets
- working capital/net worth
- cost of sales/stock.

ACTIVITY

Do you think this model has any advantages over that of Altman?

ACTIVITY FEEDBACK

This list of ratios does solve the problem that Altman's model is only applicable to quoted companies by making no reference to share values. It also, therefore, does not rely on any external information.

On a lighter note...

Clutterbuck & Kernaghan, identified from a variety of sources, a totally subjective list of failure indicators, which we offer for their entertainment value rather than as serious indicators of potential failure:

- Personalised number plates.
- Named car parking and executive washrooms.
- Annual report showing the chairman leaving in a helicopter.
- Fountain in the forecourt.
- Fish tank in the boardroom.
- New offices opened by the Prime Minister.
- Company yacht/aircraft.
- Fast talking managing director.
- Directors with military titles.
- Company matchboxes and other disposable promotions.

Does a company you have experience of display any of these characteristics?

Conclusion

Insofar as we can reach a conclusion about these models, it seems that aspects of both the qualitative and the quantitative approaches are important. Managers need to understand the importance of several factors if a company is not to fail:

- Liquidity.
- Cost changes as circumstances change.
- Stability of the industry and the activities of competitors within it.
- Corporate strategy.
- The quality of all levels of management.
- How investors perceive the company when they look at its accounts and other relevant information.

It would be unwise to rely on a formula in decision making; there is no substitute for judgement based on sound information.

This brief overview of the nature of company failure brings us to the end of this module. We said at the start that failure could be seen as one of a number of factors; for example, not meeting objectives or being taken over. This module has attempted to show the importance of a number of aspects of strategic financial management:

- Making investments that show a positive NPV, and with due regard to the specific risks involved.
- Using appropriate sources of finance.
- Having a suitable gearing level.
- Having an attractive dividend policy.
- Correct management of working capital.
- Acting wisely if a merger or takeover is likely.
- Managing the risks involved in foreign exchange.

All these reflect the objective of maximising shareholder wealth, and any one of them carries with it the potential for corporate failure. You should now read the key points from this unit given below before attempting the self-assessment questions.

KEY POINTS

The key points from this unit are:

1. A company may experience financial difficulty because it fails to maximise shareholder wealth, by following any one of a number of courses of action identified throughout this module, and summarised above.

2. Two broad approaches have been used in the research literature on company failure: qualitative and quantitative.

3. The qualitative approach looks at the common features of failed companies in an attempt to identify causes of failure, although these may only be symptoms. This approach is represented by the work of Argenti, who identified a three-stage process leading to:

   - defects: of management, in information and accounting systems and failure to respond to change
   - a major mistake such as big project syndrome, overtrading or over-gearing
   - symptoms of failure: a deteriorating financial situation, creative accounting, cutting expenditure and senior staff leaving, rumours and writs.

4. Other qualitative research carried out by Clutterbuck & Kernaghan suggested that companies' survival needed positive attitudes towards management, customers, winning and losing, learning and investors.

5. The quantitative approach relies on numerical data and attempts to predict the likelihood of failure. Altman's Z score model is an example of this approach. He used the following ratios:

   R_1 working capital/total assets

   R_2 retained earnings/total assets

   R_3 earnings before interest and tax/total assets

   R_4 market value of shares/book value of total debt

   R_5 sales/total assets

   in the formula:

   $$Z = 1.2R_1 + 1.4R_2 + 3.3R_3 + 0.6R_4 + R_5$$

and claimed a score below 1.8 indicated a 95% likelihood of failure.

SELF-ASSESSMENT QUESTIONS

Question 1

In the table below draw up a list of the differences between the qualitative and quantitative approaches to research into company failure, by answering the questions:

	Qualitative	Quantitative
What is the aim of the research?		
What is studied?		
Who is the main researcher?		
What model did their work produce?		

Question 2

Explain why a company's use of an old-fashioned production process might be a symptom of its failure rather than the cause.

Question 3

Which of these are the three stages of Argenti's process towards failure?

(a) poor management, poor information and failure to respond to change

(b) big project syndrome, over-gearing and overtrading

(c) creative accounting, cutting expenditure and senior staff leaving

(d) defects, mistakes and symptoms

Question 4

What are the four parts of Stradling's model of areas of potential failure:

S————-

C————-

A————-

M————

Question 5

What is a Z score?

Question 6

According to Altman what significance would the following Z scores have in relation to a company?

(a) 3.8

(b) 2.0

(c) 1.8

(d) 1.1

ANSWERS TO SELF-ASSESSMENT QUESTIONS

Answer 1

Your table should look something like this:

	Qualitative	Quantitative
What is the aim of the research?	To identify the causes of failure	To predict corporate failure
What is studied?	Common features of failed companies	Numerical data from company accounts
Who is the main researcher?	Argenti	Altman
What model did their work produce?	Three stage model of process towards failure	Z score model

Answer 2

The old-fashioned technology being superseded is a potential cause of failure, if the company does not adapt to the changes and keep up-to-date. A symptom of failure would be the continued use of the old process.

Answer 3

The correct answer is (d) defects, mistakes and symptoms are the three stages of Argenti's process. (a) gives examples of defects, (b) of mistakes and (c) of symptoms.

Answer 4

The four parts of the Stradling model are:

- Strategic
- Control
- Accounting and finance
- Management.

Answer 5

A Z score is the sum of the value of weighted accounting ratios, identified by Altman as differentiating between failed and non-failed companies. A score of less than 1.8 indicates that a company is likely to fail.

Answer 6

Altman's cut-off points were 3 and 1.8 so:

(a) 3.8 indicates that a company is safe.

(b) 2.0 is in the band between safety and failure, and there is a possibility of failure for this company.

(c) 1.8 is the score below which a company is likely to fail, so this company is on the borderline.

(d) 1.1 indicates that the company is likely to fail.

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