

ACCA

Advanced Performance Management (APM)

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Advanced Performance Management (APM)

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SYLLABUS

1. The aim of the paper

The aim of this paper is to apply relevant knowledge, skills and exercise professional judgement in selecting and applying strategic management techniques in different business contexts and to contribute to the evaluation of the performance of an organisation and its strategic development.

2. The syllabus and the exam

2.1. Syllabus overview

There are six areas detailed in the syllabus:

- Strategic planning and control
- External influences on organisational performance
- Performance measurement systems and design
- Strategic performance measurement
- Performance evaluation and corporate failure
- Current developments and emerging issues in performance management

Each of these areas are dealt with in the following chapters of these Course Notes.

2.2. The examination will be a three hour 15 minute paper in two sections:

	<i>Marks</i>
Section A: one compulsory question	50
Section B: two compulsory questions of 25 marks each	50
Total	100

2.3. Paper APM

ACCA Paper Advanced Performance Management (APM) builds on ACCA Performance Management paper and you are expected to have a thorough understanding of the F5/PM syllabus. Although some of the topics from Paper F5/PM are revised in these notes, it is impossible to revise all of them. If (because of previous syllabus changes) you did not take Paper F5/PM, or if you have forgotten what is covered there, then it is vital that you obtain a set of PM notes and work through them properly yourself. PM Notes and lectures are available on the [Opentuition.com](https://www.opentuition.com) site.



2.4. Paper SBL

In addition, there is considerable overlap between APM and SBL in the area of strategic planning and control. Although this area is revised briefly in these notes you should make sure that you are prepared to demonstrate your SBL knowledge in the Paper APM exam.

2.5. Finally!

Because of the overlap of APM with both PM and SBL, it will appear that there is not a lot new to learn for APM. In one way that is true with respect to the technical content of the syllabus, but it is certainly not true with respect to the style of questions and skills needed to pass this exam. Question practice is essential.

The examiner has written an article explaining his approach to the exam. You can find the article on the ACCA website:

<https://www.accaglobal.com/us/en/student/exam-support-resources/professional-exams-study-resources/p5/technical-articles/apm-approach.html>

It is strongly recommended that you read this article before (and after!) your studies.



Chapter 1

THE NATURE OF PERFORMANCE MANAGEMENT

1. Introduction

This chapter looks at what is meant by “performance management”. It is essential to understand that term if you are going to succeed in this paper as questions are directed at describing, improving and reporting on performance management systems.

2. Performance management

It is presumably obvious that organisations will want to improve their performance. However, it is not at all obvious how good performance should be defined. This will differ between organisations and departments within those organisations, and will often vary over time within a single organisation or department.

For example:

<i>Type of organisation</i>	<i>Possible signs of good performance</i>
Profit seeking/commercial	Rising share price, increasing profits, dividends and EPS.
A city council's waste management services	Regular rubbish collection, clean streets, few complaints, no smell.
A school	Good exam results, good pupil attendance, low rates of bullying, success at sport.
A charity for the supply of medicines and medical care	Number of patients helped, number of patients cured, number of people vaccinated.

You might disagree with some of the signs of good performance listed. For example, not everyone might think that good sports performance is relevant to schools; others feel strongly that it is. Some people might believe that vaccination is wrong. Additionally, some indicators can be contradictory. For example, the relationship between increasing profits, increasing dividends and increasing share value is complex.

Furthermore, identifying desirable performance such as an increasing share price does not say anything about what behaviours are needed to produce that. For example, it could be dependent on more advertising, cost cutting, moving-up market, withdrawing certain products and from certain markets, spending on research and development to invent new unique and popular products. If increased share price depends on innovation then successful innovation becomes essential performance.



So, to where do managers look to see what might be regarded as markers of performance? The answer is that they must look to the organisation's mission and its stakeholders.

3. Performance management

Once desirable performances have been defined, the next step is to manage it so that individuals, cost centres, divisions and subsidiaries all work towards achieving those behaviours and targets. This requires three steps:

- (1) Design ways in which to measure the desired behaviours and achievements
- (1) Measure them
- (2) Provide suitable feedback

There can be many measures in a large company, but the most important are called key performance indicators (KPIs). These are just what the name implies: measurements, or indicators, of performance where the organisation must do well if it is to succeed. Achievement of the KPIs should be high on everyone's agenda.

4. The mission statement, goals and objectives

4.1. The mission statement

In section 2, above, we asked how good performance could be identified or defined and the mission or mission statement is very important here.

The mission statement is an expression of the overall purpose and scope of the organisation, which is in line with the values and expectations of the stakeholders.

It answers the question: What sort of business are we, or do we want to be?

A mission statement will generally contain four elements:

- | | |
|------------------------------------|--|
| • a purpose | What, and for whom, the company exists for. |
| • a strategy | The range of businesses in which the firm seeks to compete and some indication of how it intends to compete. |
| • policies and behaviour standards | Guidelines which help staff decide what to do on a day-to-day basis to carry out the strategy. |
| • values | The beliefs and moral principles which lie behind the firm's culture. |

So a mission and mission statement is a public statement about what the organisation is for, how it intends to achieve those aims and also statements about its ethics and values.

Achieving the mission can therefore be taken as a strong indication of what is meant by of good performance.



Examples of three 'real-life' mission statements are reproduced below:

Mission Statement

The mission of The Walt Disney Company is to be one of the world's leading producers and providers of entertainment and information. Using our portfolio of brands to differentiate our content, services and consumer products, we seek to develop the most creative, innovative and profitable entertainment experiences and related products in the world.

McDonald's vision is to be the world's best quick service restaurant experience. Being the best means providing outstanding quality, service, cleanliness, and value, so that we make every customer in every restaurant smile.

The mission of the Office of the United Nations High Commissioner for Human Rights (OHCHR) is to protect and promote all human rights for all.

So, performance in The Walt Disney Company includes:

- Creativity
- Innovation
- Differentiated content
- Profit

McDonalds lists:

- Quality
- Service
- Cleanliness
- Value
- Customer satisfaction (smiles!)

No doubt profit is also important to McDonalds, but some companies are reluctant to refer to that in their mission statements.

The mission of the Office of the United Nations High Commissioner for Human Rights (OHCHR) is to protect and promote all human rights for all is somewhat fuzzy. It would be better if it were more precise in defining human rights and how it might resolve conflicting views.

Although the purpose of the Mission Statement is to communicate to stakeholders the nature of the organisation, and to focus strategy, in practice they are often full of meaningless phrases!



4.2. Goals and objectives

Missions can be very grand and not very specific. It's all very well for a company to say that it has 'quality' as one of its mission, but what does quality mean? What frequency and type of defect must be eliminated and which will be tolerated? By when must a quality level be attained? Something more specific is needed.

Goals and objectives are often put together with no distinction made between them. However, strictly speaking, **goals** are statements of general intentions (not that much different to a mission), whereas **objectives** are more specific.

An example of a **goal** is: to improve profits

An example of an **objective** is: to achieve a Return on Capital Employed of 25% within two years.

4.3. Good' objectives should be SMART:

Specific: sales, rejects, cost per unit are all specific. Better and improve are not

Measurable: usually that the specific aspects of performance have to be quantified

Agreed/accepted/achievable: imposing an unrealistic or impossible target will be ineffective

Relevant: relevant to the person responsible (ie they can affect it); relevant to the organisation's mission. If objectives are seen as irrelevant, arbitrary and merely an exercise in management power they will fall into disrepute.

Time-bound: objectives should be attained within a specified time frame.

An example of 'real-life' objectives is printed below:

Financial objectives over the next 3 years:

- To increase the operating profit before taxes by 15%
- Return on equity of at least 20%
- Cost-income ratio below 45%
- Net credit losses below 0.5%



4.4. Critical success factors

An organisation can easily end up with many objectives and there is a danger that the more easily attained objectives is what people concentrate on. However, there are some objectives which are more important or fundamental to success than others. These are the organisation's **critical success factors**.

Here are two definitions:

Johnson, Scholes & Whittington:

- 'Those product features that are particularly valued by a group of customers, and, therefore, where the organisation must excel to outperform the competition'

Or:

- Where an organisation must perform well if it is to succeed.

The second definition is simpler, but the first is more useful because it places emphasis on the idea that success is caused by customers: it is vital (critical) to meet customers' expectations.

Controlling and planning critical success factors

Sometimes it is essential that current targets are met - and particularly important if these targets relate to critical success factors. The target has become a KPI.

For example, if a company's success relies on its reputation for high quality then it must maintain that reputation by ensuring methodologies are put in place to measure that quality so that remedial action can be taken quickly if needed. That would be an example of a controlling CSF and its associated KPI.

Sometimes, however, a company might have decided that its future depends on change. Perhaps its products have become dated and to survive the company must have a successful program of innovation. Innovation requires careful (and risky) planning but it might be essential. CSF and KPIs (eg two new, innovative products within 12 months) must be established and incorporated into the planning process.

Both controlling activities and planning activities are necessary and a careful balance is needed between them. Enough resources must be dedicated to the future whilst not jeopardising current profitable operations.



Examples of critical factors could be:

- Profitability
- Market position
- Reputation
- Market share
- Productivity
- Product leadership
- Personnel development
- Employee attitudes
- Public responsibility

They depend on:

- Structure of the industry
- Competitive strategy
- Industry position
- Geographical location
- Environmental factors
- Temporary factors
- Functional managerial position

Classification:

- Internal eg inventory control; delivery times
- External eg exchange rates
- Monitoring eg actual vs budget
- Building eg targets to launch new products or updates

Johnson and Scholes suggested a six step process for developing CSFs:

- Identify the success factors that are critical for profitability.
- Identify what is necessary (the 'critical competencies') in order to achieve a superior performance in the critical success factors.
- Develop the level of critical competence so that a competitive advantage is obtained.
- Identify appropriate key performance indicators for each critical competence.
- Give emphasis to developing critical competencies that competitors will find it difficult to match.
- Monitor the firm's and competitors' achievement.



4.5. Stakeholders

A stakeholder is anyone, or any organisation, affected by an organisation.

Stakeholders include: shareholders, employees, suppliers, customers, the local populace, government. Stakeholders have different requirements and these will affect what is meant by performance. Consideration of stakeholders is important because:

- Generally, the organisation is being run for the benefit of at least some stakeholders. For example, a profit-seeking organisation is run primarily for the benefit of shareholders; a hospital is run primarily for the benefit of patients.
- Other stakeholders can influence the success of the organisation. For example, if employees go on strike then this will put the organisation's profits at risk or might prevent further admissions of patients to a hospital

Therefore, when devising strategies, managers must bear in mind:

- What the principal stakeholders want
- What the stakeholders will tolerate.

Mendelow's matrix can help managers to decide on how best to handle stakeholders:

		Interest	
		Low	High
Power	Low	Minimal Effort	Keep Informed
	High	Keep Satisfied	Key Players

Power = the amount of power a stakeholder can exercise

Interest = how likely a stakeholder is to take action

The four categories of stakeholder are:

- Key players: these people have the power and will take action. Therefore management needs to keep them happy.
- Keep satisfied: they have power but are reluctant to exercise that power provided they are kept satisfied. If really unhappy, they might turn into key players.
- Keep informed: no power, but lots of noise. Management will aim to keep them informed as a matter of politeness.
- Minimal effort: this group is at the back of the queue when management is making decisions.





Chapter 2

STRATEGIC MANAGEMENT ACCOUNTING

1. Introduction

This chapter contains a general review of the different levels at which planning, decision making and control take place within an organisation so as to manage both its long-term and short term performance.

Additionally, more detailed consideration is given to the nature and purpose of strategic planning.

2. Hierarchy of management

Planning, performance management, decision making and control can be classified into three levels:



Strategies and objectives (for example budgets) measurement and controls will be exist at all three levels and should form a coherent plan. For example, if the company wants to increase its sales by 50% in the next three years by expanding abroad (a strategic level target), this will have to be communicated to the various operating units and each will be given their own objectives for each year (the tactical level). If all operating units achieve their targets then so should the company. In turn, the tactical-level objectives will have to be communicated to operating departments: sales, production, marketing etc. so that operating unit performs as required. All the time, measurement of progress has to be in place at all levels and performance actively managed where necessary. In this way strategic objectives are cascaded down the organisation via the formulation of subsidiary performance objectives.



2.1. Strategic planning:

This is the process of developing the long-term (for example 5 to 10 years) plans for the company.

For example: what new products to launch?
 what new markets to develop?

This sort of planning, together with the decision making involved, will be done at Board level. It tends to be more outline rather than detailed planning.

2.2. Management control / Tactical planning:

This is the more detailed, short-term planning (for example, the one year budgets) in order to ensure resources are obtained and used effectively in order to achieve the long-term plans of the company

For example: how many staff will the company need next year?

Control will be exercised against budget using, for example, variance analysis.

2.3. Operational control:

This is the day-to-day management of the business in order to ensure that specific tasks are carried out effectively and efficiently.

For example: ensuring that the budgeted production is achieved each day.

The information used will be very detailed and will be quantitative, but will often be expressed in terms of (for example) units or hours instead of purely in monetary terms.

3. Strategic planning

As previously stated, strategic planning is the developing of a long-term plan for the company. The various stages involved are illustrated in the diagram below (P3 revision):



3.1. Strategic planning model



Each of the stages involved is explained in the following paragraphs.



3.2. Mission statement

As described above: the mission tries to encapsulate the purpose and values of the organisation.

3.3. Stakeholders

As described above: strategy should be determined by what stakeholders want or tolerate.

3.4. Ethics

Strategic decisions cannot be separated from a consideration of the ethical consequences of those decisions. For example, if management decides to close down an operation, employees there will lose their jobs and there is an ethical issue there'. Similarly, starting to drill for oil in an area of natural beauty will also have an ethical dimension.

With regard to ethics, in APM you are simply expected to be aware that strategies can have ethical repercussions and you should be able to discuss those at a relatively simple level. In particular unethical behaviour can have serious financial consequences such as reputational damage, fines, compensation payments and loss of trading licences.

Increasingly, sustainability is becoming an important ethical issue which customers pay attention to. Sustainability means meeting our own current needs without compromising the ability of future generations to meet their own needs. Sustainability is not just environmentalism and most definitions of sustainability also include concerns for social equity and economic development.

3.5. Corporate Appraisal

Corporate appraisal is a critical assessment of the strengths and weaknesses, opportunities and threats in relation to the internal and external (environmental) factors affecting an organisation. The purpose is to establish the condition of the organisation prior to preparing a long-term, strategic plan.

The term 'Position Audit' is sometimes used as an alternative to 'Corporate Appraisal' and sometimes used to refer to an organisation's internal factors.

Corporate appraisal requires organisation to look at:

- External (environmental) factors. These can be categorized as opportunities or threats
- Internal factors (resources and competences). These can be categorized as strengths or weaknesses.



3.6. External factors can be assessed using PESTEL or a Porter's five forces analysis:

PESTEL

- Political
- Economic
- Social
- Technological
- Environmental/ecological
- Legal

Although organisations usually can't do much to change PESTEL factors, they might be able to avoid threats (for example do not try to develop markets which technology is likely to make redundant) or make use of opportunities (for example, expand into a country that has become economically and politically attractive).

Porter's five forces (industry level): looks at industry attractiveness.

- Threat of new entrants
- Threat of substitutes
- Bargaining power of buyers
- Bargaining power of suppliers
- Rivalry between existing competitors

Organisations can assess which industries are most attractive and may also be able to change the effect of the five forces. So, if competition (rivalry) is fierce perhaps the organisation should consider a takeover or merger; if there is intense bargaining power from suppliers, performance might be improved by backwards integration by setting up or taking over a supplier.

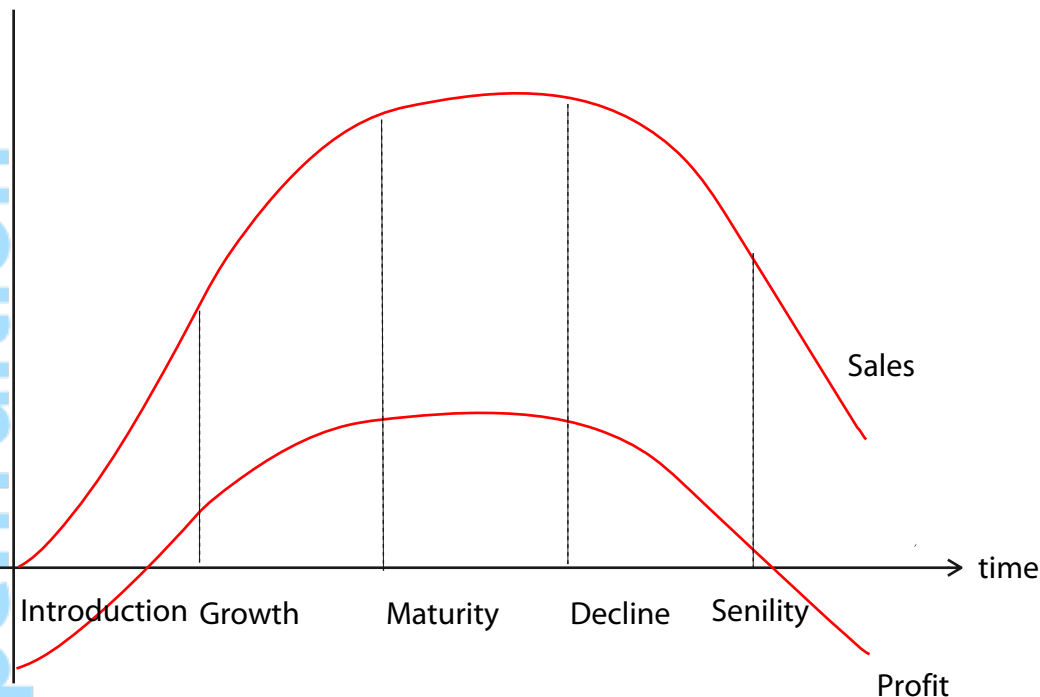
3.7. Internal factors – resource analysis (M words)

- Money
- Men and women
- Manufacturing/machinery
- Material
- Methods (knowhow)
- Management
- Management information systems (IT)
- Marque/make (brand)
- Markets and marketing



3.8. Internal factors - produce life cycle

This helps an organisation to decide on which products should be continued and promoted, and which products should perhaps be phased out or abandoned as this is influenced by where products are positioned on its 'product life cycle'.



Remember this is not very good at forecasting when a new phase might start.

It can be useful to think about what aspects of performance should be concentrated on at each phase of the life cycle to try to maximise performance:

Introduction:

It is vital that the product has a successful launch. Successful advertising and promotion to generate good early sales is essential. If the product does not have a successful launch it can be very difficult to rescue it later. Essential performance measures could be advertising effectiveness and sales volumes achieving their budget levels. Profits are not really expected at this stage.

Growth:

The product is going to be successful. Copycats will enter the market. Continuing good performance depends on trying to stay in the lead. The company should be keeping a careful watch on competitors' activities: prices, promotions, sales volumes.

Maturity:

The market has stopped growing and there will be considerable competition. Prices will be forced down and good performance (profits) depends on large efficient operations, often global, with low unit costs.

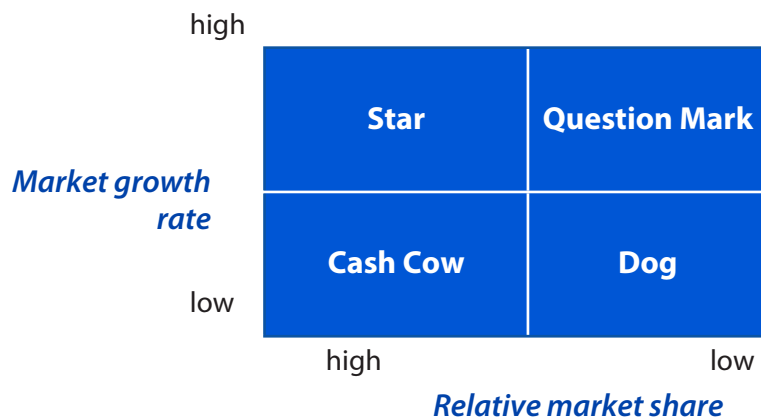
Decline:

Decline can be slow and profitable and performance depends on hanging onto a niche market. Alternatively, the company could decide to exit from the industry.



3.9. Boston consulting group (BCG) matrix.

A potentially useful approach to considering each existing product is to position them on a Boston Matrix (or Boston Grid).



Having positioned the products on the grid, it can then be used to consider future strategies for each of them.

Question mark:

Because there is a high growth rate, this product is relatively new with (perhaps) a big future. It's a product the company should be interested in selling. However, BCG places a lot of emphasis on 'big is beautiful' and says that there is no hope of profitable survival if the market share is low. Therefore decide whether to withdraw or to work to increase market share. This will be cash negative and profits are unlikely to be made as the company fights for an increased market share. Suitable performance will be successful market growth. Profit targets would not be very relevant.

Star:

Not as good as it sounds. Usually cash neutral as the company fights to keep market dominance. Sustained market share is what's wanted here.

Cash cow:

now the payback for all that earlier effort. Conserve cash, go for profits and set appropriate targets. You should not expect a major assault on this product because it is perceived as an old product on its way out. Stretch its life out as long as you can.

Dog:

Divest either by closure or sale. No growth and a small market share – going nowhere



3.10. SWOT analysis

Having analysed the internal and external factors, they can be arranged as a SWOT analysis

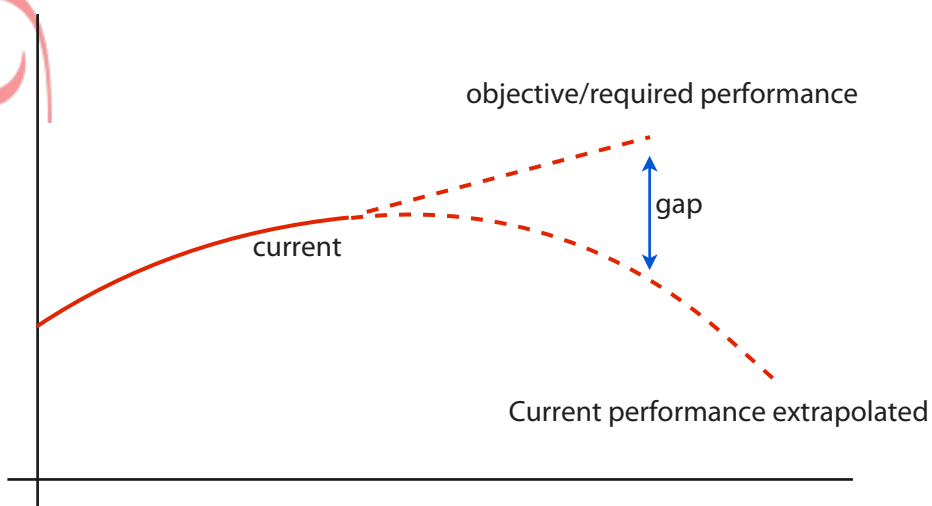
(S = strengths, W = weaknesses, O = opportunities, T = threats).

It can be useful to arrange these factors in a grid as follows so that appropriate responses can be generated - again with the hope of optimising performance:

	<i>Opportunities</i>	<i>Threats</i>
<i>Strengths</i>	This is a perfect match: strengths can be used to exploit opportunities.	Use strengths to defend against threats.
<i>Weakness</i>	An opportunity will be difficult to exploit if it depends on an area of weakness.	The organisation could be in trouble: it must defend itself, but is weak.

3.11. Gap analysis

A gap analysis compares what an organisation is likely to do if it continues more or less as it is doing, and what its owners (or other stakeholders) want the organisation to achieve.



It is often very useful to think of the organisation as having a gap in the profits expected and required so that the organisation must close a profit gap. Ansoff's product-market matrix sets out how this might be achieved.



3.12. Generic strategies

Porter argued that there are three generic strategies that will enable a company to gain sustained competitive advantage.

These are:

- Cost leadership
- Differentiation
- Focus

Cost leadership means selling ordinary products into a competitive market at a competitive price. Profits can be increased by reducing the cost of manufacture, not by raising the price of the product. Good performance depends on low costs and the company must focus on measures such as efficiency, cost of material, automation and so on. Cost leadership is usually easier to achieve if the company is very large so that it can benefit from economies of scale.

Differentiation means selling a product that is special in some way so that it commands a higher selling price than rival products. The product might be better styled, be of better quality, be tailored to the buyer's precise needs and so on. Low costs are not so vital because the profit margin depends on high selling prices. Good performance relies on innovation, flexibility, quality etc.

A focus strategy can be superimposed on the first two strategies. Focus means concentrating on only a small segment of the market. Perhaps the company is small and cannot produce a full product range, so it focuses its efforts on one segment or niche. The company has to get to know its chosen segment very well and must be able to accurately target those customers. Both cost leaders and differentiators can choose to also adopt a focus strategy.

3.13. Ansoff's matrix

Ansoff's matrix is commonly used by businesses that have growth as their main objective, and is used to focus management's attention on the four main alternative strategic options available for growth, particularly profit growth:

	<i>Existing products</i>	<i>New products</i>
<i>Existing markets</i>	Market penetration/growth Efficiency gains/cost savings Withdrawal Consolidation	Product development
<i>New markets</i>	Market development	Diversification

Ansoff's matrix is very useful: in a simple diagram all classifications of growth options are set out.

In general, staying with existing markets and products is a low-risk, low-return strategy. Exploring new markets or new products will be higher risk and return. Venturing into diversification might be sometimes seen as a sign of desperation: what is driving an organisation to risk so much on the success of a radically different business?



4. Strategic choice

Having carried out a corporate appraisal and having identified potential strategies, it is then necessary to appraise them and formulate a strategic plan. The types of techniques that may be employed in appraising the strategies are discussed in the chapter on decision making.

5. Strategy implementation

The strategic plan will generally be formulated at Board level. Once it has been prepared, it will normally be the managers of the company who will be expected to implement it. This then becomes the second tier of decision making identified at the start of this chapter – Management control / Tactical planning.

6. Special considerations for multinational companies

A multinational company is one which undertakes a substantial proportion of its business in countries other than the one in which it is based.

The strategic planning process in these companies and the strategic choices made must take account of certain special features, and you must be able to briefly describe these for the examination.

- **Process specialisation**

e.g. place labour intensive operations in countries with low wage rates

- **Product specialisation**

e.g. consumers in different countries have different requirements and 'tastes'

- **International trade issues**

e.g. the economics of a business may be particularly sensitive to exchange rate fluctuations. There could be import restrictions. There might be transportation problems.

- **Political sensitivities**

e.g. particular countries may have particular political risks.

- **Administrative issues**

e.g. the transfer of profits may result in tax being payable twice. Ownership of foreign companies might be subject to special rules.



7. Benchmarking

An organisation's objectives, capabilities, performance and strategic plans should be assessed in relative terms since its success depends on beating competitors or on improvement of previous performance. **Benchmarking** means comparing performances and there are a number of bases that can be used:

- Historical: compare to own performance in previous periods.
- Industry/sector: compare to the performance seen in other similar industries.
- Best-in-class: compare to the performance seen in the best competitor.

Additionally, the factors that are benchmarked can be:

- Functional benchmarking: comparing specific functions with the same functions in other companies (which do not have to be in the same industry)
- Product benchmarking: comparing specific products with those produced by competitors (sometimes involving reverse engineering)
- Financial benchmarking: comparing financial performance with that of competitors
- Strategic benchmarking: comparing with how other companies compete.

The typical stages involved are:

- The identification of problem areas
- The identification of other industries with similar processes, and from them the industry leaders
- The detailed surveying of the other company's business practices.
- The implementation of new, improved business practices.
- The monitoring of improvements.

There can be considerable difficulties in obtaining from competitors data needed for benchmarking. For example, no competitor is likely to volunteer how long it takes to make a product or what internal quality standards it sets. Even not-for profit organisations can be reluctant to supply benchmarking data as they are sensitive about their performance. Sometimes governments step in to ensure that comparative data is made available. For example, in the UK the government insists that schools and hospitals publish performance data. School head teachers and hospital administrators often disapprove, stating that the published data does not take into account many important factors, such as the nature of the population making use of the school or hospital.





Chapter 3

PERFORMANCE MANAGEMENT AND CONTROL OF THE ORGANISATION

1. Introduction

This chapter looks at budgeting used as a method of control within an organisation. You will already have been examined on budgeting in previous examinations, and much of this chapter is therefore revision.

In this examination, questions are more likely to focus on written aspects, and the syllabus includes budgeting in not-for-profit organisations; modern developments; and behavioural aspects.

2. Functions of budgeting

Forecasting

Planning

Communication

Co-ordination

Control

Authorising and delegating

Motivation

Evaluation of performance

[Mnemonic: Few People Can Comfortable Carry A Male Elephant!]

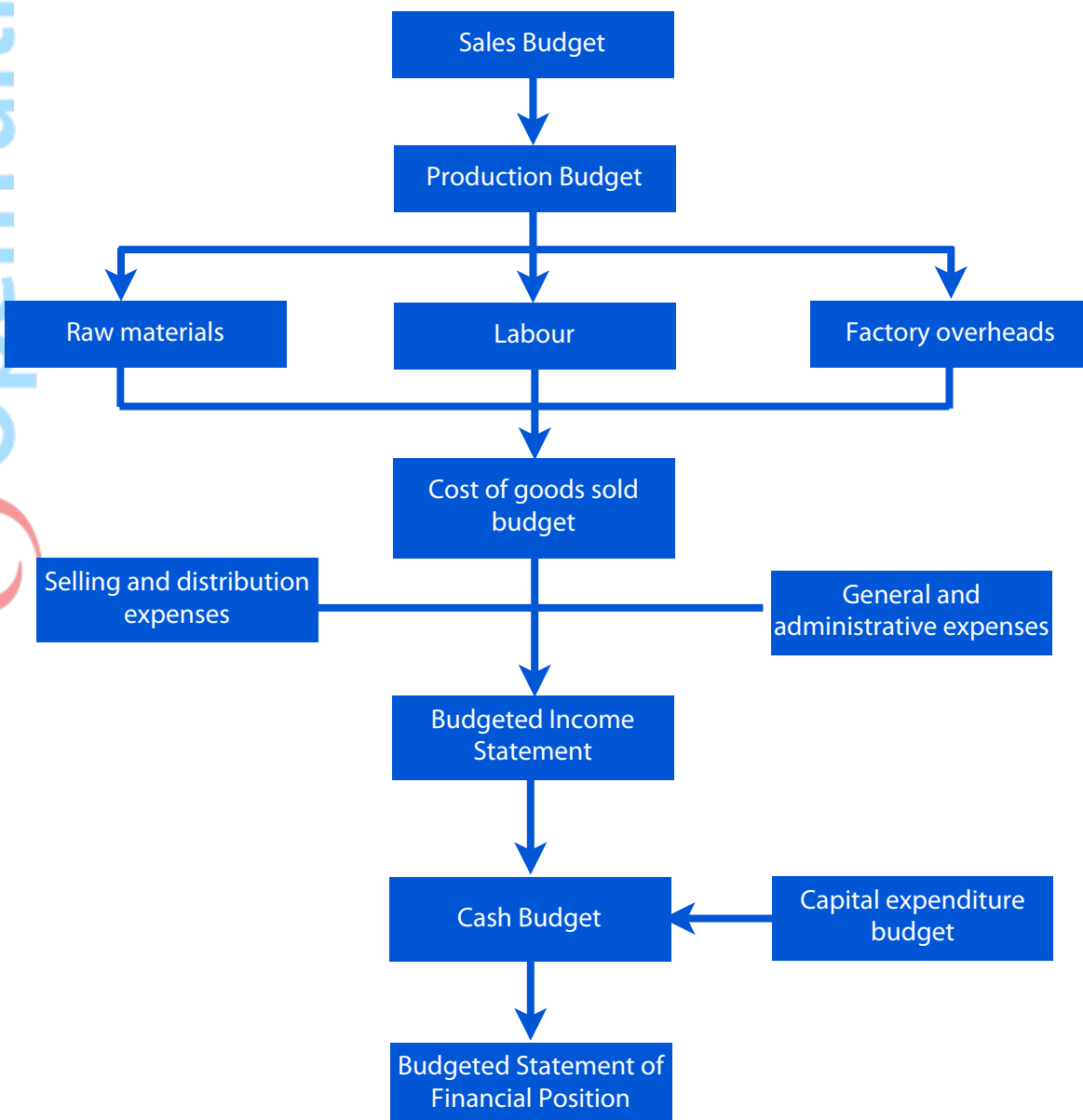


3. Principal budget factor

The principal budget factor is the factor that limits the activity for the budget period. Normally this is the level of sales and therefore the sales budget is usually the first budget to be prepared – this then leads to the others.

However, it could be (for example) a limit on the availability of raw materials that limits activity. In this case raw materials would be the principal budget factor, and this would be the first budget to be prepared.

4. The preparation of budgets



5. Types of budget

5.1. Fixed budget

This is a budget prepared at the anticipated level of activity.

If the expected level of activity changes during the period, then the fixed budget becomes unrealistic and will usually be flexed (see below) for use as control.

However, the original fixed budget still very often remains as an overall target – for instance, the profit from the fixed budget will often have been given to head office and used as the target for the period.

5.2. Flexed budget

A flexed budget is when the budget is revised (or flexed) to reflect the actual level of activity.

This budget is useful particularly for control purposes and is what we use in our variance analysis.

5.3. Rolling budget

A rolling budget is one that is kept continually up-to-date by revising at the end of each month and also adding a further month.

For example, on 1 January 2008 prepare a budget for the year to 31 December 2008.

At the end of January 2008, revise the budget for the remaining 11 months of 2008 (in the light of what happened in January), and also prepare a budget for January 2009.

In this way there is always a budget for the coming 12 month period.

The benefits of rolling budgets are that they are likely to be more accurate, and also the work-load of budgeting is spread throughout the year and becomes part of the normal job – again leading to more accurate budgeting.



Example 1

A company has prepared the following fixed budget for the coming year.

Sales	10,000 units	
Production	10,000 units	
		\$
Direct materials	50,000	
Direct labour	25,000	
Variable overheads	12,500	
Fixed overheads	10,000	
	\$97,500	

Budgeted selling price \$10 per unit.

At the end of the year, the following costs had been incurred for the actual production of 12,000 units.

		\$
Direct materials	60,000	
Direct labour	28,500	
Variable overheads	15,000	
Fixed overheads	11,000	
	\$114,500	

The actual sales were 12,000 units for \$122,000

- (a) **Prepare a flexed budget for the actual activity for the year**
 (b) **Calculate the variances between actual and flexed budget, and summarise in a form suitable for management.**
 (Use a marginal costing approach)



6. Methods of budgeting

6.1. Incremental budgeting

This approach is to take the previous year's results and then to adjust them by an amount to cover inflation and any other known changes.

It is the most common approach, is a reasonably quick approach, and for stable companies it tends to be fairly accurate.

However, one large potential problem is that it can encourage the continuation of previous problems and inefficiencies. All too often the new budget is worked out by taking last year's figures, then adding an amount for inflation (and often adding another amount for 'padding'). If we require a wages budget, we will probably ask the wages department to produce it and they (using an incremental approach) will assume that our workers will continue to operate as before. They will therefore simply adjust by any expected wage increases.

As a result, the 'plan' for our workers stays the same as before. Nobody has been encouraged to consider critically different ways of operating that may be more efficient. It is at budget time that we perhaps should be considering different ways of operating.

6.2. Zero-based budgeting

With zero-based budgeting we do not consider the previous period. Instead, we consider each activity on its own merits and draw up the costs and benefits of the different ways of performing it (and indeed whether or not the activity should continue).

We then decide on the most effective way of performing each activity.

Clearly any changes to the way an activity is performed may require funding, and there may not be sufficient funding available for all changes proposed, and therefore they are ranked to decide which changes are made.

Although this approach is in principle a much better approach to budgeting, it is time-consuming and also requires much more expertise than incremental budgeting. For this reason, it is often restricted just to a few activities each year in order that training and help may be given to the people involved. Other activities are budgeted using the incremental approach.

6.3. Activity Based budgeting

This is the application of the idea of Activity Based Costing to the process of budgeting, and as such has particular relevance to budgeting for fixed overheads.

At the planning stage, attempts are made to identify which activities drive (cause) various overheads. Costs are spread over these cost drivers using whatever basis appears to be appropriate in the circumstances. A better understanding between costs and their causes should result in better budgets better decision making and better performance.



7. Behavioural aspects

7.1. Participation

If the budget process is not handled properly, it can easily cause dysfunctional activity. It is therefore necessary to give thought to the behavioural aspects.

- **Top-down budgeting**

This is where budgets are imposed by top management without the participation of the people who will actually be involved in implementing it.

- **Bottom-up budgeting**

Here the budget-holders do participate in the setting of their own budgets.

7.2. Target setting and motivation

Targets can assist motivation and appraisal if they are set at the right level.

- if they are too difficult then they will demotivate
- if they are too easy then managers are less likely to strive for optimal performance
- ideally they should be slightly above the anticipated performance level

Good targets should be:

- agreed in advance
- dependent on factors controllable by the individual
- measurable
- linked to appropriate rewards and penalties
- chosen carefully to ensure goal congruence



7.3. Budgets and evaluation

Budgets are often used for the evaluation of performance: hit a budget and you've done well, miss it and you could be in trouble. However, proper evaluation requires care as performance might not be controllable and, indeed the budget could have been or could become incorrect.

Hopwood identified three approaches to the use of budget information by managers in performance evaluation:

Budget constrained style:	A cost overrun or a revenue shortfall is always bad and is always the subordinate's fault. Even if the subordinate had spent more for a good reason (for example to appease a very important customer who had had poor service), that expenditure would be criticized - even though it might have led to the customer being retained. This approach leads to very bad relations between superior and subordinate; it can also lead to misreporting.
Profit conscious style:	Long-term profitability and long term performance are the important measures. Cost overruns will be looked at, but will usually be tolerated for the sake of long-term success. This is probably how most of us would like to be managed.
Non-accounting style:	Here, the manager is not particularly interested in accounting and budgets. At one stage this approach would have been found in many hospitals in the UK. Treatments were relatively basic and cheap and expenditure didn't have to be watched. Now with more expensive treatments and an aging population, financial budgets have become much more important.

7.4. Responsibility accounting

A system of accounting that separates revenues and costs into areas of separate responsibility, which can then be assigned to specific managers. This can improve performance provided there is no doubt about who is in charge of achieving results and provided that person can influence the results.

7.5. Management by objectives

A system of management incorporating clearly established objectives at every level of the organisation. Here there is less emphasis on monetary budgets and more emphasis on taking action which helps the business to achieve its objectives.

Employees are given objectives then it is substantially left up to them to decide how to achieve those objectives. It can be very motivating because employees are given the responsibility to choose how best to meet their objectives.



8. Budgeting in not-for-profit organisations

Issues that tend to arise in budgeting that are specific to not-for-profit organisations include the following:

- There might be little control over revenue. For example, it might arise from an allocation of government money.
- There might be no revenue because goods and services are provided free. Therefore, how is success to be identified?
- The organisation may be prevented from borrowing funds or from budgeting for a deficit.
- The organisation may not be allowed to transfer funds from one budget head to another.
- The budgeting tends to be just for one financial year (i.e. short-term rather than long-term) incremental budgeting is the method most widely used.



Chapter 4

BUSINESS STRUCTURE, MANAGEMENT ACCOUNTING AND CHANGE

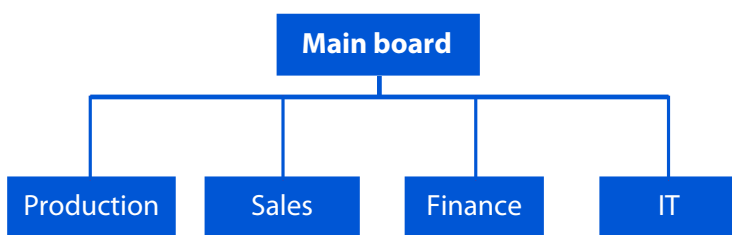
1. Introduction

This chapter looks at the different types of business structure, and the effect the structure has on the information needed. It also looks at the types of changes that business might implement to improve their performance.

2. The information needs of different business structures

2.1. Functional structure

One of the common structures found in medium-sized organisations is the functional structure. This means that people within an organisation are organised by function. So, for example, there is a finance department, a manufacturing department, a sales department, and so on.



The advantages of such a structure are:

- The organisation gains economies of scale
- Each of these department is likely to be large enough to be headed by a well-qualified manager
- Staff within each department are dealing with like-minded individuals with similar skills and motivation.

The disadvantages of such a structure are:

- As the organisation grows, each of the functional departments can become very powerful and can begin to concentrate on their own interests rather than those of the organisation as a whole. This is sometime known as a silo mentality in which departments do not wish to share information others in the same company. This type of mentality will reduce efficiency, morale and company performance.
- It is not easy to identify where profits and losses are made eg are production costs too high sales too low or has not enough been spent on research and development.



Information needs of functional structures:

Because top management in functional organisations is centralised, data from each department needs to be aggregated before top management can review and give feedback on it.

The aggregation can introduce delays in responding to the information. In addition, top management needs the skills to deal with many departments, markets and issues.

2.2. Divisional structure

As organisations grow they will often develop a divisional structure, where each division has its own functional departments and where the divisional manager has a degree of autonomy.

Divisions can be on the basis of:

- Products.
- Geography.
- Type of customer.

The advantages of such a structure are:

- Divisional managers are more motivated as they are provided with performance targets that are easier to define, measure and evaluate.
- Decisions are made 'closer to the action' so that faster decisions can be made.
- Divisions can specialize. For example, the N American division can concentrate making goods to suit that market, pricing them competitively and countering the competition there.
- Junior managers have more responsibility and get training for more senior positions in the future

The disadvantages of such a structure are:

- Head office management may need to restrict the autonomy of divisional managers, which can reduce motivation and cause dissatisfaction
- Divisional managers are concerned about their own division's performance rather than that of the organisation as a whole, which can lead to a loss of goal congruence.
- Poorer coordination.
- There can be transfer pricing issues.
- There can be some duplication of service departments eg to finance departments.

Information needs of divisional structures:

Each divisional manager needs information about the performance of his division – aggregating the data from each department within the division. This aggregated information is then passed upwards to head office.

Head office does however need to aggregate the information received from each division in order to assess the overall performance of the organisation.




2.3. Network (or matrix) structure

An example of this may be found in firms of accountants, where there may be managers responsible for each individual office within a country, but at the same time there may be managers responsible for different activities in all offices throughout the country.

As a result, an employee working in the tax department of an office in one town will be reporting both to the manager of that office, and to the nationwide tax manager.

Another example is that of employees being assigned to a project.

	Engineering	Finance	Quality control	Purchasing
Project A			↑	
Project B	←			
Project C				

These employees are responsible to both the project leader of project B and to the quality control manager.

The advantages of such a structure are:

- Communication is encouraged between various departments and activities
- Employees are encouraged to be more concerned for the organisation as a whole instead of simply their geographical division

The disadvantages of such a structure are:

- There can be conflicting pressures brought to bear on employees by the different managers to whom they report (but that might happen even in a conventional structure).
- There can be confusion over which boss has the ultimate say.

Information needs of network structures:

Data needs to be aggregated in two ways – both for the manager of the division and for the manager of the activity.

As with a divisional structure, the aggregated information is passed upwards to head office, and head office need to be able to aggregate it in order to assess the performance of the organisation as a whole.



2.4. Information needs for service organisations

You will be familiar with the information needs of manufacturing organisations. Indeed, you just have to go down the typical variances found in an operating statement:

- Sales: Volume, price and mix
- Materials: Usage, price and mix
- Labour: efficiency rate idle time and mix
- Variable overheads: expenditure, efficiency
- Fixed overheads: expenditure, volume

Service organisations conduct many different types of business such as:

- Accountancy
- Advertising
- Legal
- Consultancy of all sorts
- Training
- Travel

The many business types mean that their information needs are diverse but, assuming we are dealing with a profit-seeking organisation, they must ultimately look at information that analyses their revenue and their costs.

As with manufacturing organisations, revenue will depend on price and volume of work. The price will depend price per unit provided (such as a seat on an aircraft or price per hour charged to clients). The volume depends on units sold (like passengers or hours charged).

In service organisations, material costs are usually very low. Most will be employment costs and fixed overhead costs (such as office rent or aircraft leasing costs). Variable overheads might be significant if a lot of travel to clients is needed.

To manage these costs suitable metrics will need to be invented. For example:

- Labour: hourly rate, team mix, idle time, time taken compared to budgeted time for a job.
- Fixed overheads: expenditure, cost per chargeable hour

There are no hard and fast rules as service businesses are so varied, so think what you might be interested in if you were a manager and had to explain why your department's profit is lower than expected.



3. Business change

3.1. Types of change

Changes can be categorized as:

- Automation
- Rationalisation
- Business process engineering



Increasing degree of change

3.2. Automation

Doing by machine what had previously been done manually. Examples include:

- Wage and salary calculations
- Receivables processing
- Supermarket stock ordering

These changes should improve performance through saving labour costs, increased processing speed (so fewer delays), greater accuracy and improved management information. For example, the receivables ledger has been computerised it is possible to easily obtain management reports such as aged analysis and sales analyses.

3.3. Rationalisation

Improving performance by carrying out a process in a more logical way to reduce bottle-necks and increase efficiency. For example, asking airline passengers to check-in on-line, and to print (or have sent to a smart phone) their boarding cards. Airlines are experimenting with self-printing of luggage tags at the airport and also with labelling luggage in a completely different way, such as each piece having an electronic identifier tag.



3.4. Business Process Reengineering

Business process reengineering involves re-thinking and radically re-designing of the way an organisations processes operate.

It is not simply attempting to improve the existing way of doing things, but starting almost with a blank piece of paper and designing how best to operate the business. The starting point is to determine what the desired outcome is of the organisation and then to design how best to achieve it.

It focuses on maximising customer value and removing non-value adding work.

A leading advocate of business process reengineering – Michael Hammer – claimed that most of the work being done does not add any value for customers, and that this work should be removed, rather than simply speeded up, using technology. Information technology in particular has been used primarily for automating existing processes whereas it should be used as a way of making non-value added work obsolete.

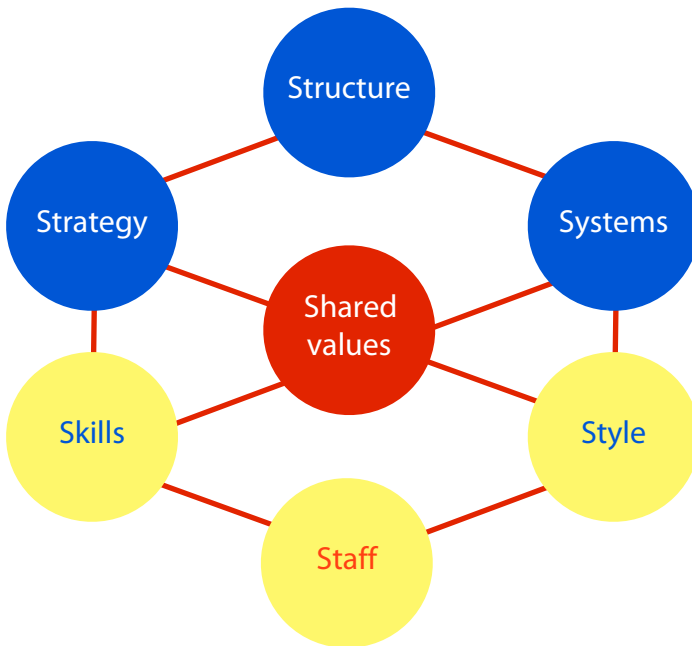
Business process reengineering opportunities can be identified by the following approaches:

- Zero-based: if you were starting the business now, how would you choose to organize it?
- Simplification – eliminate duplication and redundant steps
- Value-added analysis – remove non-value adding activities
- Gaps and disconnects – check flows between departments



3.5. McKinsey's 7S model

This model represents organisations using the following inter-related elements. To carry out a strategy successfully, consideration has to be given to getting each element correct:



Strategy

Plans on how to reach identified goals and for dealing with the environment, competition, customers, new technology and so on

Structure

The way the organisation's units relate to each other: centralised, functional divisions, divisionalisation, tall/narrow or wide/flat, decentralised (the trend in larger organisations); matrix etc.

Systems

The procedures, processes and routines define how work is to be done: financial systems, quality control systems, recruitment, promotion and performance appraisal systems, information systems, safety procedures.

Skills

Distinctive competences of personnel or of the organisation as a whole.

Staff

Numbers and types of personnel within the organisation.

Style

Cultural style of the organisation and how key managers behave in achieving the organisation's goals. For example an organisation could adopt a role culture or a task culture.

Shared Values

What the organisation stands for and what it believes in. Central beliefs and attitudes.

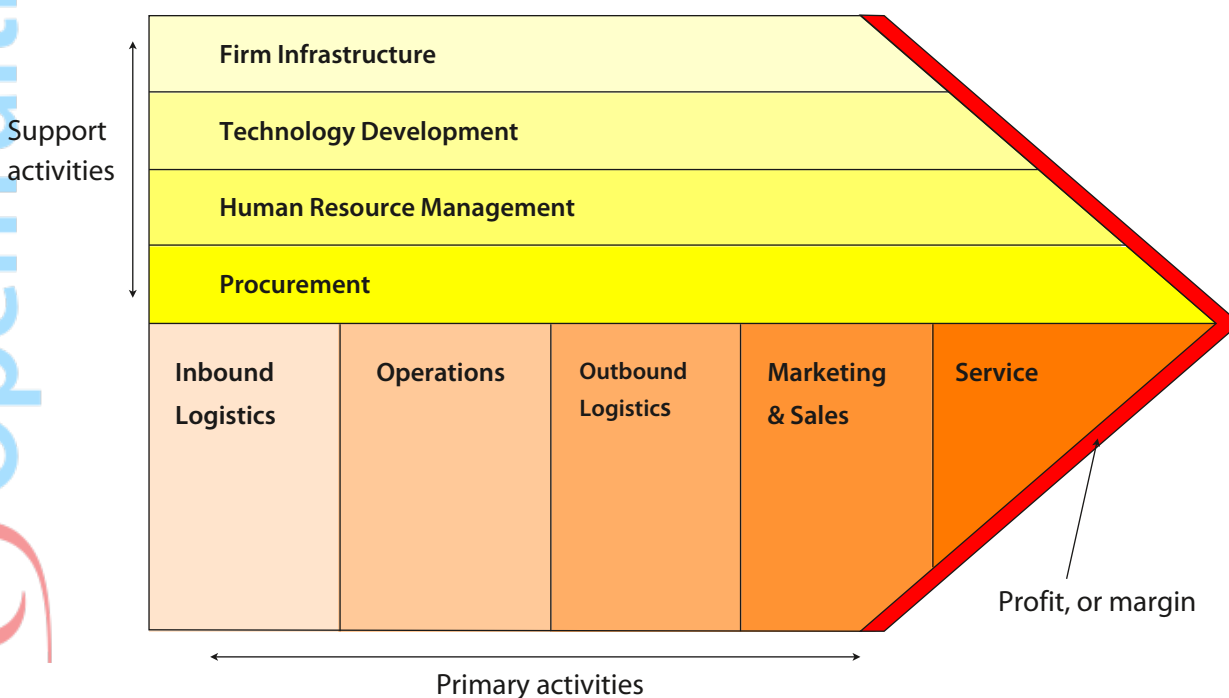


The upper three elements on the dark background are the 'hard Ss', meaning that they are relatively easy to describe and define. Many organisations focus too much on these because they are easy to define and describe.

The lower three on the white background and the central element are the 'soft Ss' and are less easy to describe and define. Therefore, these tend to be ignored.

Additionally, all the elements are all inter-dependant so that changing one will affect others. For example, the introduction of a new production system will probably affect skills structure, style and staff. It could even have an impact on strategy if it allowed, for example, more flexible production.

3.6. The value chain



This model represents organisations by setting out the activities they carry out.

Firm infrastructure, technology development, human resources and procurement are known as support activities (mostly indirect-costs). The other activities are primary activities.

By carrying out these activities organisation can manage to make profits. However, it is essential for the organisation to know what gives the right (or ability) to make profits.

Why do customers pay enough to allow a profit to be made? It might be because:

- The organisation possesses knowhow that customers pay for
- The organisation offers flexibility
- The organisation offers economies of scale
- The organisation take on risks

Whatever it is that customers value is the key to an organisation's success and its performance there needs to be carefully managed. The organisation also has to be careful about changing or removing activities or performance that customers value. If an organisation is left carrying out tasks that are not valued by customers, how will the organisation survive? Short term



performance improvements in one area might lead to long-term performance decreases in another.

3.7. Business change and performance measures

When a business undergoes a change almost certainly it will be important for it to change its performance measures: different aspects of performance will now be important. For example:

- Automation: fewer people, more machinery. The cost of running the machines will be more significant and wage costs less so. Increased production speeds and higher quality output might be expected. It might be important to measure how quickly the machinery can be reset to allow the production of different products. Customers will probably see flexibility and speed of response as being important.
- Rationalisation: the prime result of rationalisation is to reduce bottlenecks, increase flow rates and so increase processing efficiency. These qualities should be measured.
- Business process engineering: potentially radical changes. For example, some processes could be outsourced. If so, a cost comparison is needed between the old method and the new. The efficiency and performance of the outsource company need to be assessed too. If a non-value-adding process is removed the company would need to monitor improvements in cost and time but must also to ensure that removing the process does not, for example, have an adverse impact on quality or the reliability of order-processing and the despatch of goods.

Similarly, for alterations to any of the value chain components. For example, moving to a just-in-time system for raw materials should decrease inventory costs but there is a risk that production will stop because the company has run out of components. These effects should be measured.





Chapter 5

EFFECT OF INFORMATION TECHNOLOGY ON STRATEGIC MANAGEMENT ACCOUNTING

1. Introduction

This chapter considers the impact of IT on management accounting. There is a lot of terminology, which may or may not be already familiar to you. You are unlikely to be tested on specific terminology, but you should be aware of the various items listed in this chapter.

2. Information needs of traditional manufacturing businesses

Manufacturing businesses need information areas:

- Costs: material, labour overheads
- Efficiency
- Orders
- Inventory (raw material, work-in-progress, finished goods)
- Quality
- Major customers and their buying habits
- Sales by product, customer, season, country.
- Time for the manufacturing process to allow scheduling
- Resources
- Competitors' products and prices
- Innovation: new products being developed



3. Service oriented businesses

The nature of what is provided by service orientated businesses is often different to what manufacturing businesses provide in the following respects:

Heterogeneity:

manufacturing often produces many identical units; service industries often produce tailored products eg an audit. Costing information and efficiency measurement will be quite different. Pricing will be very different as customer (or clients) will find it more difficult to judge prices.

Perishability:

many services are perishable ie they lose their value after a certain time. An example is airline seats: once the aircraft departs the seats have no value. Again, this presents interesting pricing challenges. Performance will be improved by attracting each extra passenger at the maximum marginal price, but if everyone knows that prices will fall near the departure date, passengers will be encouraged to postpone booking until prices reduce.

Intangibility:

it is difficult to show potential customer what they will get for their money. Auditing firms cannot show clients an audit or audit file so how can potential clients judge value for money?

Simultaneity:

in manufacturing, production and sale can be separated. This allows products to be quality checked before dispatch and allow flexibility in timing. For example, production can be carried out steadily throughout the year and inventory can be stored until busy sales periods. Services cannot be stored and are often instantly delivered. This places additional demands on scheduling, pricing and quality control information

No transfer of ownership.

Often services or the use of a service provider is for a limited period of time. Pricing and demand information has to reflect this. For example, the pricing of hotel rooms will vary from week-days to weekends. In addition because a service is being provided for a limited period only, consumers are likely to be very demanding during that period.

The information needed to perform well when providing a service will often be more related to qualitative than quantitative aspects. For example, reputation, customer satisfaction, availability of the service when required,



4. Instant access to data

IT has made it possible to access data and information **instantly**. This should mean that delays between events, processing the results of those events and feedback to alter future events should be much shorter. With manual accounting systems it took significant time to collect and process results, prepare reports and for those reports to be distributed to managers. Now is common for managers to have daily update on events (for example sales of many different products in supermarkets) and to take action to improve performance much more quickly. Indeed this can often be in **real time**. For example, as a particular airline flight receives bookings, air fares can be changed many times per day to try to maximize the marginal revenue that can be earned.

You should be aware of the following terminology:

Databases:	large amounts of data are held in a way that allows many diverse users to access the data and to update it. Every will see the data in the same state ie it is consistent. Controls are needed to ensure that the data is held securely and confidentially.
Data warehouse:	a vast amount of data. For example, supermarkets recording every loyalty card owner's purchases.
Data mining:	searching through a data warehouse in the hope of finding information of use – particularly unexpected useful information.
Groupware:	allows users to collaborate. An example is Lotus Notes.
Internet:	gives access to websites. Searches can be made on keywords (eg using Google) to find sites that might be of use.
Intranets:	an internal internet. Very useful for distributing information within an organisation
Extranets:	an organisation's intranet given access to another's intranet.
ERP	(Enterprise resource planning). A system that integrates internal and external management information across an entire organisation, including: finance/ accounting, manufacturing, sales and service, customer relationship management, etc. ERP systems automate these activities with an integrated software application and they facilitate the flow of information between all business functions of the organisation.
MIS:	(Management information systems). Used for structured decision- making ie where there is a correct answer.



DSS: (Decision support system).
Helps managers to cope with unstructured decisions such as what should next year's budget show. Spreadsheets are a good example.

EIS: (Executive information systems).
Used by top management. Flexible with the ability to 'drill down' to more and more detailed information. Access to external information is essential at this level.

ES: (Expert systems).
These can make decisions that replicate the decisions an expert would make. They rely on extracting knowledge from the expert and storing this in a knowledge base. Situations can then be presented to the system which uses the knowledge base to come to a conclusion or recommendation. The type of data needed depends on the management level:

<i>Management level</i>	<i>Characteristics of the information</i>
Strategic	Highly summarised Often using estimates about the future Often non-routine High need for external information
Tactical	A mix of the characteristics of strategic and operational
Operational	Very detailed Usually historical Routine Mostly internal



5. Customer relationship management software

Firstly, what's meant by relationship management and marketing? A useful distinction can be drawn between:

- Transaction marketing, and
- Relationship marketing.

Transaction marketing focuses on the product, and develops the marketing mix (product, price, position, and place) according to the needs customers satisfy when they buy the product. However, this approach looks at one transaction at a time. You may well have developed a product which suits a particular segment of the market, but that doesn't mean that you build that segment of the market into a loyal following.

Relationship marketing goes further. It seeks to attract, maintain, and enhance customer relationships by focusing on the whole satisfaction experienced by the customer when dealing with the firm. It's not satisfied simply with one-off transactions, one-off sales. It wants ongoing close relationship with the customer.

It is aimed at:

- Acquiring customers
- Retaining customers
- Extending customers i.e. sell more, sell related products or sell more expensive products (up-selling).

What customer relationship management software does can best be illustrated by an example.

A client rings up and the incoming caller number is recognised and it brings up to customer's details on the screen. Those details show the name, address, telephone number of the customer and also the main personnel with whom we deal. It will give the job title of these people and may give their spending authorities. It may also contain information about their likes, dislikes and interests so it is possible to make relatively easy conversation with them. It will show a history of the products bought: the name of the product, the date of the purchase, the amount paid. This would be extremely useful, let's say, in a software company allowing it to suggest an upgrade which is now available for some products that the client had.

It will also contain a diary where a summary of previous conversations can be noted. It gives the client the impression that the company they are dealing with is well-organised. If you can look at the diary and know that the client phoned up last week with this query, then that's definitely impressive. It's not at all impressive if the client has to explain yet again why they are phoning. You can also set alerts if you promised to ring the client back next week. How else are you going to remember it?

The emphasis here is on building a relationship, making the client believe that you know them, that you know the products they have, and the problems they have. It can be used for e-marketing and e-commerce. It can allow sales to be automated and certainly gathers very valuable information about the client. It's very effective communication within the company. It doesn't matter who answers the phone, if relevant information about the client is brought up, it gives the client the impression that they are dealing with a joined-up company. Finally, it's a very important mechanism for knowledge management. At a very simple level, we are simply noting down conversations with the client and this is available to everybody in the organisation.



6. Cloud computing

In traditional client-server networks each client (the users' machines on their desks) would have had a copy of, say, Word for Windows. Documents would have been downloaded from the server for local editing then saved back to the server. The disadvantage of this is that each machine in the network needs a copy of Word. Not only was this initially expensive, but if the company were upgrading its software all copies of the program had to be changed. Inevitably different machines ended up with different software versions.

Furthermore, all the client machines have to be powerful enough to run all applications – even if powerful computing were only needed occasionally.

With cloud computing, this approach has changed. There is only one copy of the software on the server within a web-based interface. Users log into the web system and their processing is then carried out on the server or a 'cloud' of servers. It appears to each user that they have a local version of the software, but what they are really seeing is the program operating in the server. As more processing is needed more cloud resources can be used and this gives users great flexibility.

Client machines can be 'thin-clients' (ie not powerful) as they do not have to store much data and software nor do they have to carry out much processing. Hardware, software and maintenance costs are greatly reduced, though the system is vulnerable to service disruption. For example, relatively simple machines, even laptops, can be used for highly demanding graphical work. The laptop acts as an interface, receiving commands from the operator and displaying results. However, all the very complex and power-hungry computing is done on a remote, cloud-based computer.

Hotmail and Gmail provide examples of cloud technology. Whenever you want to write an email you log into the web email account and the processing is carried by the system's computer cloud – not your computer. All it has to do is to handle the interface.

7. Remote input of data

Traditionally, data was input into the computer systems using a keyboard. This takes time, and inevitably results in input errors.

IT has enabled more and more data to be input remotely and/or automatically. You should be aware of the uses of the following:

- Laptop/notebook computers often with WiFi or 3G (or 4FG) connectivity allow sales personnel to contact head office to check on inventory and to enter new orders.
- Handheld devices (including smartphones and iPads) can be used to input inventory counts and update production statistics
- Barcodes (standard super-market technology)
- RFID tags (radio frequency identification tags). RFID tags are tracking consumer products worldwide. Many manufacturers use the tags to track the location of each product they make from the time it's made until it's pulled off the shelf and tossed in a shopping cart.



8. The need for continual development

However well a management accounting system has been designed, it is vitally important that it is continually re-appraised, refined and developed if a business is to maintain or improve its performance.

The marketplace is increasingly competitive and increasingly global, creating different information needs for management.

9. Big Data

There are many definitions of the term 'big data' but most suggest something like the following:

"Extremely large collections of data (data sets) that may be analysed to reveal patterns, trends, and associations, especially relating to human behaviour and interactions."

In addition, many definitions also state that the data sets are so large that conventional methods of storing and processing the data will not work.

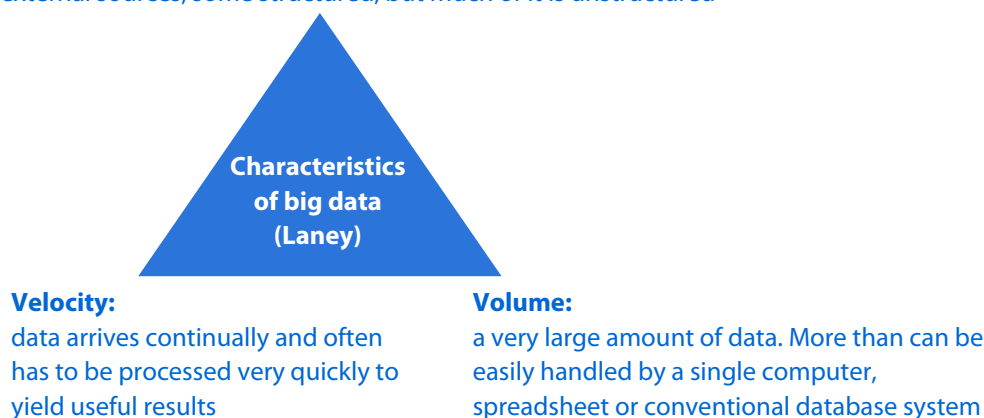
In 2001 Doug Laney, an analyst with Gartner (a large US IT consultancy company) stated that big data has the following characteristics, known as the 3Vs:

- Volume
- Variety
- Velocity

These characteristics, and sometimes additional ones, have been generally adopted as essential qualities of big data.

Variety:

disparate non-uniform data of different sizes, sources, shape, arriving irregularly, some from internal sources and some from external sources, some structured, but much of it is unstructured



The commonest fourth 'V' that is sometimes added is veracity: Is the data true? Can its accuracy be relied upon?



Volume

The volume of big data held by large companies such as Walmart (supermarkets), Apple and EBay is measured in multiple petabytes. What's a petabyte? It's 10^{15} bytes (characters) of information. A typical disc on a personal computer (PC) holds 10^9 bytes (a gigabyte), so the big data depositories of these companies hold at least the data that could typically be held on 1 million PCs, perhaps even 10 to 20 million PCs.

These numbers probably mean little even when converted into equivalent PCs. It is more instructive to list some of the types of data that large companies will typically store.

● Retailers

Via loyalty cards being swiped at checkouts: details of all purchases you make, when, where, how you pay, use of coupons.

Via websites: every product you have ever looked at, every page you have visited, every product you have ever bought. (To paraphrase a Sting song "Every click you make I'll be watching you".)

● Social media (such as Facebook and Twitter)

Friends and contacts, postings made, your location when postings are made, photographs (that can be scanned for identification), any other data you might choose to reveal to the universe.

● Mobile phone companies

Numbers you ring, texts you send (which can be automatically scanned for key words), every location your phone has ever been whilst switched on (to an accuracy of a few metres), your browsing habits. Voice mails.

Internet providers and browser providers

Every site and every page you visit. Information about all downloads and all emails (again these are routinely scanned to provide insights into your interests). Search terms you enter.

● Banking systems

Every receipt, payment, credit card payment information (amount, date, retailer, location), location of ATM machines used.



Variety

Some of the variety of information can be seen from the examples listed above. In particular, the following types of information are held:

- Browsing activities: sites, pages visited, membership of sites, downloads, searches
- Financial transactions
- Interests
- Buying habits
- Reaction to ads on the internet or to advertising emails
- Geographical information
- Information about social and business contacts
- Text
- Numerical information
- Graphical information (such as photographs)
- Oral information (such as voice mails)
- Technical information, such as jet engine vibration and temperature analysis

This data can be both structured and unstructured:

- **Structured data:** this data is stored within defined fields (numerical, text, date etc) often with defined lengths, within a defined record, in a file of similar records. Structured data requires a model of the types and format of business data that will be recorded and how the data will be stored, processed and accessed. This is called a data model. Designing the model defines and limits the data that can be collected and stored, and the processing that can be performed on it.

An example of structured data is found in banking systems, which record the receipts and payments from your current account: date, amount, receipt/payment, short explanations such as payee or source of the money.

Structured data is easily accessible by well-established database structured query languages.

- **Unstructured data:** refers to information that does not have a pre-defined data-model. It comes in all shapes and sizes and this variety and irregularities make it difficult to store it in a way that will allow it to be analysed, searched or otherwise used. An often quoted statistic is that 80% of business data is unstructured, residing it in word processor documents, spreadsheets, PowerPoint files, audio, video, social media interactions and map data.



Velocity

Information must be provided quickly enough to be of use in decision making. For example, in the above store scenario, there would be little use in obtaining the price-comparison information and texting customers once they had left the store. If facial recognition is going to be used by shops and hotels, it has to be more-or less instant so that guests can be welcomed by name.

You will understand that the volume and variety conspire against the third, velocity. Methods have to be found to process huge quantities of non-uniform, awkward data in real-time.

Software for big data

Without getting too technical on this issue, a library of software known as Apache Hadoop is specifically designed to allow for the distributed processing of large data sets (ie big data) across clusters of computers using simple programming models. (Clusters of computers are needed to hold the vast volume of information.) Hadoop is designed to scale up from single servers to thousands of machines, each offering local computation and storage.

The processing of big data is generally known as big data analytics and includes:

- **Data mining:** analysing data to identify patterns and establish relationships such as associations (where several events are connected), sequences (where one event leads to another) and correlations.
- **Predictive analytics:** a type of data mining which aims to predict future events. For example, the chance of someone being persuaded to upgrade a flight.
- **Text analytics:** scanning text such as emails and word processing documents to extract useful information. It could simply be looking for key-words that indicate an interest in a product or place.
- **Descriptive analytics:** looks at data to analyse what happened in the past. This will help an organisation to understand how it is performing. For example, comparison with previous years or with competitors, graphs and dashboards.
- **Diagnostic analytics:** analyse descriptive analytics to determine "Why did this change occur?" For example, the descriptive analytics might show a fall in sales and then the diagnostic analytics might be able to explain the effect by correlating this to a fall in total consumer demand or by identifying that the fall in demand was experienced only by our organisation. Further, it would attempt to explain why our products were less favoured than competitors'. Was it price? Was it design and innovation? Was it because of after sales service?
- **Video analytics:** analyses, for example, customers' behaviours in stores. Which displays caused customers to look and linger? Which were almost ignored?
- **Sentiment analysis:** this studies the subjective information in text: opinions, appraisals, emotions, or attitudes towards a topic, person, product or place. Expressions can be classified as positive, negative, or neutral. For example, a review stating that a product is good/no good.
- **Voice analytics:** as above with audio.
- **Statistical analytics:** used to identify trends, correlations and changes in behaviour.



Google provides web-site owners with Google Analytics that will track many features of web-site traffic. For example, Google analytics on the OpenTuition.com reports statistics such as the following:

Geographical distribution of users:



Type of browser used



Age of user



The final table is instructive. OpenTuition.com does not ask for users' ages, so this data has been pieced together from other information available to Google; it has been able to do this for only about 58% of users.

The analytical findings can lead to:

- Better marketing
- Better customer service and relationship management
- Increased customer loyalty
- Increased competitive strength
- Increased operational efficiency
- The discovery of new sources of revenue.

Dangers of big data

Despite the examples of the use of big data in commerce, particularly for marketing and customer relationship management, there are some potential dangers and drawbacks.

- **Cost:** It is expensive to establish the hardware and analytical software needed, though these costs are continually falling.
- **Regulation:** Some countries and cultures worry about the amount of information that is being collected and have passed laws governing its collection, storage and use. Breaking a law can have serious reputational and punitive consequences.
- **Loss and theft of data:** Apart from the consequences arising from regulatory breaches as mentioned above, companies might find themselves open to civil legal action if data were stolen and individuals suffered as a consequence.
- **Incorrect data (veracity):** If the data held is incorrect or out of date incorrect conclusions are likely. Even if the data is correct, some correlations might be spurious leading to false positive results.
- **Employee monitoring:** data collection methods allow employees to be monitored in detail every second of the day. Some companies place sensors in name badges so that employee movements and interactions at work can be monitored. The badged monitor to whom each employee talks and in what tone of voice. Stress levels can be measured from voice analysis also. Obviously, this information could be used to reduce stress levels and to facilitate better interactions but you will easily see how it could easily be used to put employees under severe pressure.



10. Lean information systems

Lean methodology is a way of optimizing the use of people, resources, effort, and energy so as to create value for customers. A simple example would be to eliminate pointless movements of inventory around a factory – or even to eliminate most inventory altogether. Although lean methodologies were developed to deal with manufacturing, the principles can also be applied to management information systems.

The tools or steps for a lean system are often described by the 5S model which is:

S	<i>Meaning in the context of management information systems</i>
Sort	What is needed and what is not useful? Remove reports and information that are not used.
Set in order (or simplify)	Set In Order focuses on creating efficient and effective storage methods to arrange information so that it is easy to use and to label and describe the information in useful ways. If used infrequently make it available but not appearing on routine screens and reports. That just causes clutter.
Shine (or scan)	Continually analyse who is using the information. Remove old records. Keep the data and information clean, tidy and relevant. Keep the information up-to-date.
Standardise	For example, achieve consistency on how amounts are calculated, how data is presented, how often reports are produced, who receives the information and when.
Sustain	Continually perform the four steps above. Achieving leanness is not a one-off exercise and the effort has to be sustained.

11. Data silos

A data silo is a collection of data that is held by one department and which is not easily or fully accessible by other groups in the same organization.

Finance, sales, production, HR, marketing teams, and other departments need different information to do their work and, historically, those departments usually stored their data in separate locations (ie separate files or separate databases) known as data or information silos. The fragmentation of data into silos creates barriers to information sharing and collaboration across departments. In addition, if different departments have to hold the same data not only does that waste storage space but, more importantly, it takes care and effort to ensure that all copies of the same piece of data are updated consistently. Inevitably the various copies of the same data begin to diverge and become inconsistent.

Additionally, each department might hold data in their own ways so that it can be difficult to know if the data is about the same entity or a different one. For example, one department might record an employee's name as J smith, another as John Smith and a third as Smith, J.



Data silos occur because of:

- **Technology**

Different departments often adopted different, possibly incompatible, technologies. A simple example is where one department records names and addresses on a word-processor and another uses a spreadsheet. It might be possible to merge the data but it takes effort and know-how.

Adopting database systems and big data methodologies will go a long way to overcoming these technological problems. In a database each piece of data is held only once (so is consistent for all users) and, with appropriate authorisation, everyone in the organisation can access any piece of data.

- **Company culture**

In many organizations departments are accustomed to working on their own, looking after their own interests and they can see other departments' demands as bothersome and even competitive. For example, if the sales department wants additional products to be manufactured so as to meet a new order, the production department could respond saying they had no resources when, in fact, they simply didn't want to work harder. So, each department guards its data jealously because their data provide them with a control mechanism: information is power.

Once again, new technology, such as databases, can help, but it is also essential to ensure that departments are willing to work together and to cooperate. It's all very well thinking that a database holds data available to all but what if a sales manager simply chose not to update the database with information about potential sales so that they could be booked in a later month instead perhaps to engineer a steady rate of sales growth?



12. Process automation and the internet of things

In process automation a whole process is automated, not just individual steps. For example, when you order goods on Amazon, once you click on 'Buy' the goods are automatically picked by machinery in the warehouse, brought together, packed and then despatched with very little human intervention. Similarly, car manufacturing allows different components to be automatically delivered to the production line so that the precise vehicles specified by customers can be made: engine size, trim, upholstery style, manual/automatic transmission, wheel style, clear or tinted windows and so on.

Process automation should allow:

- Greater flexibility to respond to customers' orders
- Cheaper production or service delivery
- Greater reliability as there is less opportunity for human error
- Faster production because of the meticulous co-ordination needed.

Process automation will often use robotic machinery not only to process material in manufacturing but also in to move raw materials, components and finished goods around warehouses.

Custom manufacturing and 3D printing (additive manufacturing) is also used in process automation. Instead of drilling holes in a piece of metal or cutting it to shape, in 3D printing material (plastic or metal powder) is gradually built up. The process is automated allowing the quick production of prototypes or one-off components.

Processes automation is do not confined to physical operations. For example, banks nearly all use process automation when you ring them, often involving voice recognition. So, you can ask about your balance, report a lost or stolen card, query a payment, order documentation. You might have discovered that with some process automation banks have some way to go in making this automation wholly successful and satisfying for customers.

The Internet of things means that many devices are connected through the internet. For example:

- You can use your phone to switch on your heating system when you come in and go out.
- Smart locks on doors that you can unlock using an App.
- Shops can message you asking for feedback after you visit them.
- Inventory and deliveries can be tracked in real time using RFID tags (radio frequency identification tags)



13. Artificial intelligence (AI)

Artificial intelligence allows machines to learn and to make deductions based on data supplied. For example, playing games such as Go, facial recognition, predicting customer purchasing requirements and tastes, recommending music (like Pandora) that each consumer should like.

Note that in AI people are not programming machines' responses: the machines are learning, uncovering patterns, trying out strategies and making decisions based on their learning.

Examples from business include:

- Engineering: Rolls-Royce uses AI when designing new engines and also to monitor engines in flight so as to learn how to predict when maintenance or part replacement is needed.
- Warehousing and distribution: AI improves demand prediction, picking, packing and working out efficient distribution routes.
- Marketing: AI builds up patterns of consumers' behaviour and can suggest items that are likely to be attractive to each customer.
- Voice and face recognition: AI has allowed these technologies to become very reliable.
- Law and accountancy: Lawyers perform due diligence to uncover background information, contract review, legal research and electronic discovery (eg searching through vast numbers of emails). Forecasting the likely outcome of litigation. Auditors use AI to examine transactions to identify those which appear to be incorrect or which might imply fraud.

A '**black box** algorithm' is the name given to any artificial intelligence system where operations are not visible or discernible to the user. For example, some companies use AI to shortlist job applicants. If it is not clear how the algorithm makes its assessments and decisions then it is a black box algorithm, an impenetrable system.

When artificial intelligence is used to develop the rules for an algorithm then this autonomous process will result in systems that are difficult for humans to understand and analyse. Questions such as "Why has the system make this decision?" are likely to be unanswerable. When this occurs errors and bias can be present in the system which are then not easily detectable by humans.

AI bias can be introduced to algorithms as a result of the conscious or unconscious prejudices of the developers, or they can they can be created by undetected errors in the AI process.

For example, to develop AI for recruitment a company might supply the system with details of current and previous employees and their success in the business. However, if most staff were historically male and young (typical in IT jobs) then the resultant AI decisions could well be biased against the recruitment of female or older applicants.

The ethical dangers are obvious.



Chapter 6

EXTERNAL INFLUENCES ON ORGANISATIONAL PERFORMANCE

1. Introduction

The business environment has been changing rapidly in recent years due to factors such as:

- Increased competition
- Globalisation
- Privatisation
- Technology in general; information technology; the Internet
- Rapid changes in customer requirements
- New approaches to manufacturing e.g. just-in-time; dedicated cells.

2. Government influences

Government policies and decisions can affect organisations in the following ways:

- Environmental protection
- The level of public expenditure
- Incentive schemes (eg to set up businesses in certain areas)
- Exchange rates
- Interest rates
- Tax rates
- Consumer and employee protection legislation
- Legislation on restrictive practices (eg industries protecting themselves)
- Monopolies and merger legislation.



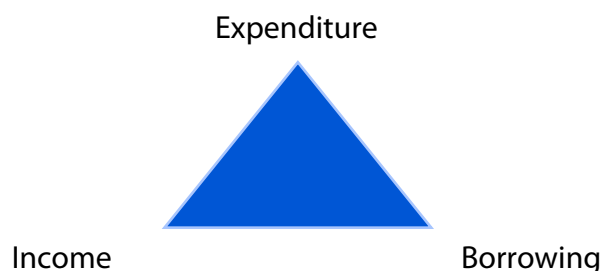
Michael Porter has identified seven ways in which a government can affect the structure of an industry:

- Capacity expansion eg encouraging new businesses
- Demand eg more government spending can increase demand
- Divestment and exit from industries
- Control of emerging industries
- Entry barriers to products (quotas and tariffs)
- Competition policy
- New product adoption eg how approval is given.

3. Fiscal and monetary policy

These are the two economic tools that governments use to regulate the economy

3.1. Fiscal policy



The government balances income, expenditure and borrowing. Income arises mainly from taxation. If the government wants to spend more it either has to increase its income from taxes or it must borrow more.

The financial crisis has shown that many governments had created very high borrowings and to reduce these, particularly in Europe, austerity measures had to be introduced and governments were forced to reduce their expenditure.

In most Western countries, government expenditure is about 40 - 50% of all expenditure, so governments policies and spending decisions have a very powerful effect on organisations

3.2. Monetary policy

This approach to economic control attempts to manage the supply of money. This can be done through:

- Interest rates.
- Money supply (eg governments 'printing' money).
- Reserve requirements (what proportion of money deposited by customers may banks lend to other customers).
- Credit controls (eg if a person is buying an item on credit, what is the minimum deposit they must give)



4. The limitations of traditional management accounting techniques

You have studied traditional management accounting techniques, such as variance analysis, for earlier examinations.

It has however been argued that in today's environment they are less than adequate. Listed below are some examples of areas where traditional management accounting is criticised.

- **Absorption of overheads**

Traditional product costing tends to be absorption costing, absorbing the overheads on a labour hour basis. In a modern environment, with more automation and a higher proportion of fixed costs, an activity based costing approach is more appropriate.

- **Process costing**

The traditional approach to cost accounting in a manufacturing business involves accounting for costs process by process as raw materials are transformed into finished goods.

In the modern environment with just-in-time systems there is very little work-in-progress and the conventional process costing approach involves a great deal of work but gains little. A backflush costing approach would be more appropriate.

- **Designing costs out of production**

The focus of traditional management accounting tends to be on reducing costs at the production stage, whereas most costs tend to be determined at the design stage. Therefore a product lifetime costing approach is needed.

- **Over-focusing on production costs**

Many costs are driven by customers (such as service delivery costs and discounts), but traditional management accounting tends to focus on production costs. It may not therefore be realised that the company is trading with some customers at a loss. A customer profitability analysis approach would be more appropriate.

- **Variance analysis**

Traditional variance analysis tends to focus on direct costs rather than on overheads, whereas in most businesses overheads are more controllable than direct costs.

- **Labour costs**

Often more like fixed costs than their conventional treatment as variable



5. Customer profitability analysis (CPA)

CPA is an application of Activity Based Costing techniques to customers.

Traditionally, ABC is applied to products but in a modern business environment in which it is vital that organisations respond promptly to the demands of customers, analysis on the basis of customers can provide vital management information.

The approach is exactly the same as the 'normal' activity based approach, except that we attempt to identify the profitability of each type of customer.

We can then identify unprofitable types of customer and attempt to persuade them to alter their buying behaviour so they become profitable customers.

This approach also identifies where we should focus our cost reduction efforts.

Example 1

Vilnius Ltd manufactures components for the heavy goods vehicle industry.

The following annual information regarding three of its key customers is available.

	X	Y	Z
Gross margin	US\$897,000	US\$1,070,000	US\$1,056,000
Orders placed	200	320	700
Sales visits	80	100	140
Invoices raised	200	320	700

The company uses an activity based costing system and the analysis of customer-related costs is as follows.

Sales visits	\$420 per visit
Order processing	\$190 per order placed
Despatch costs	\$350 per order placed
Billing and collections	\$97 per invoice raised

Using customer profitability analysis, how would the customers be ranked?



5.1. Customer profitability statement

There is no set format for the statement, but it would normally be similar to the one below.

	\$'000	\$'000
Revenue at list prices		100
Less: discounts given		8
Net revenue		<u>92</u>
Less: cost of goods sold		50
Gross margin		<u>42</u>
Less: customer specific costs	28	
financing costs:		
credit period	3	
customer specific inventory	2	
		33
Net margin from customer		<u>9</u>

Example 2

Frodo Ltd supplies shoes to Sam Ltd and Gollum Ltd. Each pair of shoes has a list price of \$50 and costs Frodo Ltd \$25. As Gollum buys in bulk it receives a 10% trade discount for every order for 100 pairs of shoes or more. Sam receives a 15% discount irrespective of order size, because that company collects the shoes, thereby saving Frodo Ltd any distribution costs. The cost of administering each order is \$50 and the distribution cost is \$1,000 per order. Sam makes 10 orders in the year, totalling 420 pairs of shoes, and Gollum places 5 orders of 100 pairs each.

Which customer is the most profitable for Frodo Ltd?



6. Activity-based costing and activity-based management

Traditional accounting for production overheads lumps them together and then usually absorbs them on a labour hour or machine hour basis. This is a very crude approach.

Modern manufacturing techniques are much more automated than previously and this increases the proportion of manufacturing costs that are fixed (whereas there is lower proportion of costs from direct labour). It is therefore that fixed costs are accounted for as accurately as possible.

Activity based costing tries to identify what activities causes costs (the cost drivers) then accounts for the fixed costs on the appropriate bases.

Example 3

	<i>Product A</i>	<i>Product B</i>
Demand (units)	1,000	200
Unit cost card	\$	\$
Marginal cost	50	80
Fixed cost	30	60
Total absorption cost	80	140
Mark-up (50%)	40	70
Selling price	120	210

Investigation shows that 1/3 of fixed costs relate to batch set-up costs and 2/3 relate to time in the factory. Each unit of B takes twice as long to make as a unit of A. Product A is made in batches of 500 units; Product B in batches of 100 units.

Recalculate the data using an activity based costing approach.

Activity-based management (ABM) is a method of identifying and evaluating activities that a business performs using activity-based costing to carry out a value chain analysis or a re-engineering initiative to improve strategic and operational decisions in an organisation. Activity-based costing establishes relationships between overhead costs and activities so that overhead costs can be more precisely allocated to products, services, or customer segments. Activity-based management focuses on managing activities to reduce costs and improve customer value.

Operational ABM is about “doing things right”, using ABC information to improve efficiency. Those activities which add value to the product can be identified and improved. Activities that don’t add value are the ones that need to be reduced to cut costs without reducing product value.

Strategic ABM is about “doing the right things”, using ABC information to decide which products to develop and which activities to use. This can also be used for customer profitability analysis, identifying which customers are the most profitable and focusing on them more.



7. Value analysis

Value analysis is the examination and assessment by an organisation of a product's features to ensure that its cost is no greater than is necessary to carry out its functions.

The product's functions are again determined by customers and the company must examine the factors affecting the cost of a product or service in order to attempt to reduce costs whilst still delivering the required standard of quality and reliability.

Note that some costs are associated with a product's functional and some with its esteem value. Luxury and cheap products might carry out the same function but the styling or quality of the luxury product might be essential in the eyes of consumers. It is important for the manufacturer damages neither function nor esteem value when trying to reduce costs.

A **value added activity** is one which adds value to the customer's perception of a product or service, whereas a **non-value added activity** is one that does not add value in the eyes of the customer.

Costs that do not add value to the product should be targeted for elimination. However, this is not always the case – the removal of some non-value added activities (such as quality control) could add further costs.

A further classification is the breakdown of activities between **core** (such as time spent with potential customers), **support** (such as travelling time to customers), and **discretionary** (such as correcting accounting errors).

Effective cost management is about reducing or eliminating costs spent on non-core activities.

8. Dedicated cells

Many production lines involve many separate processes – for example, cutting, painting, drilling. The traditional approach is often to have teams of people for each separate process. The material is cut in one process by one team of people, then moves to the next process where it is painted by another team of people, and so on.

This 'production line' approach does mean that each team becomes very skilled at their particular task, which can lead to efficiency savings.

However, a downside of this approach is that employees lose motivation and lose concern for quality, because they do not feel any responsibility for the final product (and in fact often will not even see the finished product).

A potential remedy for this is the 'dedicated cell' approach. Here the workforce is split into small teams comprising workers skilled at each of the various functions. For example one team might comprise one cutter, one painter, and one driller.

Each team is therefore responsible for all aspects of the production up to the finished product. Each member of the team feels more responsibility to other members of their team, and for the overall quality of the finished product.





Chapter 7

RISK AND UNCERTAINTY

1. Introduction

Decision making involves making decisions now which will affect future outcomes which are unlikely to be known with certainty.

Risk exists where a decision maker has knowledge that several possible outcomes are possible – usually due to past experience. This past experience enables the decision maker to estimate the probability or the likely occurrence of each potential future outcome.

Uncertainty exists where the future is unknown and where the decision maker has no past experience on which to base predictions.

Whatever the reasons for the uncertainty, the fact that it exists means that there is no 'rule' as to how to make decisions. For the examination you are expected to be aware of, and to apply, several different approaches that might be useful.

2. Risk appetite

'**Risk appetite**' is the term given to describe the amount of risk an organisation is willing to accept in pursuit of value.

Risk appetite is determined by two factors:

- Stakeholders' attitude to risk
- Risk capacity, which is the amount of risk that the organisation can bear.

Taking a personal example:

Some people are risk seekers and like to gamble; others are risk averse. So, if betting on a horse race, the risk seekers might be attracted to gamble on the high odds 100 to 1 horse. However, the risk averse person would tend not to consider that sort of gamble. They have different attitudes to risk.

However, let's say both a risk seeker and a risk averse person have \$100,000 in the bank and were being asked to bet \$100. Then, even the risk averse person might be tempted to go for 100 to 1 odds. In this situation they have high risk capacity because losing \$100 is of little consequence if you have \$100,000 in the bank.

But what if each person had only \$100 in the bank? There's a fair chance that neither would bet \$100 because the consequences of losing are so serious: they have very low risk capacity.

Overall their appetite for risk (ie their appetite for the gamble) depends on their own attitudes plus the risk capacity.

In terms of performance management and the principal agent relationship between directors and shareholders, the directors of the company should take into account the risk appetite of shareholders when making decisions. Some shareholders might prefer a 'safe' company with



moderate returns whilst others, with higher risk appetites, might prefer more adventurous companies with the possibility of high returns. The directors, as agents, should be acting in the best interests of their principals and should make decisions that are congruent with shareholder preferences and risk appetites.

Nowadays, stakeholder theory suggests that directors should try to take into account the wishes and preferences of all stakeholders, not just shareholders.

3. Decisions under risk and uncertainty

The approach taken when making decisions will depend on decision-maker's attitude to risk. Ideally this will reflect the risk attitude of shareholders, but it is almost inevitable that some of the directors' personal risk preferences will affect their decision-making.

A risk seeker will be interested in the best possible outcome, no matter how small the change that they may occur.

Someone who is risk neutral will be concerned with the most likely or 'average' outcome.

A risk avoider makes decisions on the basis of the worst possible outcomes that may occur.

For example:

A company can adopt one of three strategies, A, B or C. Independently the country's economy could enter a period of recession (probability = 0.3), stay the same (probability = 0.5) or have strong growth (probability = 0.2). The company has estimated its profits under each economic condition for each strategy and the full information is:

Profit \$m	Recession	Economy stays as it is	Economic growth
Probability	0.3	0.5	0.2
Strategy A	1,600	1,400	1,350
Strategy B	1,300	1,500	1,500
Strategy C	500	1,100	2,000

Decisions under risk

If a decision is being made under conditions of risk then the probabilities of each outcome occurring are known (or the decision-maker is willing to estimate these). In this case expected values can be used ie weight each outcome with the probability of it occurring.

So,

If Strategy A is adopted, the expected profits are: $0.3 \times 1,600 + 0.5 \times 1,400 + 0.2 \times 1,350 = 1,450$

If Strategy B is adopted, the expected profits are: $0.3 \times 1,300 + 0.5 \times 1,500 + 0.2 \times 1,500 = 1,440$

If strategy C is adopted, the expected profits are: $0.3 \times 500 + 0.5 \times 1,100 + 0.2 \times 2,000 = 1,100$

The decision would then be based on the highest expected value, here 1,450, and Strategy A would be adopted.



Decisions under uncertainty

If a decision is being made under uncertainty then the probabilities of each outcome are not known. Decision-makers have much less information to go on and so they are inevitably going to be more influenced by their attitudes towards risk: their risk appetites. Decisions are much more subjective. There is no absolute 'right' decision that can be made in advance: a decision is right if it is the decision that managers and investors (ideally their views will be congruent) feel most comfortable with. Some investors will be risk-seeking, others will be risk-avoiders. All are entitled to their views.

We will look at just two approaches: maximax and maximin. No company will mandate that one or other of these approaches must be adopted. The approaches are simply to illustrate that when information is lacking then decision-makers will make decisions that are in tune with their attitudes to risk and risk appetites.

Maximax

Investors will be drawn to this approach if they are optimists. They are like a gambler who places all their chips on one roulette wheel number. They know it's risky, but seek the big pay-out.

We will use the data presented above, but remember that the probabilities are no longer known.

So this investor will consider Strategy A and see that the best outcome is 1,600; Strategy B's best outcome is 1,500; Strategy C's best outcome is 2,000.

The best of the best outcomes (think maximax) is 2,000 so this investor would go for Strategy C.

Maximin

Investors will be drawn to this approach if they are pessimists and therefore risk avoiders because they are sure that whatever they do fate will not be kind to them.

So this investor will look at Strategy A and see that the worst outcome is 1,350; Strategy B's worst outcome is 1,300; Strategy C's worst outcome is 500. The best of these bad results is 1,350 so this investor would choose Strategy A.



4. The limitations of expected values.

Although we say that someone who is risk neutral would take an expected value approach to decision making, there are three serious limitations of this approach:

- The expected value is not usually 'expected'.
- The expected value gives no indication of the risk.
- The estimation of the probabilities is very unreliable

Example: mutually exclusive projects (\$'000)

Project cost = 3,800

State of the world	P	Project A income	Project B income	P x Project A	P x Project B
I	0.6	2,000	4,000	1,200	2,400
II	0.4	10,000	6,500	4,000	2,600
Expected values				<u>5,200</u>	<u>5,000</u>

The expected value of the income from both projects is greater than the cost of 3,800 so both appear worthwhile and Project A seems to be preferable as it has a higher expected value.

However neither of the expected values of 5,200 or 5,000 is expected to occur: the only possible results seem to be 2,000, 4,000, 6,500 and 10,000. If Project A were chosen, there is a greater than even chance that only 2,000 will be earned, creating a loss of 1,800 (ie 2,000 – 3,800). Project B is never expected to produce a loss. Perhaps Project B is preferable?



Chapter 8

SOURCES OF MANAGEMENT INFORMATION

1. Introduction

This chapter considers the information needs of an organisation, particularly in respect of control systems to ensure that the organisation maintains performance.

2. Information needs for different levels of decision making

The different levels of decision making were discussed in the previous chapter. The information needs of the decision makers will be different and depend on the type of decision.

2.1. Strategic planning

The information needed at this level is likely to be more external information and is likely to be more forecasts of the future.

2.2. Management control / Tactical planning

At this level there will be a need for both external and internal information. The focus is also more likely to be on current information.

2.3. Operational control

Here the information needs will almost exclusively be internal, and will be past and current information.



3. Sources of information

3.1. Internal sources of information

<i>Source</i>	<i>Information</i>
Sales ledger system	Number and value of invoices Volume of sales Value of sales, analysed by customer Value of sales, analysed by product
Purchase ledger system	Number and value of invoices Value of purchases, analysed by supplier
Payroll system	Number of employees Hours worked Output achieved Wages earned Tax deducted
Fixed asset system	Date of purchase Initial cost Location Depreciation method and rate Service history Production capacity

In addition the following internal, non-accounting sources may be used

<i>Source</i>	<i>Information</i>
Production	Machine breakdown times Output achieved Number of rejected units
Sales and marketing	Types of customer Market research results Demand patterns, seasonal variations etc



3.2. External courses of information

There is much information to be obtained from external sources as illustrated below:

<i>Source</i>	<i>Information</i>
Suppliers	Product prices Product specifications
Newspapers, journals	Share price Information on competitors Technological developments National and Market surveys
Government	Industry statistics Taxation policy Inflation rates Demographic statistics Forecasts for economic growth
Customers	Product requirements Price sensitivity
Employees	Wage demands Working conditions
Banks	Information on potential customers Information on national markets
Business enquiry agents	Information on competitors Information on customers
Internet	Almost everything via databases (public and private), discussion groups and mailing lists.



4. Attributes of good information

In order to be useful to management, information should possess the following attributes:
[ACCURATE]

Accurate:	Sufficient for its purpose. Note that at higher managerial levels information does not normally need to be as accurate as at lower levels
Complete:	Obviously, incomplete information is likely to mislead
Cost-beneficial:	Benefits should exceed costs
User-targeted:	It should provide the information by needed by the user to make the decision/perform the job
Relevant:	Irrelevant information distracts and wastes people's time.
Authoritative:	Well, you know how unreliable some web-site data is: sometimes deliberately misleading, sometimes sloppy, sometimes out-of-date.
Timely:	Information should be received quickly enough to enable better decisions. There is no need for all information to be 'instantly' available and speed often has a cost.
Easy to use:	Well-set out and annotated.

Another mnemonic is **PAIL**. This can be used to assess the quality of reports:

Purpose	What is the purpose of the information or report. What should it highlight? What is the important information it has to get convey?
Audience	Care has to be taken to assess the appropriate level of detail, layout and terminology used in reports so that users will properly understand the information that is provided.
Information.	The information provided must match the purpose of the performance report. In particular, non-financial performance is a very important determinant of the long term success of any enterprise.
Layout.	Layout must help users to understand the information presented and to see quickly the important amounts, trends, results and explanations.

One of the most common criticisms of reports is that they present too much information and are much too cluttered. There might be valuable information there but it is almost impossible to find and interpret it. There is always the suspicion that large volumes of information have been deliberately provided to obfuscate the facts and to blunt the message.



Although graphical information can be presented in a misleading way, graphical displays can be used to greatly enhance the impact and understanding of information.

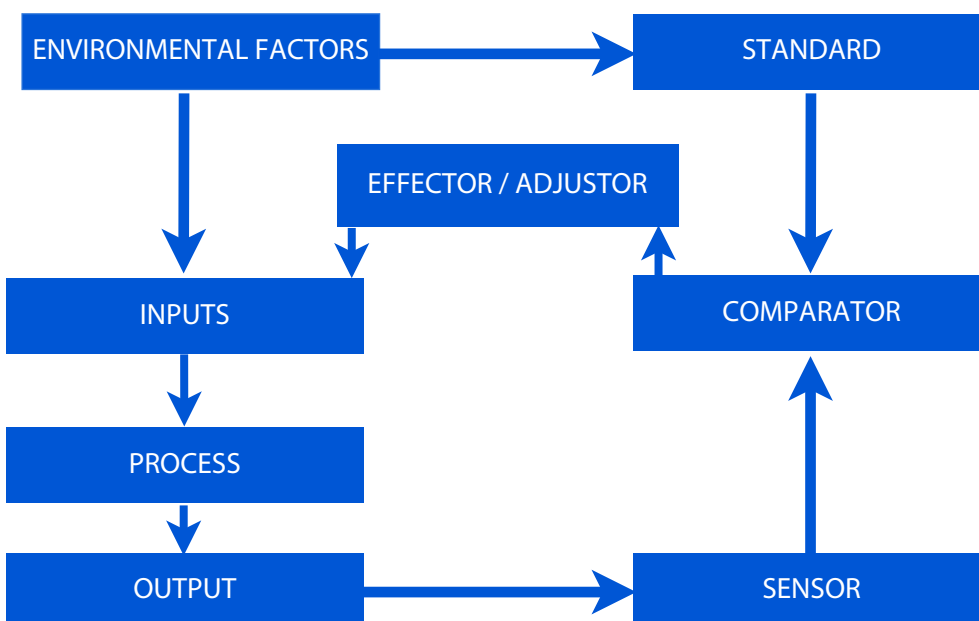
5. Control systems

Control systems are necessary throughout an organisation in order to monitor performance so that corrective action may be taken where appropriate.

An example is a budgetary control system, where costs might be compared against budget and action taken to attempt to correct any over-spends.

Another example is a quality control system, where production is compared against pre-defined standards, and again appropriate action is taken when the quality deviates from the standard.

All control systems operate in the same basic way, and you should be aware of the diagram below and the terminology.



6. Feedback / feedforward control

Feedback control is where the outputs of a process are measured and information is then provided regarding corrective action, after the outputs have been produced.

Variance analysis is an example of this. At the end of (say) each month, variances are calculated. If there is an overspend in January, then attempts will be made to correct the problem for the future. It is however too late to do anything about January!

Feed forward control is where a problem is identified in advance and corrective action taken - before the problem occurs.

An example of this is one use of the budgeting process. If a budget is prepared for the coming year and forecasts an unacceptably low profit, then ways will be looked for of changing plans in order to increase the profit. For example, increasing selling prices or cutting costs.

7. Negative / positive feedback

These terms refer to the way that feedback results in control.

Negative feedback is where the control mechanism reduces the problem, and is what we would desire to achieve. For example if actual costs are above budgeted costs, negative feedback would be applied

Positive feedback however, is where the departure from the plan is to be encouraged. For example, if sales are ahead of budget the organisation would try to encourage that behaviour.

8. Integrated reporting

8.1. Definition

Integrated reporting:

- Is a concise communication of an organisation's strategy, governance and performance.
- Demonstrates the links between its financial performance and its wider social, environmental and economic context.
- Shows how organisations create value over the short, medium and long term.

Its aim is to:

- Enable more effective decision making at board level.
- Improve the information available to investors.
- Encourage more integrated thinking and business practices.

It is encouraged by the International Integrated Reporting Council.



8.2. The six capitals

Conventional reporting usually refers to only one sort of capital: financial.

Integrated reporting recognises that more important resources are needed for business success. Together they are known as the 'six capitals'.

Financial capital: the pool of funds available for the production of goods, delivery of services and for investment.

Manufactured capital: manufactured physical objects such as equipment, factories, IT equipment, offices. Non-current assets used by the business.

Intellectual capital: patents, know-how, brand names and the tacit (informal) knowledge that organisations have about the nature of their activities, such as appropriate procedures.

Human capital: the skills, qualifications, abilities and experience of employees.

Social and relationship capital: the personal or inter-company relationships and networks that build trust, respect and cooperation.

Natural capital: renewable and non-renewable environmental resources. For example, an agricultural business relies on productive land; a fishing business relies on a supply of fish and knows that over-fishing will not result in a sustainable business.

In its integrated report, a business should ideally make reference to their six capitals as these should be maintained at appropriate levels to allow business to create value in the future. For example, if a harsh human resources policy drives employees to competitors then the organisation might be weakened. Note, however, that the capitals might not be independent and that sometimes capitals should be reduced. For example, human capital might be replaced by manufactured capital (people replaced by machinery and computers) and this might lead to increased financial capital. What's important for an organisation's long-term future is that the levels of capital are consciously managed. Forgetting about any of them could lead to problems.



8.3. Guiding principles

The following Guiding Principles underpin the preparation of an integrated report, informing the content of the report and how information is presented:

- **Strategic focus and future orientation**

An integrated report should provide insight into the organisation's strategy, and how it relates to the organisation's ability to create value in the short, medium and long term, and to its use of and effects on the capitals

- **Connectivity of information**

An integrated report should show a holistic picture of the combination, interrelatedness and dependencies between the factors that affect the organisation's ability to create value over time

- **Stakeholder relationships**

An integrated report should provide insight into the nature and quality of the organisation's relationships with its key stakeholders, including how and to what extent the organisation understands, takes into account and responds to their legitimate needs and interests

- **Materiality**

An integrated report should disclose information about matters that substantively affect the organisation's ability to create value over the short, medium and long term

- **Conciseness**

An integrated report should be concise.

- **Reliability and completeness**

An integrated report should include all material matters, both positive and negative, in a balanced way and without material error

- **Consistency and comparability**

The information in an integrated report should be presented:

- (a) on a basis that is consistent over time; and
- (b) in a way that enables comparison with other organisations to the extent it is material to the organisation's own ability to create value over time.



8.4. Content elements

An integrated report includes eight Content Elements that are fundamentally linked to each other and are not mutually exclusive:

- **Organisational overview and external environment**
What does the organisation do and what are the circumstances under which it operates?
- **Governance**
How does the organisation's governance structure support its ability to create value in the short, medium and long term?
- **Business model**
What is the organisation's business model?
- **Risks and opportunities**
What are the specific risks and opportunities that affect the organisation's ability to create value over the short, medium and long term, and how is the organisation dealing with them?
- **Strategy and resource allocation**
Where does the organisation want to go and how does it intend to get there?
- **Performance**
To what extent has the organisation achieved its strategic objectives for the period and what are its outcomes in terms of effects on the capitals?
- **Outlook**
What challenges and uncertainties is the organisation likely to encounter in pursuing its strategy, and what are the potential implications for its business model and future performance?
- **Basis of presentation**
How does the organisation determine what matters to include in the integrated report and how are such matters quantified or evaluated?



9. Non-traditional profit-based performance measures

9.1. The triple bottom line

Nowadays, there is an increased awareness of organisations' environmental impact and responsibilities, and also concern about their sustainability.

This has led some organisations to extend their traditional reporting to incorporate information on social and environmental matters in addition to traditional profit measures. It is often referred to as the "3P approach": Profit, Planet and People.

- **Profit:** nothing new here as this is the traditional reporting of financial performance.
- **Planet:** deals with environmental and sustainability issues, sometimes known as the organisation's environmental footprint. Metrics can include energy use, use of renewable energy, raw material and product kilometres (ie transportation), release of CO₂, recycling, replacement of trees, release of effluent into rivers. Non-quantitative information can also be included, such as proclaiming ambitions to ensure production is sustainable and nondetrimental to the areas from which resources are obtained.
- **People:** deals with social issues. Metrics can include reporting on the ethnic and gender composition of the work force, comparisons of the wages between different groups, health and safety, training, job security.

9.2. Beyond budgeting

Historically, the way in which direction and control was established over an organisation was through the use of budgets for costs, revenues and therefore profits. Budgets have the merit of quantifying targets but they also have considerable potential disadvantages:

- They are time-consuming and costly to put together
- They can constrain responsiveness and flexibility. For example, vital capital expenditure might be postponed because it does not appear in a budget.
- Rarely strategically focussed: most are simply for a year rather than the longer term and many are inward-looking, budgeting for modest improvements on last year's performance rather than taking note of what competitors might be achieving.
- They often concentrate on cost reduction, not long-term value creation.
- Strengthen vertical control and command and constrain flexibility further down organisations.
- Encourage 'gaming' and perverse behaviour. For example, manipulation of when sales are recorded.
- Updated too infrequently.
- Based on unsupported assumptions and guesses.
- Reinforce departmental barriers rather than sharing and cooperation so that each department focuses on attaining its budget targets rather than striving to attain the whole organisation's goals.



In contrast, **beyond budgeting** attempts the following:

- The creation of a performance management system that measures success against the competition and not against an internally focused budget. The motivation and reward process is based on the success of the team compared to the competition.
- The target setting process is based on the agreement of external benchmarks.
- The motivation of managers and employees through delegating responsibility to them so that they can make decisions themselves rather than being constrained by an historical, possibly out-of-date budget.
- The empowerment of operational managers through giving them the means to act independently and to access to resources such as cash (within agreed parameters).
- The organization is based on customer-oriented teams which are responsible for satisfied and profitable customers. Strategy and action planning is delegated to operational managers and takes place continuously and flexibly.

The two fundamental elements of the beyond budgeting model are:

- Leadership based on the principle of the empowerment of managers and employees, and
- New more adaptive management processes.

The new leadership principles (devolution) should unlock the full potential of managers and employees in order to enable the organization to react in an appropriate way and as quickly as possible to new opportunities and risks in the market environment.

Adaptive management processes are not based on fixed targets and resource plans like under the budgeting model. Instead, they enable an organization for a high degree of flexibility to respond quickly in the most appropriate way to new developments.





Chapter 9

FINANCIAL PERFORMANCE MEASUREMENT

1. Introduction

It is very common in the examination to be given information about a company and to be asked to comment on the performance. It is clearly important in practice to have measures in order to determine whether or not the company is performing well.

It is important to measure both financial and non-financial performance, but in this chapter we will consider only financial performance. You will be given extracts from the company's accounts for several years and be expected to analyse and interpret this information.

2. Approach

Although you must be aware of several key measures of financial performance, it is important that you do not fall into the trap of simply calculating every ratio imaginable for every year available. What the examiner is after is much more of an over-view and being able to determine the key measures and to comment adequately.

The following points should be considered:

2.1. What is it that you are being asked to comment on?

For example, if you are looking at the information from the shareholders' perspective, then growth (or otherwise) in the share price will be of great interest.

However, if you are looking at how well the managers are performing, the growth (or otherwise) in the profit (to the extent to which they control it) is perhaps of more importance.

2.2. Growth:

Always make some comment as to the level of growth. The amount of detail required depends on the information available and the number of marks allocated, but growth in turnover, in profit, and in share price are all potentially relevant.

Look at the overall level of growth and look for any trends, do not waste time doing detailed year-by-year analysis.



2.3. Areas for analysis:

Subject again to exactly what you are being asked to comment on, the following areas are likely to be worthy of consideration:

Profitability	– how well a company performs, given its asset base
Liquidity	– the short term financial position of the company
Gearing	– the long-term financial position of the company
Investors' ratios	– how well investors will appraise the company

2.4. Bases for comparison:

Most measures mean little on their own, and are only really useful when compared with something. Depending on the information given in the question, any comparison is likely to be with one of the following:

- Previous years for the same company
- Other similar companies
- Industry averages

3. Common ratios

The following is a list of the most common ratios that may be appropriate. However, do not simply calculate every ratio for every question – think about what you are trying to consider and choose the most appropriate ratios. If relevant by all means calculate additional ratios – there is no one set of ratios.

3.1. Profitability ratios

$$(a) \text{ Return on capital employed (ROCE) } = \frac{\text{Profit before interest and tax (PBIT)}}{\text{Capital employed}} \%$$

$$(b) \text{ Net profit margin } = \frac{\text{PBIT}}{\text{Turnover}} \%$$

$$(c) \text{ Gross profit margin } = \frac{\text{Gross profit}}{\text{Turnover}} \%$$

$$(d) \text{ Asset turnover } = \frac{\text{Turnover}}{\text{Capital employed}} \%$$

Note: Capital employed = shareholders funds plus 'creditors amounts falling due after more than one year' plus long term provisions for liabilities and charges.



Net profit margin × asset turnover = ROCE

$$\frac{\text{PBIT}}{\text{Turnover}} \times \frac{\text{Turnover}}{\text{Capital employed}} = \frac{\text{PBIT}}{\text{Capital employed}}$$

3.2. Liquidity ratios

- (a) Current ratio = $\frac{\text{Current assets}}{\text{Current liabilities}}$
- (b) Acid test (quick ratio) = $\frac{\text{Current assets less stock}}{\text{Current liabilities}}$
- (c) Debtors payment period = $\frac{\text{Average debtors}}{\text{Credit sales}} \times 365$
- (d) Stock days = $\frac{\text{Average stock}}{\text{Cost of sales}} \times 365$
- (d) Creditors payment period = $\frac{\text{Average creditors}}{\text{Purchases}} \times 365$

3.3. Gearing ratios

- (a) Gearing ratio = $\frac{\text{Prior charge capital (long term debt)}}{\text{Long term debt + equity (shareholders funds)}}$
- (b) Interest cover = $\frac{\text{PBIT}}{\text{Interest}}$
- (c) Operating gearing = $\frac{\text{Contribution}}{\text{PBIT}}$

3.4. Investor ratios

- (a) P/E ratio = $\frac{\text{Market price (pence)}}{\text{EPS (pence)}}$
- (b) Earnings per share (EPS) = $\frac{\text{Earnings available for distribution to equity}}{\text{Number of shares in issue and ranking for dividend}}$
- (c) Dividend yield = $\frac{\text{Dividend per share (pence)}}{\text{Market price (pence)}}$



4. EBITDA

EBITDA is a financial performance measure that has appeared relatively recently. It stands for

'earnings before interest, taxes, depreciation and amortisation' and is particularly popular with high-tech startup businesses.

Consideration of earnings before interest and tax has long been common – before interest in order to measure the overall profitability before any distributions to providers and capital, and before tax on the basis that this is not under direct control of management.

The reason that EBITDA additionally considers the profit before depreciation and amortisation is in order to approximate to cash flow, on the basis that depreciation and amortisation are non-cash expenses.

A major criticism, however, of EBITDA is that it fails to consider the amounts required for fixed asset replacement.

Example 1

Summary financial information for Repse plc is given below, covering performance over the last four years.

\$ thousands	Year 1	Year 2	Year 3	Year 4
Turnover	43,800	48,000	56,400	59,000
Cost of sales	16,600	18,200	22,600	22,900
Salaries and Wages	12,600	12,900	11,900	11,400
Other costs	5,900	7,400	12,200	13,400
Profit before interest and tax	8,700	9,500	9,700	11,300
Interest	1,200	1,000	200	150
Tax	2,400	2,800	3,200	3,600
Profit after interest and tax	5,100	5,700	6,300	7,550
Dividends payable	2,000	2,200	2,550	3,600
Average debtors	8,800	10,000	11,100	11,400
Average creditors	3,100	3,800	5,000	5,200
Average total net assets	33,900	35,000	47,500	50,300
Shareholders' funds	22,600	26,000	44,800	48,400
Long term debt	11,300	9,000	2,700	1,900
Number of shares in issue ('000)	9,000	9,000	12,000	12,000
P/E ratio (average for year)				
Repse plc	17.0	18.0	18.4	19.0
Industry	18.0	18.2	18.0	18.2

The increase in share capital was as a result of a rights issue.

Review Repse's performance in light of its objective being to maximise shareholder wealth.

Chapter 10

DIVISIONAL PERFORMANCE MEASUREMENT

1. Introduction

In this chapter we will consider the situation where an organisation is divisionalised (or decentralised) and the importance of proper performance measurement in this situation.

We will also consider the possible problems that can result from the use of certain standard performance measures.

2. The meaning of divisionalisation

As mentioned earlier, divisionalisation is the situation where managers of business areas are given a degree of autonomy over decision making i.e. they are given the authority to make decision without reference to senior management. In effect they are allowed to run their part of the business almost as though it were their own company.

2.1. Advantages of divisionalisation:

- Specialism in product/country/customer
- Greater motivation for managers
- Allows divisions to be profit centres (motivating and promotes efficiency)
- Allows performances between divisions to be compared
- Clearer objectives for managers (concentrate on one area of the business only)
- Usually accompanied by decentralization, so potentially better decisions.

2.2. Problems with divisionalisation:

- Coordination difficulties
- Requires transfer prices to be established
- Lack of goal congruence/dysfunctional decision-making
- Difficulties in 'fair' comparison of divisions.
- Potential duplication of some services



3. The use of performance measures to control divisional managers

If managers are to be given autonomy in their decision making, it becomes impossible for senior management to 'watch over' them on a day-to-day basis – this would remove the whole benefit of having divisionalised!

The way to control their performance is to establish in advance a set of measures that will be used to evaluate their performance at (normally) the end of each year. These measures provide a way of determining whether or not they are managing their division well, and also communicate to the managers how they are expected to perform.

It is of critical importance that the performance measures are designed well.

For example, suppose a manager was simply given one performance measure – to increase profits. This may seem sensible, in that in any normal situation the company will want the division to become more profitable. However, if the manager expects to be rewarded on the basis of how well he achieves the measure, all his actions will be focussed on increasing profit to the exclusion of everything else. This would not however be beneficial to the company if the manager were to achieve it by taking actions that reduced the quality of the output from the division. (In the long-term it may not be beneficial for the manager either, but managers tend to focus more on the short-term achievement of their performance measures.)

It is therefore necessary to have a series of performance measures for each division manager.

Maybe one measure will relate to profitability, but at the same time have another measure relating to quality. The manager will be assessed on the basis of how well he has achieved all of his measures.

We wish the performance measures to be goal congruent, that is to encourage the manager to make decisions that are not only good for him but end up being good for the company as a whole also.

In this chapter we will consider only financial performance. However, non-financial performance is just as important and we will consider that in the next chapter.

4. Controllable profits

The most important financial performance measure is profitability.

However, if the measure is to be used to assess the performance of the divisional manager it is important that any costs outside his control should be excluded.

For example, it might be decided that pay increases in all division should be fixed centrally by human resources staff at Head Office. In this case it would be unfair to penalise (or reward) the manager for any effect on the division's profits in respect of this cost. For these purposes therefore a profit and loss account would be prepared ignoring wages and it would be on the resulting controllable profit that the manager would be assessed.



5. Investment centres and the problem with measuring profitability.

As stated earlier, divisionalisation implies that the divisional manager has some degree of autonomy.

In the case of an investment centre, the manager is given decision-making authority not only over costs and revenues, but additionally over capital investment decision.

In this situation it is important that any measure of profitability is related to the level of capital expenditure. Simply to assess on the absolute level of profits would be dangerous – the manager might increase profits by \$10,000 and be rewarded for it, but this would hardly be beneficial to the company if it had required capital investment of \$1,000,000 to achieve!!

The most common way of relating profitability to capital investment is to use Return on Investment as a measure. However, as we will see, this can lead to a loss of goal congruence and a measure known as Residual Income is theoretically better.

6. Return on Investment (ROI)

ROI is defined as: Controllable division profit as a percentage of divisional investment

It is equivalent to Return on Capital Employed and this is one of the reasons that it is very popular in practice as a divisional performance measure.

Example 1

Arcania plc has divisions throughout the Baltic States.

The Ventspils division is currently making a profit of \$82,000 p.a. on investment of \$500,000. Arcania has a target return of 15%

The manager of Ventspils is considering a new investment which will require additional investment of \$100,000 and will generate additional profit of \$17,000 each year/

- (a) Calculate whether or not the new investment is attractive to the company as a whole.
- (b) Calculate the ROI of the division, with and without the new investment and hence determine whether or not the manager would decide to accept the new investment.

In the above example, the manager is motivated to accept an investment that is attractive to the company as a whole. He has been motivated to make a goal congruent decision.

Note that in this illustration we have used the opening book value for capital invested. In practice it may be more likely that we would use closing book value (which would be lower because of depreciation). There is no rule about this – in practice we could do whichever we thought more suitable. However, in examinations always **use opening book value** unless, of course, you are told to do differently.



However, there can be problems with a ROI approach as is illustrated by the following example:

Example 2

The circumstances are the same as in example 1, except that this time the manager of the Ventspils division is considering an investment that has a cost of \$100,000 and will give additional profit of \$16,000 p.a.

- (a) Calculate whether or not the new investment is attractive to the company as a whole.
- (b) Calculate the ROI of the division, with and without the new investment and hence determine whether or not the manager would decide to accept the new investment.

In this example the manager is not motivated to make a goal congruent decision. For this reason, a better approach is to assess the manager's performance on Residual Income.

7. Residual Income (RI)

Instead of using a percentage measure, as with ROI, the Residual Income approach assesses the manager on absolute profit. However, in order to take account of the capital investment, notional (or imputed, or 'pretend') interest is deducted from the Income Statement profit figure. The balance remaining is known as the Residual Income.

(Note that the interest charge is only notional, and is only made for performance measurement purposes).

Example 3

Repeat examples 1 and 2, but in each case assume that the manager is assessed on his Residual Income, and that therefore it is this that determines how he makes decisions.

Note that in both cases the manager is motivated to make goal congruent decisions.



8. ROI vs RI

Note that both RI and ROI will favour divisions with older assets because those divisions will:

- (1) Probably have bought the assets more cheaply than new divisions which buy at inflated prices.
- (2) The assets are more heavily depreciated so that the capital employed figures is less in the division with older assets – and this affects both the denominator in ROI and the notional interest charge in RI
- (3) Both methods can also suffer distortions because of assets leased on operating leases and also if head office accounts for some 'divisional' assets (for example HO holding all receivables).

In practice, ROI is more popular than RI, despite the fact that RI is technically superior in terms of encouraging managers to make the correct investment decisions.

Pros and cons of ROI:

It seems familiar – most managers will know about return on capital calculations.

- Easy: compare ROI with a company target.
- Encourages maximization of ROI which might be how congruent with shareholders judge the company.
- Good for comparing divisions of different sizes

BUT

- Decisions will not necessarily maximize shareholder wealth.

Pros and cons of RI:

- RI maximization tends to be congruent with decisions that maximise shareholder wealth
- Different notional interest rates can be set for investment of different risk.

BUT

- A less familiar calculation and concept
- Not good at comparing divisions of different sizes. (Larger RIs might simply be a function of bigger divisions).



9. Annuity Depreciation

Despite the points made above, even if we use a Residual Income approach there is a danger of non-goal congruent decisions being made because divisional managers tend to think short-term. (The same problem applies to ROI approaches also). This is because in early years the book value of any new investment is high and this depresses both the ROI and RI.

A solution to this problem is to use annuity depreciation.

We will illustrate the nature of the problem, and the solution of annuity depreciation by means of an example.

Example 4

Grip plc has a cost of capital of 10% p.a..

One of its divisions has the possibility of undertaking the following project:

Investment	US\$250,000
Project life	5 years
Net cash inflow	\$72,500 p.a.
Scrap value	Nil

- (a) Calculate the Net Present Value of the project and assess therefore whether or not the company as a whole wishes to invest in the project
- (b) Calculate the additional Residual Income generated by the project for each of the 5 years, and comment as to whether or not the manager is likely to accept the project (assume that the division depreciates on a straight line basis).
- (c) Recalculate the Residual Income each year using annuity depreciation, and comment as to whether or not the manager is likely to accept the project.



10. Economic Value Added

Economic value added (EVA) is a performance metric that is very similar in approach to Residual Income, and is defined as being:

$$\text{EVA} = \text{Net operating profit after tax} - \text{WACC} \times \text{book value of capital employed}$$

EVA is a trade-marked technique, developed by consultants called Stern Stewart and Co.

The principle behind it is that a business is only really creating value if its profit is in excess of the required minimum rate of return that shareholders and debt holders could get by investing in other securities of comparable risk.

The capital employed is the **opening** capital employed, adjusted from the items set out below.

EVA allows all management decisions to be modelled, monitored, communicated, and compensated in a single and consistent way – always in terms of the value added to shareholder investment.

However, EVA makes certain adjustments because certain types of expenditure which appear in the statements of profit and loss under ISAs and IFRSs are NOT regarded as expenses when using EVA and cash accounting is regarded as more reliable than accruals accounting).

The major adjustments are:

Add back to profits:

- Expenditure on building for the future (e.g. research expenditure, marketing expenditure and staff training):
- Non-cash expenses
- Provisions
- Goodwill written off
- Depreciation: add back book depreciation and deduct economic depreciation. If economic depreciation is not given, assume it is the same as book depreciation and that there is no net adjustment.
- Interest on debt capital

Add back to net profit after adjusting for any tax relief.

Treat the debt as part of capital employed

Adjustment to statement of financial position

- Non capitalized leases
- Research etc now capitalised
- Goodwill written off
- Provisions



Example 5

Extracts from the accounts of Value Co are as follows:

Income Statements:

	2014	2013
	\$m	\$m
Revenue	608	520
Pre-tax accounting profit (note 1)	134	108
Taxation	(46)	(37)
Profit after tax	<u>88</u>	<u>71</u>
Dividends	(29)	(24)
Retained earnings	<u>59</u>	<u>47</u>

Balance Sheets:

	2014	2013
	\$m	\$m
Non-current assets	250	192
Net current assets	256	208
	<u>506</u>	<u>400</u>
Financed by: Shareholders' funds	380	312
Medium and long-term bank loans	126	88
	<u>506</u>	<u>400</u>

Note: After deduction of the economic depreciation of the company's non-current assets. This is also the depreciation used for tax purposes. Other information is as follows:

- Capital employed at the end of 2012 amounted to \$350m.
- Value Co had non-capitalised leases valued at \$16m in each of the years 2012 to 2014. The leases are not subject to amortisation.
- Value Co's pre-tax cost of debt was estimated to be 9% in 2013 and 10% in 2014.
- Value Co's cost of equity was estimated to be 15% in 2013 and 17% in 2014.
- The target capital structure is 70% equity and 30% debt.
- The rate of taxation is 30% in both 2013 and 2014.
- Economic depreciation amounted to \$64m in 2013 and \$72m in 2014. These amounts were equal to the depreciation used for tax purposes and the depreciation charged in the income statements.
- Interest payable amounted to \$6m in 2013 and \$8m in 2014.
- Other non-cash expenses amounted to \$20m in 2013 and \$15m in 2014.
- Research and development expenditure on a new project started in 2013 and written off was \$10 million in 2013 and \$11 million in 2014.

Calculate the Economic Value Added in each of 2014 and 2013.



11. Potential problems of EVA

- It is difficult to use EVA to compare firms or divisions because it is an absolute measure and takes no account of the relative size of the business.
- Because EVA is a year-to-year measure, it could be improved in the short term but to the detriment of the business in the long term.
- Economic depreciation is difficult to calculate and conflicts with generally accepted accounting principles.
- Other factors that could be important but are not included in the accounts are ignored.
- EVA is a short-term measure whereas performance measures should focus on the longer-term forecasts. Ideally economic income would be used (by discounting estimated future cash flows) but even ignoring the complexity of this, the person responsible for estimating it would very often be the person being measured, which could lead to bias.





Chapter 11

NON-FINANCIAL PERFORMANCE MEASUREMENT

1. Introduction

In the previous two chapters we were looking at measures of financial performance. However, as we stated, it is important to have a range of performance measures considering non-financial as well as financial matters.

In general, financial performance is easy to measure (earning per share, profit, dividends, EVA etc) but these measurements do **not** tell managers why financial performance has improved. For example, sales might have increased either because prices have been lowered or the company has spent money developing a new, innovative product. In this chapter we will consider the various areas where performance measures are likely to be needed.

Note that although we might all like to think that, for example, customer service is a foundation for company success, it is not necessarily so. Some low-cost airlines have been very successful despite giving poor customer service. Good customer service, and the other non-financial qualities which are mentioned about below are not ends in themselves. They become important in profit seeking organisations only if they enable financial success.

In not-for-profit organisations, non-financial measures can be ends in themselves. For example, in a hospital patient service is likely to be a fundamental part of its mission.

Various authors have summarised the areas in different ways and the main approaches are summarised in this chapter.

2. Fitzgerald and Moon building blocks

Fitzgerald and Moon focussed on performance measurement in service businesses. They said that organisations need:

Measures: dimensions of performance that should be measured

Standards: KPIs need to be capable of ownership (ie the person responsible feels able to influence the measure), should be achievable and should be fair.

Rewards: should be clear, provide motivation and controllable ie managers can influence their rewards by their behaviour.



Common non-financial performance measures are:

- Quality measures (eg repairs required within one year)
- Warranty claims
- Customer satisfaction surveys
- Customer number growth
- Returns volume
- Repeat business
- Internet page visits
- Placement in independent surveys
- Speed of response to customer queries
- How quickly telephone are answered
- Number of new products launched each year
- Students' success rates in a training business
- Patients cured (hospital)
- Vaccines administered
- Waiting times for appointments

Of course there are complications. For example, when assessing the success of a school there will be some dependence on the pupil catchment area. When assessing surgeons, it could be that the best will be assigned to the most difficult operations so might have lower success rates than less talented colleagues. Repeat business will be difficult to assess for major purchases: how often do you expect someone to buy a new washing machine?

However, it is important to make an effort to assess non-financial performance because, as noted above, good performance in service and quality will usually underpin good financial performance.



They suggested that the following dimensions need measures of performance:

<i>Performance area</i>	<i>Possible measures</i>
Financial performance	<ul style="list-style-type: none"> • Profitability • Sales growth • ROI • Cash flow/liquidity • EVA
Competitive performance	<ul style="list-style-type: none"> • Sales growth • Proportion of contracts won • Customer assessment/feedback • Market share
Quality	<ul style="list-style-type: none"> • Rejects/reworks • Customer complaints/feedback • Claims for compensation • Peer review assessments
Flexibility	<ul style="list-style-type: none"> • Spare capacity • Time order to delivery • Set-up time • % of work declined
Resource utilization	<ul style="list-style-type: none"> • Idle time • Non-chargeable time • Machine utilization • Wastage
Innovation	<ul style="list-style-type: none"> • New products brought to market • Patents files • R&D spend



3. Kaplan and Norton's Balanced Scorecard

The balanced scorecard (developed by Kaplan and Norton 1992) views the business from four perspectives and aims to establish goals for each together with measures which can be used to evaluate whether these goals have been achieved. These should be viewed as a hierarchy with good financial performance depending on 'happy' customers, who are 'happy' if we do what we say we will do. Continued success demands that organisations never stop trying to improve through learning and innovation.

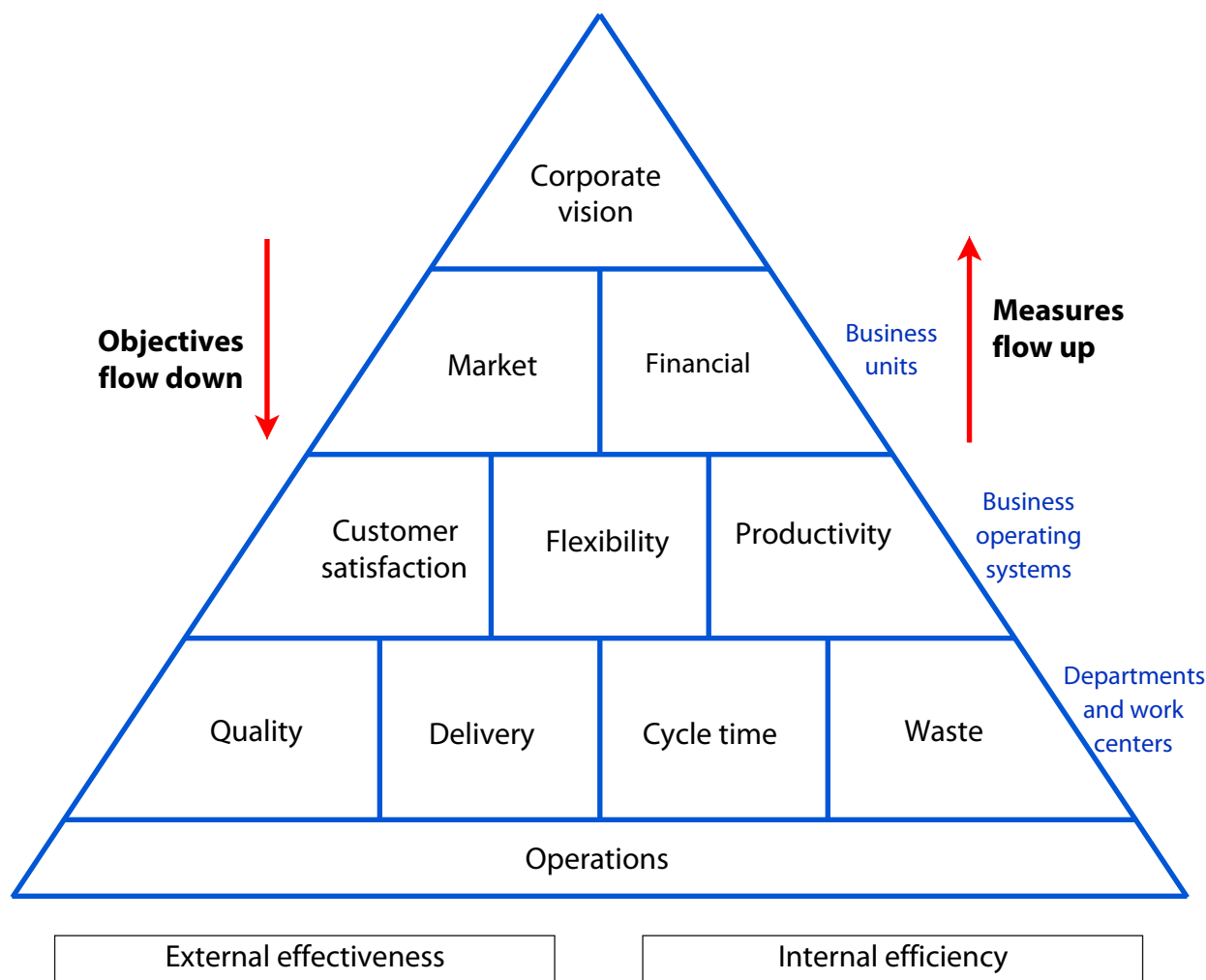
<i>Perspective</i>	<i>Question</i>	<i>Possible Measures</i>
Financial Perspective	How do we create value for our shareholders?	<ul style="list-style-type: none"> • Profitability • Sales growth • ROI • Cash flow/liquidity
Customer Perspective	What do existing and potential customers value from us?	<ul style="list-style-type: none"> • % Sales from new customers • % On time deliveries • % Orders from enquiries • Customers survey analysis
Internal Business Perspective	What process must we excel at to achieve our customer and financial objectives?	<ul style="list-style-type: none"> • Unit cost analysis • Process/cycle time • Value analysis • Efficiency
Innovation and Learning Perspective	How can we continue to improve and create future value?	<ul style="list-style-type: none"> • Number of new products introduced • Time to market for new products



4. The Performance Pyramid

Lynch and Cross viewed business as a performance pyramid.

The pyramid views a range of objectives for both external effectiveness and internal efficiency. The objectives can be achieved through measures at various levels as shown in the pyramid below. These measures are seen to interact with each other both horizontally at each level and vertically across levels in the pyramid.



Operations carried on in departments and work centres: quality, delivery, cycle time and waste. These operations support the layers further up the pyramid.

Companies must achieve customer satisfaction, productivity and flexibility – the ability to adapt to different customer requirements and methods of production. Customer satisfaction arises from quality and delivery. Productivity arises from system time and waste; flexibility arises from delivery and cycle time.

A strong performance in the market depends on customer satisfaction and flexibility towards different environments. Financial performance depends on productivity and flexibility.





Chapter 12

PERFORMANCE IN THE NOT-FOR-PROFIT SECTOR

1. Introduction

Non-profit seeking organisations are those whose prime goal cannot be assessed by economic means. Examples would include charities and state bodies such as the police and the health service.

For this sort of organisation, it is not possible or desirable to use standard profit measures. Instead (in for example the case of the health service) the objective is to ensure that the best service is provided at the best cost.

In this chapter we will consider the problems of performance measures and suggestions as to how to approach it.

2. Problems with performance measurement

- **Multiple objectives**

Even if all objectives can be clearly identified, it may be impossible to identify an over-riding objective or to choose between competing objectives

- **The difficulty of measuring outputs**

An objective of the health service is obviously to make ill people better. However, how can we in practice measure how much better they are?

- **Financial constraints**

Public sector organisations have limited control over the level of funding that they receive and the objectives that they can achieve.

- **Political, social and legal considerations**

The public have higher expectations from public sector organisations than from commercial ones, and such organisations are subject to greater scrutiny and more onerous legal requirements.

- **Little market competition and no profit motive.**



3. Value for money

Non-profit organisations, such as the health service, are expected to provide value for money. This can be defined as providing a service in a way which is economical, efficient and effective. Performance should be assessed under each of these '3 E's'

Effectiveness

Determining how well the organisation has achieved its desired objectives.

Efficiency

Maximising the output for a given input (or, for a given output achieving the minimum input).

Economy

Attaining the appropriate quantity and quality of inputs at the lowest cost

4. The use of league tables

In the UK, the government insists that schools, police forces, hospitals and other public bodies publish league tables relating to their performance. For example, schools publish their exam grades. The government instigated league table reporting to provide the public with information that might be useful to make more informed choices and to put pressure on under-performing public-funded institutions. Managers in the institutions are themselves sensitive to this public reporting of performance. Generally, they dislike it, but the hope is that the transparency offered by league tables about performance encourages improvements in performance.

Potential problems:

- What should be measured? Not-for-profit organisations usually have complex sets of stakeholders and objectives. There is no single, agreed measure of what, say, a good school is, so league tables might over-simplify a complex appraisal. Of course, separate tables could be produced using several measures for each organisation – but that approach is likely to become complex and confusing to use. If the measures are summarised into one score, details are lost and the weightings given to each component might be arbitrary.
- Is the data 'fair'? For example a school in a poor area of town, where there is less parental support, might find it hard to achieve the exam grades of a school in a prosperous area. Similarly the health problems and outcomes of people in a hospital's catchment area will vary greatly depending on whether that area is affluent or poor.
- Manipulation of data. A police force can flatter its success at solving crimes by simply not recording some crimes. Doctors might not attempt risky, but necessary, procedures in case their success rate or that of the hospital's declined.
- Magnification of differences. Three organisations achieving scores of 75, 74.5 and 74 will be labelled 1, 2, 3 which could mask the fact that there is really no material difference in performance.



Chapter 13

TRANSFER PRICING

1. Introduction

Transfer prices were examined in a previous examination. It is, however deemed knowledge for this paper and can be asked again. It is therefore repeated here for revision.

2. What is a transfer price?

The transfer price is the price that one division charges another division of the same company for goods or services supplied from one to the other. It is an internal charge – the 'sale' of one division is the 'purchase' of the other. Although it will be reflected in the results for each division individually, there is no effect in the accounts of the company as a whole.

Ideally transfer prices should:

Be perceived as fair to both divisions and therefore good for performance measurement and management

- Provide profits for both divisions because profits are motivating
- Promote goal congruence so that divisions volunteer to do what is good for the group
- Promote autonomy ie minimise head office interference

Example 1

Division A produces goods and transfers them to Division B which packs and sells them to outside customers. Division A has costs of \$10 per unit, and Division B has additional costs of \$4 p.u.. Division B sells the goods to external customers at a price of \$20 p.u.

Assuming a transfer price between the divisions of \$12 p.u., calculate:

- the total profit p.u. made by the company overall**
- the profit p.u. made by each division**



3. Why have a transfer price?

The reason for having a transfer price is to be able to make each division profit accountable. If, in the previous example, there was no transfer price and goods were transferred 'free of charge' between the division, then the overall profit for the company would be unchanged. However, Division A would only be reporting costs, and Division B would be reporting an enormous profit. The problem would be compounded if Division A was selling the same product externally as well as transferring to Division B.

4. Cost-plus transfer pricing

A very common way in practice of determining a transfer price is for the company to have a policy that all goods are transferred at the cost to the supplying division plus a fixed percentage.

Example 2

Division A has costs of \$15 p.u., and transfer goods to Division B which has additional costs of \$5 p.u.. Division B sells externally at \$30 p.u.

The company has a policy of setting transfer prices at cost + 20%.

Calculate:

- (a) the transfer price
- (b) the profit made by the company overall
- (c) the profit reported by each division separately



5. Other practical approaches

- Market prices: perceived as fair to both parties and places them in a position as though they were independent and trading on their own rather than part of a group.
- Marginal cost: condemns selling divisions to making losses because fixed costs are not covered. However, promotes goal congruent decisions
- Marginal cost plus lump sum: during the year marginal costs are used (goal congruence). At the end of the an additional lump sum is transferred between transferee and transferor to account for profits.
- Dual prices: transferee transfers at a markup (so makes a profit); transferee buys in at marginal cost (so can make correct decisions for goal congruence)

6. Goal congruence

If we are properly divisionalised, then each divisional manager will have autonomy over decision making. It will be therefore the decision of each manager which products are worth producing in their division (for these purposes we assume that each division has many products and therefore stopping production of one product will not be a problem).

A cost-plus approach, which easy to apply can lead to problems with goal congruence in that in some situations a manager may be motivated not to produce a product which is in fact to the benefit of the company as a whole.

Example 3

Division A has costs of \$20 p.u., and transfer goods to Division B which has additional costs of \$8 p.u.. Division B sells externally at \$30 p.u.

The company has a policy of setting transfer prices at cost + 20%.

Calculate:

- the transfer price**
- the profit made by the company overall**
- the profit reported by each division separately**

Determine the decisions that will be made by the managers and comment on whether or not goal congruent decisions will be made.



7. “Sensible” transfer pricing to achieve goal congruence.

The previous example illustrates that unless care is taken to set the transfer price sensibly, decisions may be made that are not goal congruent.

In the examination you can be asked to suggest sensible transfer prices. (As we will illustrate, you will normally be asked to state a range rather than one specific price.)

There is a ‘rule’ that may be applied. However, it is dangerous to simply learn a rule without fully understanding the logic. We will therefore build up the rule using a series of small examples, and then state the rule at the end.

Example 4

Division A has costs of \$20 p.u., and transfer goods to Division B which has additional costs of \$8 p.u.. Division B sells externally at \$30 p.u.

Determine a sensible range for the transfer price in order to achieve goal congruence.

Example 5

Division A has costs of \$15 p.u., and transfers goods to Division B which has additional costs of \$10 p.u.. Division B sells externally at \$35 p.u.

A can sell part-finished units externally for \$20 p.u.. There is limited demand externally from A, and A has unlimited production capacity.

Determine a sensible range for the transfer price in order to achieve goal congruence.

Example 6

Division A has costs of \$15 p.u., and transfers goods to Division B which has additional costs of \$10 p.u.. Division B sells externally at \$35 p.u.

A can sell part-finished units externally for \$20 p.u.. There is unlimited external demand from A, and A has limited production capacity.

Determine a sensible range for the transfer price in order to achieve goal congruence.



Example 7

Division A has costs of \$8 p.u., and transfers goods to Division B which has additional costs of \$4 p.u.. Division B sells externally at \$20 p.u.

Determine a sensible range for the transfer price in order to achieve goal congruence, if Division B can buy part-finished goods externally for:

- (a) \$14 p.u.
- (b) \$18 p.u.

8. The 'rule' for sensible transfer pricing

The following rule summarises the results from the previous examples:

8.1. Minimum transfer price:

(Determined by the transferor, or seller): $MC + \text{lost contribution from transferring internally}$

8.2. Maximum transfer price:

(Determined by the transferee, or buyer): Lower of nMR and external buy-in price.

(Note: we always assume that both divisions are manufacturing many products and that discontinuing one product will have no effect on the fixed costs. It is therefore only the marginal costs that we are interested in when applying the above rules.)



9. Capacity limitations

In one of the previous examples there was a limit on production in one of the divisions. This problem can be made a little more interesting, although the same rule as summarised in Section 7 still applies.

Example 8

A is capable of making two products, X and Y. A can sell both products externally as follows:

	X	Y
External selling price	80	100
Variable costs	60	70
Contribution p.u.	20	30

A has limited labour available. The labour hours required for each product are X: 5 hours p.u., Y: 10 hours p.u.

A has unlimited external demand for both products. Division B requires product Y from Division A.

Calculate the minimum transfer price that should be charged by A for supply of Product Y to Division B.



10. Multinational Transfer Pricing

Globalisation, the rise of multinational companies, and the fact that more than 60% of world trade takes place within multinational organisations means that international transfer pricing is very important.

When transfers occur between different countries, then there are additional factors to take into account. These include the following:

Taxation in the different countries

Import tariffs

Exchange controls

Anti-dumping legislation Competitive pressures Repatriation of funds

In practice, most countries tax laws will include rules about transfer pricing.

Usually they encourage a transfer price at market value to ensure that both countries receive a fair share of the profits. However, it is not always easy to establish what is a fair market value.

A transfer price at full cost is usually acceptable to tax authorities, but transfer prices at variable cost are unlikely to be acceptable.





Chapter 14

DISCOUNTED CASH FLOW TECHNIQUES

1. Introduction

You have studied investment appraisal previously so most of this chapter will be revision for you. Of the few new items in this chapter, the most important is Modified Internal Rate of Return and you should make sure that you learn the technique involved.

2. Net present value calculations

Here is a list of the main points to remember when performing a net present value calculation. After we will look at a full example containing all the points.

- Remember it is cash flows that you are considering, and only cash flows. Non-cash items (such as depreciation) are irrelevant.
- It is only future cash flows that you are interested in. Any amounts already spent (such as market research already done) are sunk costs and are irrelevant.
- There is very likely to be inflation in the question, in which case the cash flows should be adjusted in your schedule in order to calculate the actual expected cash flows. The actual cash flows should be discounted at the actual cost of capital (the money, or nominal rate). (Note: alternatively, it is possible to discount the cash flows ignoring inflation at the cost of capital ignoring inflation (the real rate). We will remind you of this later in this chapter, but it is much less likely to be relevant in the examination.)
- There is also very likely to be taxation in the question. Tax is a cash flow and needs bringing into your schedule. It is usually easier to deal with tax in two stages – to calculate the tax payable on the operating cash flows (ignoring capital allowances) and then to calculate separately the tax saving on the capital allowances.
- You are often told that cash is needed to finance additional working capital necessary for the project. These are cash flows in your schedule, but they have no tax effects and, unless told otherwise, you assume that the total cash paid out is received back at the end of the project.



Example 1

Rome plc is considering buying a new machine in order to produce a new product.

The machine will cost \$1,800,000 and is expected to last for 5 years at which time it will have an estimated scrap value of \$1,000,000.

They expect to produce 100,000 units p.a. of the new product, which will be sold for \$20 per unit in the first year.

Production costs p.u. (at current prices) are as follows:

Materials \$8

Labour \$7

Materials are expected to inflate at 8% p.a. and labour is expected to inflate at 5% p.a..

Fixed overheads of the company currently amount to \$1,000,000. The management accountant has decided that 20% of these should be absorbed into the new product.

The company expects to be able to increase the selling price of the product by 7% p.a.. An additional \$200,000 of working capital will be required at the start of the project. Capital allowances: 25% reducing balance

Tax: 25%, payable immediately

Cost of capital: 10%

Calculate the NPV of the project and advise whether or not it should be accepted.

3. Internal rate of return

One problem with decision making using the Net Present Value is that the Cost of Capital is at best only an estimate and if it turns out to be different that the rate actually used in the calculation, then the NPV will be different. Provided that the NPV remains positive then the project will still be worthwhile, but if the NPV were to become negative that the wrong decision will have been made.

The Internal Rate of Return (IRR) is that rate of interest at which the NPV of the project is zero (i.e. breakeven).

In order to estimate the IRR we calculate the NPV at two different rates of interest, and then approximate between the two assuming linearity. (In fact, the relationship is not linear and so any estimate will only be approximate)

Example 2

For the project in example 1, calculate the Internal Rate of Return.



4. Problems with the use of the internal rate of return

Although the IRR is the 'breakeven' rate of interest for the project, and as such can be useful when we are not certain of the Cost of Capital for the company, it does have many drawbacks.

It is only a relative measure of wealth creation, it can have multiple solutions, it is difficult to calculate, and it does effectively assume that the cash flows produced by the project are re-invested at the IRR.

A possible better measure is the **Modified Internal Rate of Return (MIRR)**.

5. Modified internal rate of return

The MIRR is quicker to calculate than the IRR and effectively assumes that the cash flows are re-invested at the Cost of Capital.

There are several ways of calculating it, but the method suggested here is to calculate the Present Value of the 'investment phase' (the flows in the years when the company is investing in the project) and to calculate the Terminal Value of the 'return phase' (the flows in the years when the project is generating returns) ie what the returns would have generated by the end of the project if invested as soon as received. This reduces the problem to two flows only: an outflow at time 0 and an inflow at the termination of the project. The IRR of these two flows can then be calculated.

Example 3

A project has the following cash flows:

Time	US\$0
0	(1,000)
1	600
2	700
3	(200)

The cost of capital and the rate at which cash can be invested is 10%

Calculate the MIRR

The MIRR is usually lower than the IRR, because it assumes that the proceeds are re-invested at the Cost of Capital. However in practice the proceeds are often re-invested elsewhere within the firm. It does however have the advantage of being much quicker to calculate than the IRR.





Chapter 15

BEHAVIOURAL ASPECTS OF PERFORMANCE MANAGEMENT

1. Introduction

This relates to the 'management' part of performance management. If one knows that one's performance is being measured (and very often one's rewards are tied into the performance measure) then it is human nature to concentrate on those aspects of the work that are being measured. Indeed many would claim that 'what you measure you change' with the implication that what you do no measure will not change.

It is important therefore that the performance measures encourage goal congruence (i.e. encourage working for the overall good of the company) and that they encourage long-term as opposed to short-term thinking.

2. Recap of earlier chapters

We have already discussed in earlier chapters the use of Return on Investment, Residual Income, and Economic Value Added, NPV and IRR as ways of measuring financial performance, and the effect of these on long-term and short-term thinking.

We have also discussed in earlier chapters the importance of having a range of performance measures, looking at non-financial as well as financial performance.

3. Reward Practices

Employees are a key resource for almost all organisations This resource is difficult to manage:

- Unlike buying more non-current assets which will generally be easily available, employee shortages can be slow to overcome as the recruitment and training steps are often time-consuming.
- How much should employees be paid and what should be the relationship between the remuneration for the various grades and skill?
- Employees' performances vary depending on mood, motivation, health and fatigue. Consistency and levels of effort are needed.
- At the end of every working day, these valuable assets leave the organisations premises and there is no guarantee that they will appear again in the morning. Most other resources, such as non-current assets, are more permanent. Worse still, you can find that your human resource has decided to relocate to a competitor.

HR policies, such as working from home, can vary greatly from employer to employer but a key element of HR management is the reward system. How much should be paid? Can remuneration be used to encourage employees behave in ways that the employer requires?



Broadly, remuneration can be made up of three elements:

3.1 Basic pay

Generally this will be in line with what competitors offer though gaining insight into competitors' remuneration policies can be difficult. Often basic pay falls into bands for each grade or skill level so that modest pay increases can be awarded even if an employee's grade has not increased.

3.2 Performance related rewards

This sounds great in theory (pay more for better performance) but it is not easy to achieve in practice. The easiest implementation is seen in sales commissions awarded to sales representatives based on their volume or value of sales. Sales are easy to measure and can often be traced to a given salesperson and their customers. Performance related pay for other jobs is usually more difficult:

For example:

- What type of areas of performance does the organisation want to encourage?
- Can those be measured?
- To what extent is the individual's own efforts responsible for good performance? Good performance often depends on a number of people acting together successfully.
- How should measured performance be translated in increased remuneration?

The performance related rewards will often simply be money, for example, a bonus at the end of the year. However, in listed companies it is quite popular to offer employees, particularly senior employees share options. For example, say the current share price is \$2. Options could be awarded allowing employees to buy shares after three years' time at \$3, provided they were still employed by the business. If after three years the shares are trading at \$4, then exercising the options, paying \$3/share will produce a profit of \$1/share when the shares are sold. If the share price were only \$2.50, the options would not be exercised (there is no point buying at the option exercise price if shares can be bought and sold on the market at \$2.50).

This arrangement focusses managers's attention on the share price - which is what most shareholders will be interested in maximising.

3.3 Benefits

For example:

- Medical insurance
- Pension contributions
- Provision of a car
- Holiday entitlements
- Child care
- Subsidised canteen
- Flexible working arrangements

Once again the benefits on offer usually have to be in line with what competitors offer. Often an employer can offer a 'menu' of benefits so that each employee could, for example, choose three or four benefits from a list.



3.4 How performance-related pay can be calculated

The calculation of the reward amounts can be based on:

An individual's performance (eg a sales representative).

A team's performance (eg the development and launch of a new product)

Divisional or group performance (eg divisional profit).

Whatever the level of the calculation, performance targets should be congruent with organisational objectives and set so that the correct performances are encouraged. Communication with employees is essential so that they know what they must achieve to earn their rewards. The rewards should be worth working for and the required performance should be perceived to be achievable otherwise the system is not likely to have much effect. In addition, the performances required to earn the additional rewards should not be trivial or too easy. For example, there have been cases where directors devised share option schemes for themselves where shares could be bought in a year for \$5, but the current share price was \$6! Not much encouragement there to drive the share price higher.

The reward system for many employees will be based on their behaviour across a number of desirable achievements as it is unusual for only one performance area to be dominant.

Whatever else, the performance-related reward system should be both transparent, fair and a clear link between the rewards and the achievement of the desired performances.

4. Potential benefits of reward schemes

Management encourage employees to achieve goals by having rewards linked to their success or failure in achieving desired levels of performance.

Potential benefits of implementing a reward scheme include:

- Rewards and incentives shape the behaviour of employees – a well-designed scheme will be consistent with the organisational objectives
- A reward scheme provides an incentive to achieve good performance.
- Key incentives can be emphasised in the reward scheme – it is a way of communicating the goals of the company to the employee.
- An effective scheme will create an environment in which all employees are focussed on continuous improvement.
- Schemes that incorporate share ownership can encourage behaviour that in the longer-term increases the market value of the business.



5. Potential behavioural problems

Reward systems inevitably alter employees' behaviour and, as noted above, this can lead to better organisational performance. However, there can be adverse consequences arising from reward systems. For example, some reward systems can affect the risk appetite of employees so that they are encouraged to take greater risks with their employer's resources in the hope of earning a large bonus.

In one of his articles for Student Accountant, the previous examiner highlighted the following specific problems that can occur with performance measurement schemes:

- **Tunnel vision**

Undue focus on performance measures to the detriment of other areas ('What you measure you change')

- **Sub-optimisation**

Ceasing effort when acceptable performance is achieved (eg when budgeted sales have been achieved), even though better performance might be achievable.

- **Myopia**

Focussing on the short-term resulting in the ignoring of the long-term

- **Measure fixation**

Behaviour and activities in order to achieve specific performance measure that may not be effective. For example, measuring behavior or results that are not important

- **Misrepresentation**

Using creative reporting to suggest that performance measures have been achieved

- **Gaming**

Behaviour designed to achieve some strategic advantage. For example, not passing on sales leads to a colleague so that your sales are comparatively higher.

- **Ossification**

The unwillingness to change a performance measure scheme once it has been set up.

6. Suggested ways of addressing the problems

- Involve staff at all levels in the development and implementation of the scheme
- Be flexible in the use of performance measures
- Keep the performance measurement system under constant review



Chapter 16

CURRENT DEVELOPMENTS IN MANAGEMENT ACCOUNTING

1. Introduction

In this chapter we will look at a few modern ideas in management accounting. Some of them you will have seen before in your studies for Paper F5, but others are here for the first time.

2. Quality management

2.1. Definitions

Quality can be defined as:

- "Fitness for use" (Juran)

Or

- "...the totality of characteristics...ability to satisfy customers' stated or implied needs.." (ISO9000 handbook)

Quality control refers to the processes (such as sampling and testing) that an organisation employs to check on quality.

Quality assurance is the sum of the management allow an organisation to dependably achieve a stated level of quality

Quality management is the overseeing of all the activities needed to achieve and maintain the required quality. It includes establishing the required quality level, setting quality control procedures and also considering quality improvement

2.2. Costs associated with quality

Costs of conformance (i.e. of improving quality)

- Prevention costs
- Appraisal costs

Costs of non-conformance (i.e. of allowing poor quality)

- Internal failure costs
- External failure costs

Moving effort towards the top of this list should save costs. Hence the claim that 'quality is free'



2.3. Total Quality Management (TQM)

TQM is defined as “the continuous improvement in quality, productivity and effectiveness obtained by establishing management responsibility for processes as well as outputs. In this, every process has an identified process owner and every person in an entity operates within a process and contributes to its improvement”.

Any manufacturing company will want to deliver goods to the customer that are of sufficiently high quality to avoid goods being returned. In order to check this, the company will have some form of quality control checks on goods leaving the factory. However, even though good quality control will result in poor quality goods being rejected, and therefore not reaching the customer, there remain the costs associated with waste and poor quality work.

It is therefore important that all possible steps are taken not only to check quality at each stage, but to design processes and educate the workforce to facilitate good quality production. If everything is done right first time, there will be no quality control problems and no waste of materials or time.

TQM does not apply only to the manufacturing system. It will also apply to phone answering, provision of information, the organisation’s web-site, order processing, invoicing, recruitment and training.

The implementation of TQM is never really complete and there is a culture within the organisation of continually achieving improvements. Often these are small, but nevertheless will add up to be significant. The process of a continuous series of small improvements is known as ‘Kaizen’.

2.4. Six sigma

Six sigma is an approach to quality control that was originally devised by Motorola, a high tech electronics company that manufactures, amongst other products, microprocessor chips. The aim of the company was to achieve very low rejection rates, < 3.4 defects/million, though that specific objective is not as important as their methodology, known as DMAIC: define, measure, analyse, improve, control.

Define:	define what is meant by quality. For example, reliability, style, fast response, helpful service.
Measure	Ways of measuring the quality factors have to be devised. For example, failure rate for reliability, customer surveys for style. Measure both current performance and use the measurement methods to better define what is meant by quality i.e. set targets.
Analyze	Investigate why current performance falls short of required performance.
Improve	Attempt to improve performance.
Repeat the D, M, A, I cycle until the required standards have been achieved.	
Control	Control is continuously applied to ensure, for example, that definitions are still relevant, that costs are within budget and that progress is being made.

DMAIC fits in with Kaizen ie a continuous series of improvements



3. Life-cycle costing

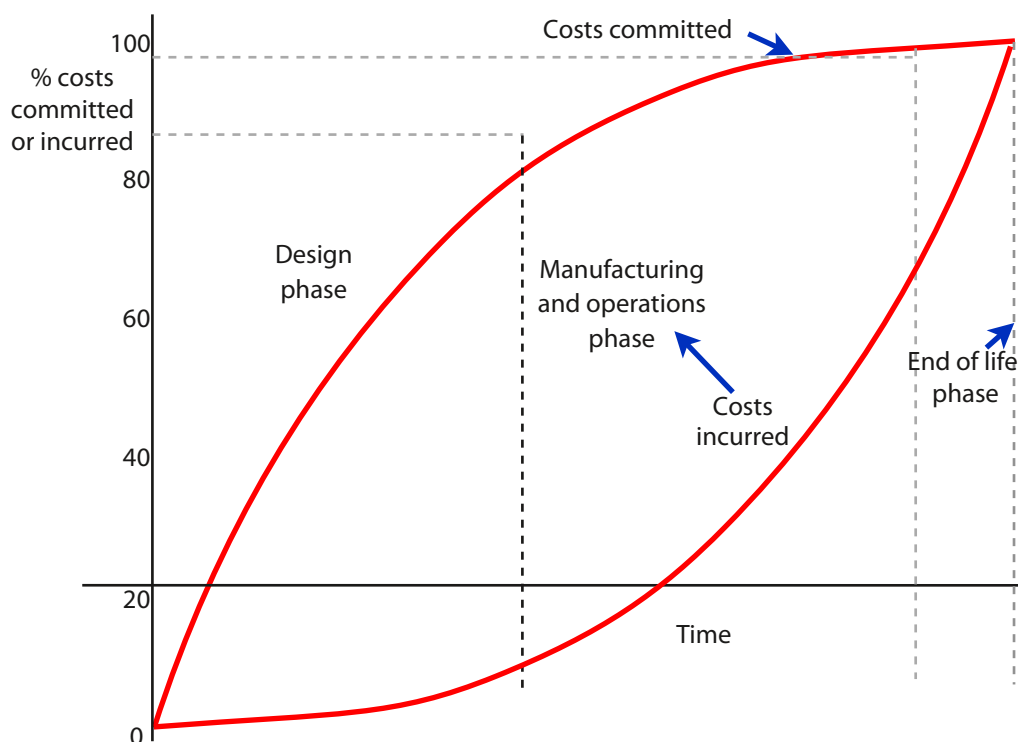
When seeking to make a profit on a product it is essential that the total revenue arising from the product exceeds total costs, whether these costs are incurred during the phases of design, manufacture, operation, end-of-life:

Phase	Examples of types of cost
Design	Research, development, design, tooling
Manufacture	Material, labour, overheads, machine set up, inventory, training, production machine maintenance, depreciation, and environmental costs
Operation	Distribution, advertising, warranty claims
End of life	Environmental clean-up, disposal, de-commissioning,

There are four principal lessons to be learned from life-cycle costing:

- (1) All costs should be taken into account when working out the cost of a unit and its profitability.
- (2) Attention to all costs will help to reduce the cost per unit and will help an organisation achieve its target cost.
- (3) Many costs will be linked. For example, more attention to design can reduce manufacturing and warranty costs. More attention to training can reduce machine maintenance costs. More attention to waste disposal during manufacturing can reduce end-of life costs.
- (4) Costs are committed and incurred at very different times. A committed cost is a cost that will be incurred in the future because of decisions that have already been made. Costs are incurred only when a resource is used.

Typically the following pattern of costs committed and costs incurred is observed:



The diagram shows that by the end of the design phase approximately 80% of costs are committed.



For example, the design will largely dictate material, labour and machine and environmental costs. The company can try to haggle with suppliers over the cost of components but if, for example, the design specifies ten units of a certain component, negotiating with suppliers is likely to have only a small overall effect on costs. A bigger cost decrease would be obtained if the design had specified only eight units of the component. The design phase locks the company in to most future costs and it is this phase which gives the company its greatest opportunities to reduce those costs.

Conventional costing records costs only as they are incurred, but recording those costs is different to controlling those costs and performance management depends on cost control, not cost measurement. Many costs in the manufacturing phase can only be controlled by what happened in the design phase.

4. Just-in-time (JIT)

Traditionally, most manufacturing companies have considered it necessary to have a certain level of stock of raw materials, work-in-progress, and finished goods.

However, not only may this be costly in terms of physically holding the stock and in terms of the possibility of damage and obsolescence, but also the requirement to hold stock may be symptomatic of inefficiencies within the company.

For example, the level of work-in-progress is determined by the length of time of the manufacturing process. If the process can be streamlined and production time reduced, then the level of work-in-progress will be reduced but the company will make additional gains as a result of greater efficiency.

With a just-in-time approach, the focus is on allowing the demand to determine the production ('demand-pull' production). This results in greater customer satisfaction, savings resulting from greater efficiency, and savings resulting from the need to have lower stock levels.

4.1. Conventional reasons for keeping stocks:

Raw materials

- To deal with production needs
- To safeguard supplies
- To take advantage of low prices
- Some materials produced seasonally, so has to be purchased when available
- To obtain bulk discounts

Work-in-progress

- To have some partially made inventory that will allow fast completion
- Technical reasons (eg production maturing, chemical processes that take time to complete).

Finished goods

- To deal with variable demand
- To enable instant supply (might be required by customers)
- To hold goods at different locations to reduce delivery times



4.2. Main features of a just-in-time approach:

- Very little (or no) inventory held.
- A pull approach: inventory is 'pulled in' in response to orders received.
- A very high degree of coordination is needed internally and with suppliers and customers. The management information system has to be very good
- Reliable suppliers and transportation
- Flexible suppliers
- Supplies of high quality
- Supplies available quickly (often implies that manufacturers have to be close to both their suppliers and customers).

Note that any disruption of the supply of raw materials and components quickly causes serious problems: no raw materials implies no production, implies an idle work-force and unhappy customers.

5. Target costing

Traditionally it has been the cost of producing an item that has driven the selling price – the first step was to estimate the production cost and then to decide on a selling price. However, this approach ignored the effect of the selling price on the demand for the product, and also gave no direct incentive to reduce costs. Target costing is a market driven approach and consists of the following steps:

- From research of the market determine a selling price at which the company expects to achieve the desired market share – the target selling price.
- Decide on the profit required (e.g. a required profit margin, or a required return on investment)
- Calculate the maximum cost per unit in order to achieve the required profit – this is the target cost
- Estimate the actual cost of production and compare with the target cost.

Example 1

Packard plc are considering whether or not to launch a new product. The sales department have determined that a realistic selling price will be \$20 per unit.

Packard have a requirement that all products generate a gross profit of 40% of selling price.

Calculate the target cost.



Example 2

Hewlett plc is about to launch a new product on which it requires a pre-tax ROI of 30% p.a.. Buildings and equipment needed for production will cost \$5,000,000.

The expected sales are 40,000 units p.a. at a selling price of \$67.50 p.u..

Calculate the target cost.

5.1. The use of the target cost

Once the target cost has been determined, it will be compared with the estimated actual cost of production. Any excess of the actual cost over the target cost is known as the target cost gap and the company will then be looking for ways of closing this gap.

Possible 'solutions' to the target cost gap:

- Cheaper materials
- Fewer features
- Outsource to a cheaper producer
- More efficient production eg longer production runs

6. Kaizen costing

Is the process of cost reduction during the manufacturing phase of an existing product. The Japanese word kaizen refers to continual and gradual improvement through small betterment activities, rather than large or radical improvement made through innovation or large investments in technology. Kaizen costing is most consistent with the saying "slow and steady wins the race."

Whereas target costing is used during the design phase of a new product, Kaizen costing is used during the manufacturing phase and involves team work by employees continually looking for ways of reducing costs and improving quality



7. Environmental management accounting

Businesses have become increasingly aware of the environmental implications of their operations. Poor environmental behaviour has an adverse impact on the business due to the possibility of fines, loss of sales etc.. As a consequence, environmental issues need to be measured and managed.

Techniques that are useful for managing environmental costs include:

- **input / output analysis**
record material flows in order to discover what happens to the material input – what proportion of it ends up in the final product, what proportion ends up as waste, etc..
- **flow cost accounting**
concentrates more on where material losses are occurring within the business, with the aim of reducing the quantities of materials used.
- **environmental activity based costing**
ABC distinguishing between environment –related costs (e.g. direct waste disposal costs) and environment –driven costs (more general overheads e.g. higher staff costs)
- **life cycle costing**
e.g. Xerox developed new packing for photocopiers that could be used both for the delivery of new machines and the return by customers of old machines – the packaging was re-usable.





Chapter 17

USE AND MISUSE OF NUMERICAL DATA

1. Introduction

The APM syllabus contains the learning outcome:

'Advise on the common mistakes and misconceptions in the use of numerical data used for performance measurement'.

The mistakes and misconceptions can be divided into two causes:

- The quality of the data: what measures have been chosen and how have data been collected?
- How have the data been processed and presented to allow valid conclusions to be drawn?

Inevitably, these two causes overlap because the nature of the data collected will influence both processing and presentation.

2. The collection and choice of data

2.1. What to measure?

What to measure is the first decision and the first place where wrong conclusions can be either innocently or deliberately generated. For example:

- A company boasts about impressive revenue increases but downplays or ignores disappointing profits.
- A manager wishing to promote one of two mutually exclusive projects might concentrate on its impressive IRR whilst glossing over which project has the higher NPV.
- A production manager measures the quantity of units produced but not their quality.
- An investment company with 20 different funds advertises only the five most successful ones.

Not only might inappropriate amounts be measured, but they might be deliberately undefined. For example, a marketing manager in a consumer products company might claim that the company's new toothbrush is reported by users to be 20% better.

But what's meant by that statement? What is 'better'? Even if that quality could be defined, is the toothbrush 20% better than: using nothing, competitors' products, the company's previous products, or better than using a tree twig?

Another potential way to confuse readers is to report relative rather than absolute changes. For example, you will occasionally read reports claiming that eating a particular type of food will double your risk of getting a disease. Doubling sounds serious but what if you were told that consumption would change your risk from 1 in 10m to 1 in 5m? For most people doubling the risk does not look quite so serious now. The event is still rare and the risk remains very low.



Similarly, if you were told that using a new material would halve the number of units rejected by quality control, you might be tempted to switch to using it. But if the rate of rejections is falling from 1 in 10,000 to 1 in 20,000, the switch does not look so convincing – though it would depend on the consequences of failure.

2.2. Sampling

Many statistical results depend on sampling. The characteristics of a sample of the population are measured and, based on those measurements, conclusions are drawn about the characteristics of the population.

There are two potential problems:

- (1) For the conclusions to be valid, the sample must be representative of the population. This means that random sampling must be used so that every member of the population has an equal chance of being selected for the sample. Other sorts of sampling are liable to introduce bias so that some elements of the population are over or under represented and false conclusions are likely to be drawn. For example, a marketing manager could sample customer satisfaction only at outlets known to be successful.
- (2) Complete certainty can only be obtained by looking at the whole population and there are dangers in relying on samples which are too small. It is possible to quantify these dangers and, in particular, you need to know information like "to a 95% confidence level, average salaries are \$20,000 \pm 2,300". This means that, based on the sample, you are 95% confident (**the confidence level**) that the population mean salary is between \$17,700 and \$22,300 (**the confidence interval**). Of course, there is a 5% chance that the true mean salary lies outside this range. Conclusions based on samples are meaningless if confidence intervals and confidence levels are not supplied.

The larger the sample the greater the reliance that can be placed on conclusions drawn. In general, the confidence interval is inversely proportional to the square size of the sample. So, to halve the confidence interval the sample size has to be increased four times – often a requiring a significant amount of work and expense.



2.3. More on small samples

Consider a company that has launched a new advert on television. The company knows that before the advert 50% of the population recognises its brand name. The marketing director is keen to show to the board that the ad has been effective in raising brand recognition to at least 60%. To support this contention a small survey has been quickly conducted by stopping 20 people at 'random' in the street and their brand recognition was tested. (Note that this methodology can introduce bias: which members of the population are out and about during the survey period? Which street was used? What are the views of people who refuse to be questioned?)

Even if the ad were completely ineffective and only 50% of the population recognises the brand it can be shown that there is a 25% chance that at least 12 out of the 20 selected will recognise the brand. So, if the director didn't get a favourable answer in the first sample of 20, another small sample could be quickly organised. There is a good chance that by the time about four surveys have been carried out one of the results will show the improved recognition that the marketing director wants. (Note: these results make use of the binomial distribution, which you do not need to be able to use.)

It's rather like flipping a coin 20 times – you intuitively know that there is a good chance of getting an 8:12 split in the results.

If instead of just 20 people being surveyed, 100 were asked, then the chance of getting a recognition rate of at least 60% would be only 1.8%.

In general, small samples:

- Increase the chance that results are false positives.
- Increase chance that important effects will be missed.

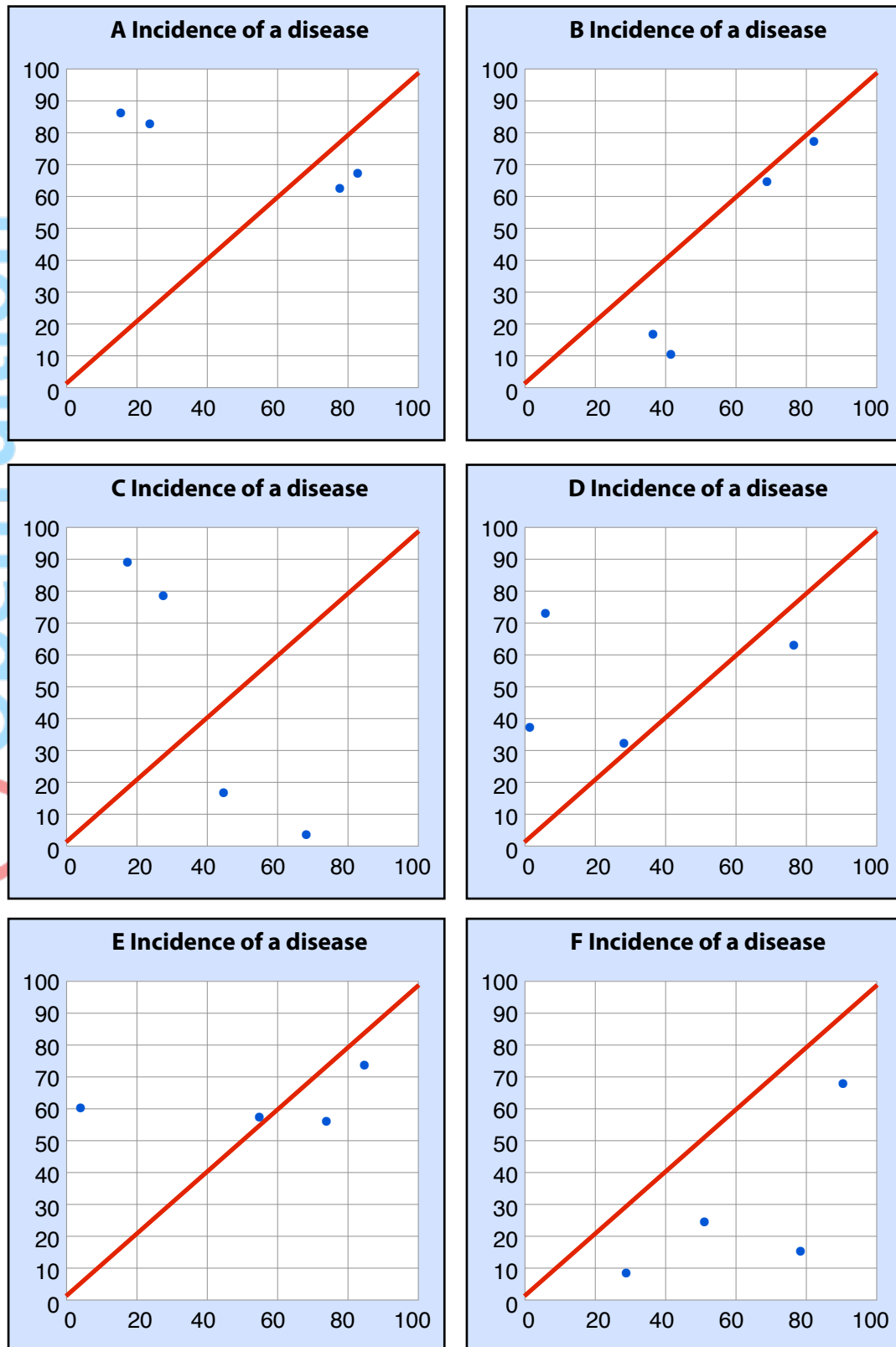
Always be suspicious of survey results that do not tell you how many items were in the sample.

Another example of a danger arising from small samples is that of seeing a pattern where there is none of any significance.

Imagine a small country of 100 km x 100 km. The population is evenly distributed and that four people will suffer from a specific disease. In the graphs below, the locations of the sufferers have been generated randomly using Excel and plotted on the 100 x 100 grid. These are actual results from six consecutive recalculations on the spreadsheet data and represent the six possible scenarios



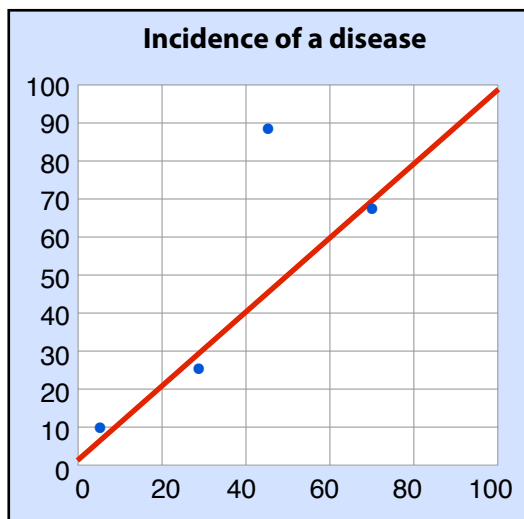
Now imagine you are a researcher who believes that the disease might be caused high-speed trains. The dark diagonal line represents the railway track going through the country.



Have a look at the position of the dots (sick people) compared to the rail-tracks. If you wanted to see a clustering of disease close to the railway tracks you could probably do so in several of the charts. Yet the data has been generated randomly.



I didn't have to do many more recalculations before the following pattern emerged:



For people predisposed to believing what they want to believe, this graph is presenting them with a pattern they will interpret as conclusive evidence of the effect.

The problem is that if you are dealing with only four pieces of data then there is a good chance that they will often cluster around any given shape. The negative results such as seen in Graph C are easily dismissed and researchers concentrate on the patterns they want to see.

Now think about the following business propositions:

- A business receives very few complaints about its level of service, but in one year all relate to one branch. Does that indicate that the branch is performing poorly or is it just an artefact of chance?
- In a year a business tenders for 1000 contracts but only three are won – all by the same sales team. Does that really mean that that sales team is fantastic or is it again simply the result of chance?



3. The processing and presentation of data

3.1. Averages

Almost certainly when you use the term 'average' you are referring to the arithmetic mean. This is calculated by adding up all results and dividing by the number of results. So, for example:

Person Height (cm)

A	175
B	179
C	185
D	179
E	176
Total	894

So the arithmetic mean of these 5 people is $894/5 = 178.8$ and this feels as though it is a natural way to describe an important measurement about the data. However, as we will see below, it can lead you astray.

The arithmetic mean is one measure of the data's **location**. The other common measures are:

Mode: the most commonly occurring value. In the table above, the mode is 179. This measure would be more useful to you than the mean if you were a mobile phone manufacturer and needed to know customer preferences for phones of 8, 16, 32 or 64 GB. You need to know the most popular.

Median: this is the value of the middle ranking item. So, for the data above arrange it in ascending order of height and find the height of the person at the mid-point

Person Height (cm)

A	175
E	176
B	179
D	179
C	185

So, the height of the mid-ranking person is 179 and this is the median

Unless the distribution of the data is completely symmetrical, the mean, mode and median will generally not have the same values. In particular, the arithmetic mean can be distorted by extreme values that give rise to its misinterpretation.



To demonstrate this we will initially set up a theoretical symmetrical distribution of the annual income of a population:

Number of people (000)	10	20	30	40	50	40	30	20	10
Annual income \$000	15	25	35	45	55	65	75	85	95

The mean, median and mode are all \$55,000. If you earned that you would feel that you were on 'average' pay with as many people earning more than you as less than you.

Now let's say that into this population comes the founder of a hi-tech internet company called Mark Gutenberg who invented a social medium service called U-Twit-Face. Mr Gutenberg has a very high income - \$10m/year. The salary distribution now looks like:

Number of people (000)	10	20	30	40	50	40	30	20	10	M Gutenberg	1
Annual income \$000	15	25	35	45	55	65	75	85	95		10000

The arithmetic mean of this distribution is \$55,400, so now earning only \$55,000 you feel that you are earning less than average. In fact over 50% of the population is earning less than 'average' – something that at first glance would seem impossible.

This distortion could allow a government to claim that people are now better off because average earnings are higher. In fact, even if all the salary bands were reduced by 5%, the arithmetic mean including Gutenberg would be around \$55,380. So the government could claim that on average the population is better off when, in fact, almost everyone is worse off.

In situations where the data is not symmetrical, the median value will often provide a more useful measure. The inclusion of Gutenberg does not change the median value and if everyone's income fell by 5%, so would the median.



3.2. False positives and false negatives: Bayes' theorem

This will first be demonstrated using a medical example, then it will be applied to a more business-related area.

Assume there is a serious medical condition called 'lurgy' suffered by 5% of the population. There is a diagnostic test available, but this is not perfect. If the test result is positive there is a 90% chance that it is correct, and a 10% chance that it is wrong (false positive). If the test is negative, there is an 80% chance that the result is correct, but a 20% chance that the disease was missed (false negative).

You are tested and the result is positive, so what is the probability that you have lurgy? You might assume the answer is 90%, but that is far from the truth.

The easiest way to solve this is to construct a table, based (say) on 10,000 people.

	<i>Suffers from lurgy</i>	<i>Does not suffer from lurgy</i>	<i>Total</i>
Positive test result			
Negative test result			
Total	500	9,500	10,000

First, put in the true number of the 10,000 who suffer from the disease: 5% and 95% of 10,000.

So, of the 500 who have the disease, the test will report correctly on 90% of them and incorrectly on 10%. In numbers this will be $90\% \times 500 = 450$ who have the disease and who are correctly reported on, and $10\% \times 500 = 50$ who have the disease but are not reported on.

Similarly, of the 9,500 non-sufferers, the test will correctly report on 80% of them. The numbers are $80\% \times 9,500 = 7,600$. The remainder will be reported as having the disease, $20\% \times 9,500 = 1,900$

The table can now be shown as:

	<i>Suffers from lurgy</i>	<i>Does not suffer from lurgy</i>	<i>Total</i>
Positive test result	450	1,900	2,350
Negative test result	50	7,600	7,650
Total	500	9,500	10,000

So, you go to your doctor for your test results and find they are positive. You are obviously in the top line of this table (where the positive results are). From the population of 10,000 there are 2,350 positive results, but only 450 are true positives. Therefore your chance of actually having the disease is $450/2,350 = 19\%$ - a far cry from the 90% you might have thought at the start.



Now let's look at a business-orientated example.

Maxter Software Co creates software and web-sites for clients. They prefer to recruit employees with no programming experience and train them. It is believed that 1% of the population has the aptitude to become a programmer. The company asks each applicant to undergo an aptitude test. If someone has the proper aptitude the test will identify them correctly on 80% of occasions, but 20% are missed. If a recruit does not have aptitude there is a 5% chance that they will pass the test.

If someone is identified as having aptitude, what is the chance that they actually do?

	<i>Has aptitude</i>	<i>Does not have aptitude</i>	<i>Total</i>
Passes test	80	475	555
Does not pass test	20	9,525	9,545
Total	100	9,900	10,000

So the chance that a person who passes the test actually has aptitude is $80/555 = 14.4\%$: not a great way to recruit successful staff.

3.3. Correlation

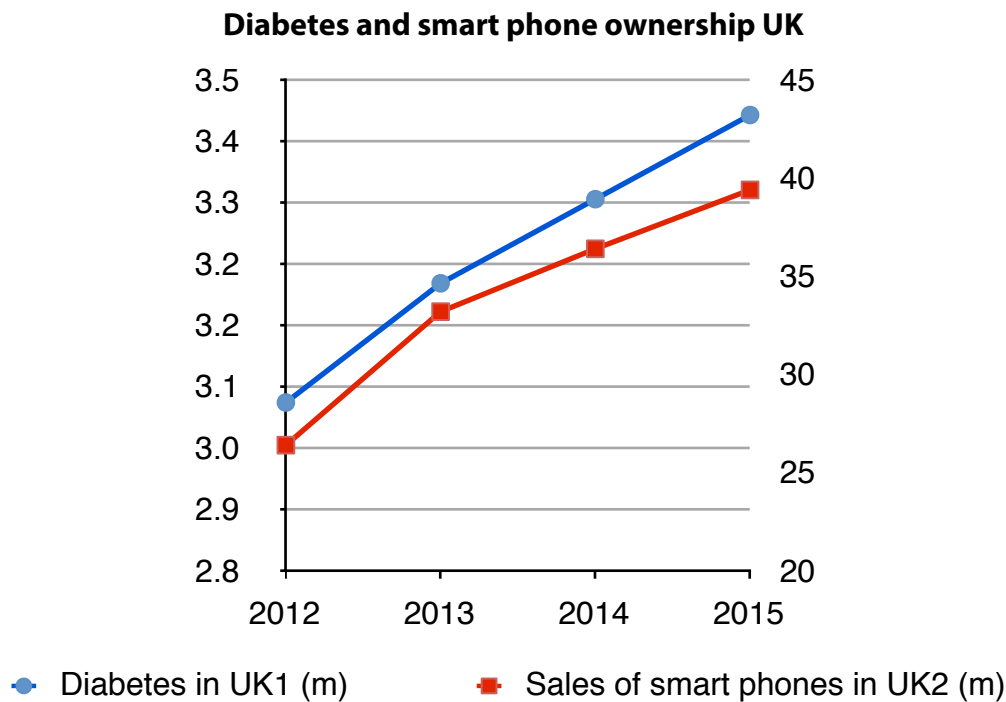
One of the commonest misuses of data is to assume that good correlation between two sets of data (ie they move closely together) implies causation (that one causes the other). This is an immensely seductive fallacy and one that needs to be constantly fought against.

For example, consider this data set:

	<i>Diabetes in UK1 (m)</i>	<i>Sales of smart phones in UK2 (m)</i>
2012	3.04	26.4
2013	3.21	33.2
2014	3.33	36.4
2015	3.45	39.4
1 Diabetes UK 2 Statista/eMarketer		



On a graph the data looks like:



The two sets of data follow one another closely and indeed the coefficient of correlation between the variables is 0.99, meaning very close association.

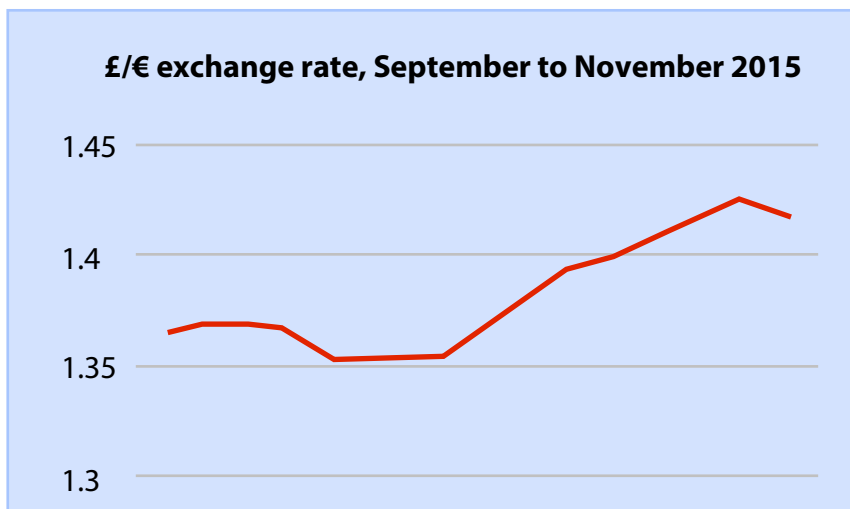
It is unlikely that any of you believe that owning a smart phone causes diabetes or vice versa and you will easily prefer to believe that the high correlation is spurious. However, with other sets of data showing with high correlation it is easier to assume that there is causation. For example:

- Use of MMR vaccines and incidence of autism. Almost no doctors now accept there is any causal connection. In addition the whole study was later discredited and the doctor responsible was struck off the UK medical register.
- Cigarette smoking and lung cancer. A causal effect is well-established, but it took more than correlation to do so.
- Concentration of CO₂ in the atmosphere and average global temperatures. Not universally accepted (but increasingly accepted).

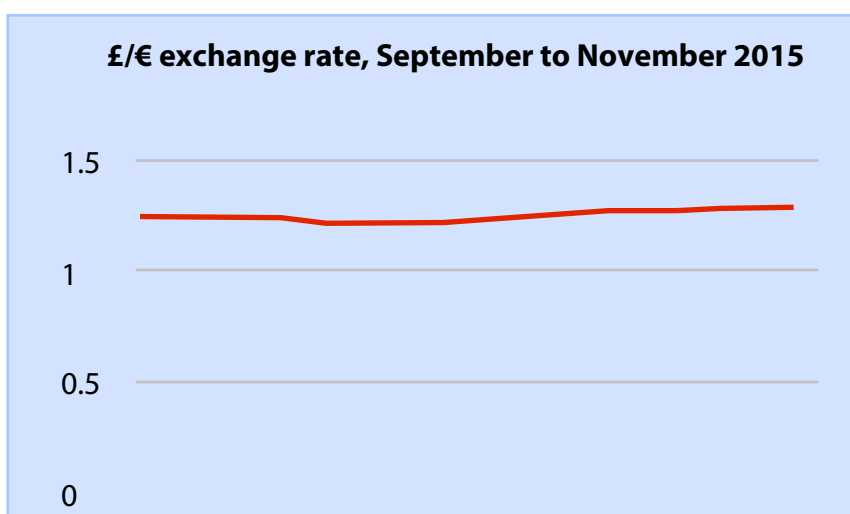


3.4. Graphs and pictograms

Here's a graph of the £/€ exchange rate for September to October 2015. It seems to be quite a rollercoaster:



However, the effect has been magnified because the y axis starts at 1.3, not 0. The whole graph only stretches from 1.3 to 1.44. If the graph is redrawn starting the y axis at 0, then the graph will look a follows:



Not nearly so dramatic.

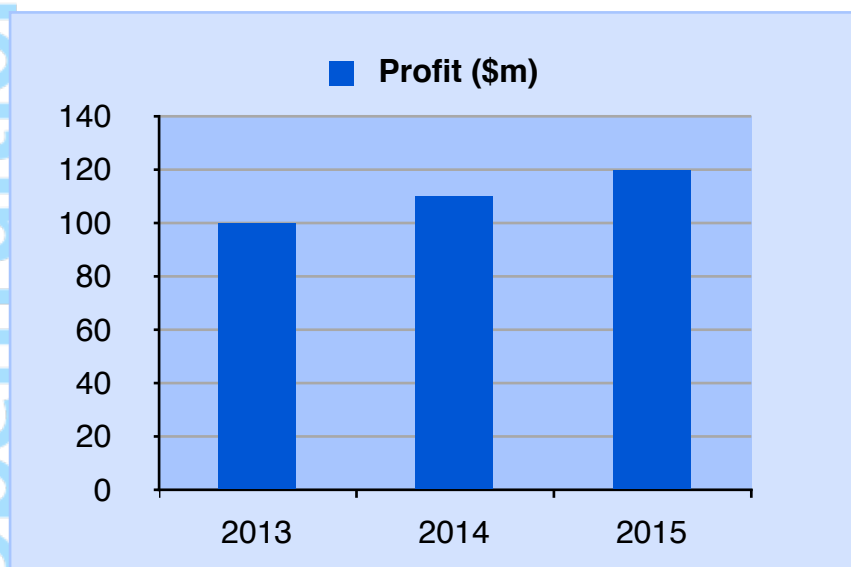
Note that a board of directors that wants to accentuate profit changes could easily make small increases look dramatic, simply by starting the y axis at a high value.



Pictograms are often used to make numerical results more striking and interesting. Look at the following set of results:

Year	Profit (\$m)
2013	100
2014	110
2015	120

The increase has been a relatively modest 10% per year and on a bar chart would appear as:



A pictogram could show this as:



Look at the first and last bag of money and think about how much you could fit into each. I would suggest the capacity of the third one looks at least 50% greater than the first one. That's because the linear dimensions have increased by 20%, but that means that the capacity has increased by $1.2^3 = 1.73$, flattering the results.



4. Data visualisation

Data visualization is the representation of data using graphs, charts and diagrams. It uses images that:

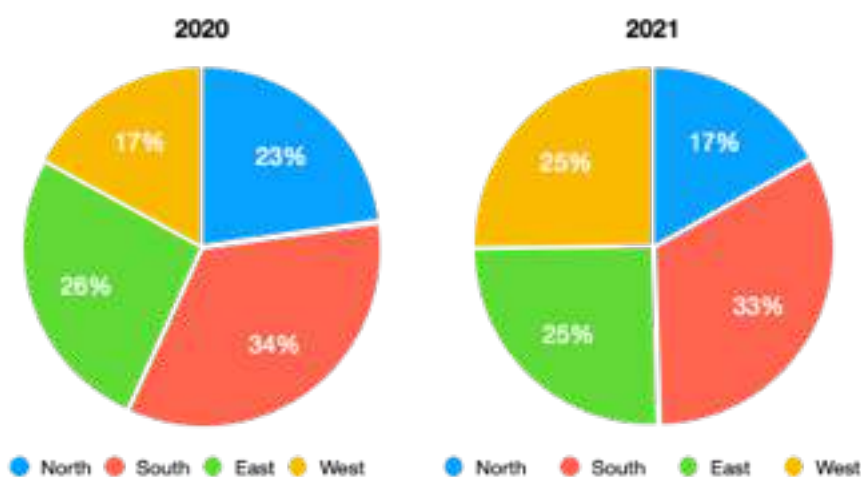
- Communicate relationships among a set or sets of data
- Uncover relationships between data
- Help users' understanding of the data
- Make an impact on users
- Help users to remember the significance of data

Historically, data visualisation was limited to static charts and diagrams but increasingly data visualisations presented on computers allow users to explore the data sets eg by magnifying some areas of a graph, or the use of animated diagrams eg additional information can be displayed if the mouse pointer hovers over a figure.

5. Simple charts and diagrams

5.1. Pie charts

Sales		
\$m	2020	2021
North	20	18
South	30	35
East	23	27
West	15	27
Total	88	107



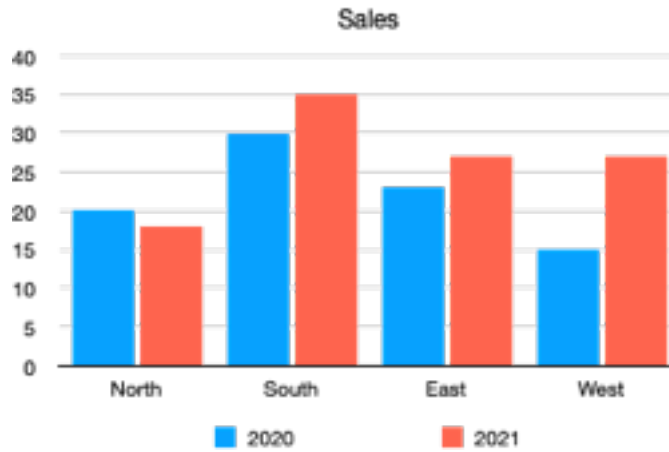
These are visually striking and are particularly good at showing the relative sizes of the components of a total. For example, it is easy to see how West's importance has grown from 2020 to 2021 whereas North is less important. These diagrams are not so good at showing total growth or decline.



5.2. Bar charts

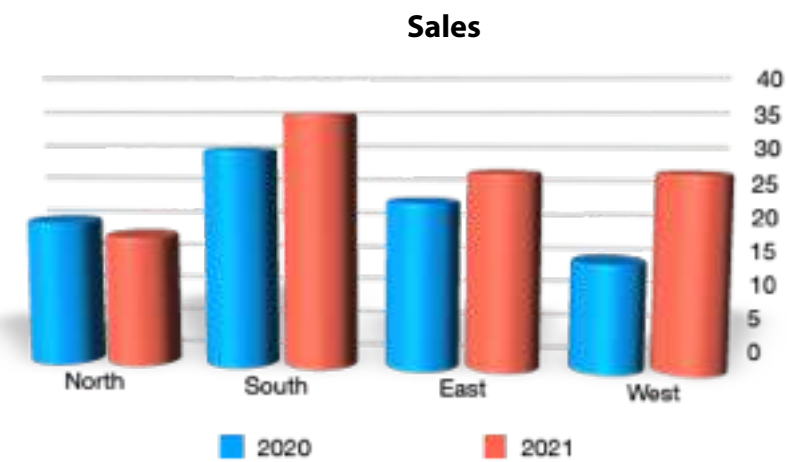
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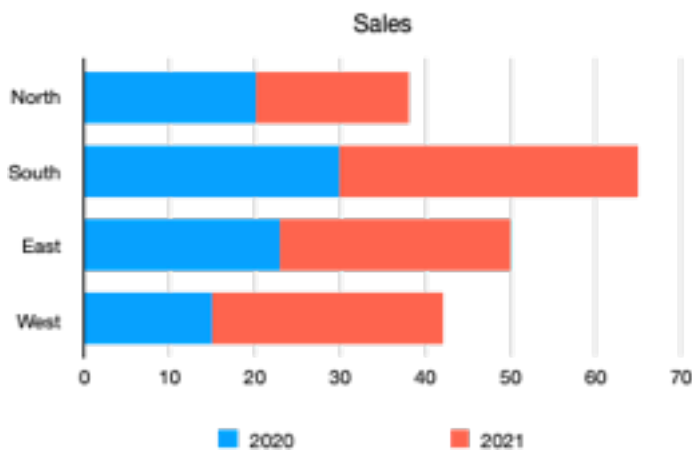
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Total	88	107



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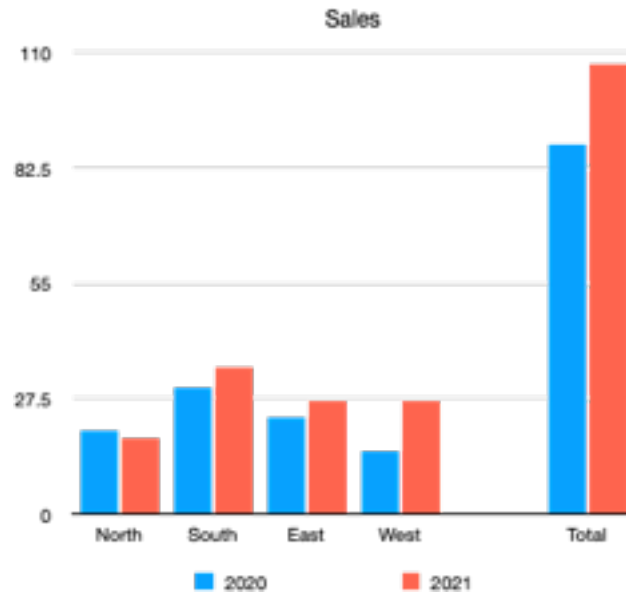


There is not real difference between the first and second diagrams, but Excel makes it easy to produce fancier charts, like 3D charts.

Once again, these two diagrams do not emphasise total sales growth, but they allow the relative performance of each area from one year to the next to be easily seen.

If total sales were to be shown also, it is easy to add another set of columns:

\$m	2020	2021
North	20	18
South	30	35
East	23	27
West	15	27
Total	88	107



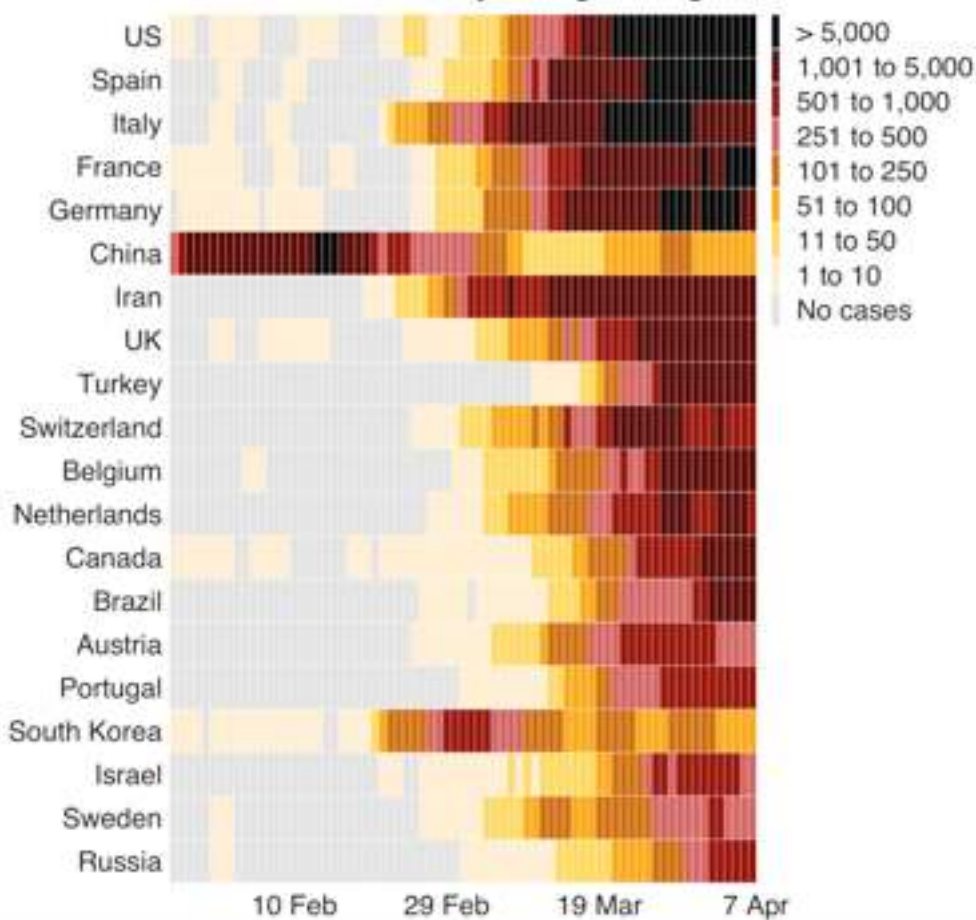
5.3. More complex charts and diagrams

More complicated sets of data might require more ingenious charts and diagrams to display the information well. You would not have to invent a diagram as complex as shown in the following examples. They are here just for illustration.

Covid-19 virus effect over time in many different countries

Where are the most new coronavirus cases?

New confirmed cases, three-day rolling average

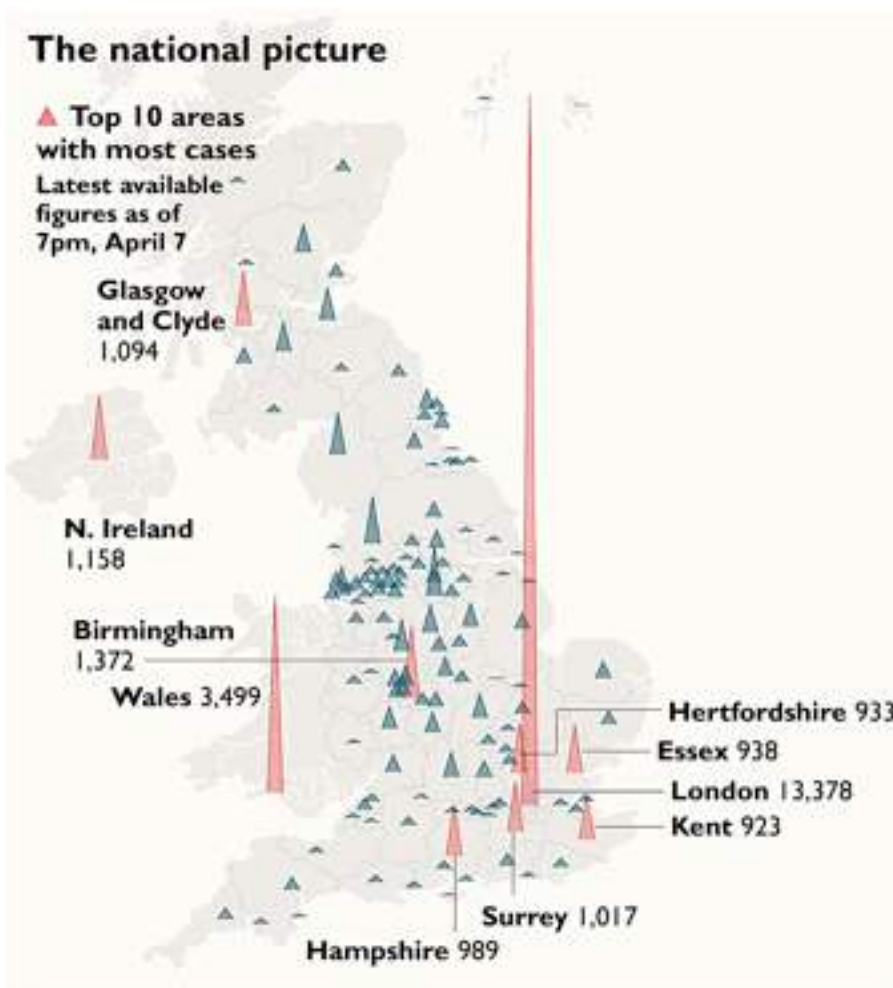


Source: Johns Hopkins University, updated: 7 April 23:59 BST

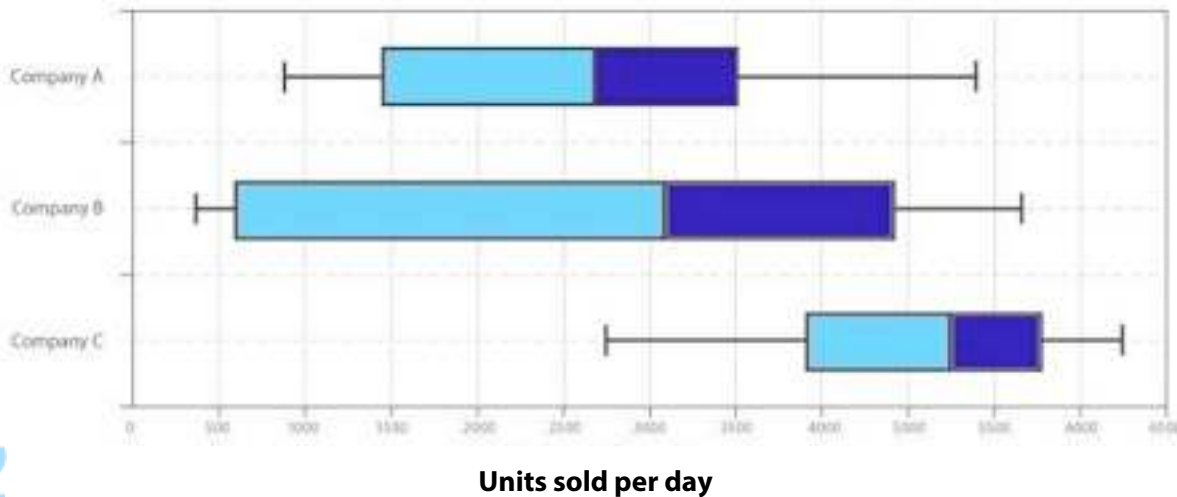
BBC



The second example, below, is also drawn from a presentation of the Covid-19 epidemic in the UK. Note that this type of visualisation could just as easily be effectively used to present sales of a new product in different town and regions.



5.4. Box and whisker plot



This diagram shows simple information about how values are distributed.

The extreme left of each bar are the lowest values for each company and the extreme right the highest values.

Moving from the left, the box starts at the lower quartile value (ie the value that separates the lowest 25% and the highest 75% of values). The light-coloured box shows the third quartile values ie 25% - 50% of all values. The dark coloured box is the second quartile values (50% to 75% of all values and the 'whisker' to the right shows the top 25% of values. The median is where the light and dark boxes meet and the median value is the value half-way down the population when it is arranged in descending order.

We can see that Company C units sold are generally higher than the other companies. Also, Company B shows a very wide dispersion (spread) of daily unit sales.



5.5. Time series

A time series simply shows how a value moves as time passes. For example, sales per quarter year.

The first graph shows a plot of the raw data and this goes up and down fairly regularly with the seasons. If you want to see the trend (ie the underlying increase or decrease over time) then there are ways in which the data can be smoothed out (eg by using moving averages). The second diagram shows a trend line superimposed on the raw data plot.



5.6. Time series and growth

Growth can be defined in two ways:

- (1) An absolute increase each period
- (2) A percentage increase for each period over the previous period. This represents exponential growth (like compound interest) and can quickly lead to very large changes in the absolute amounts.

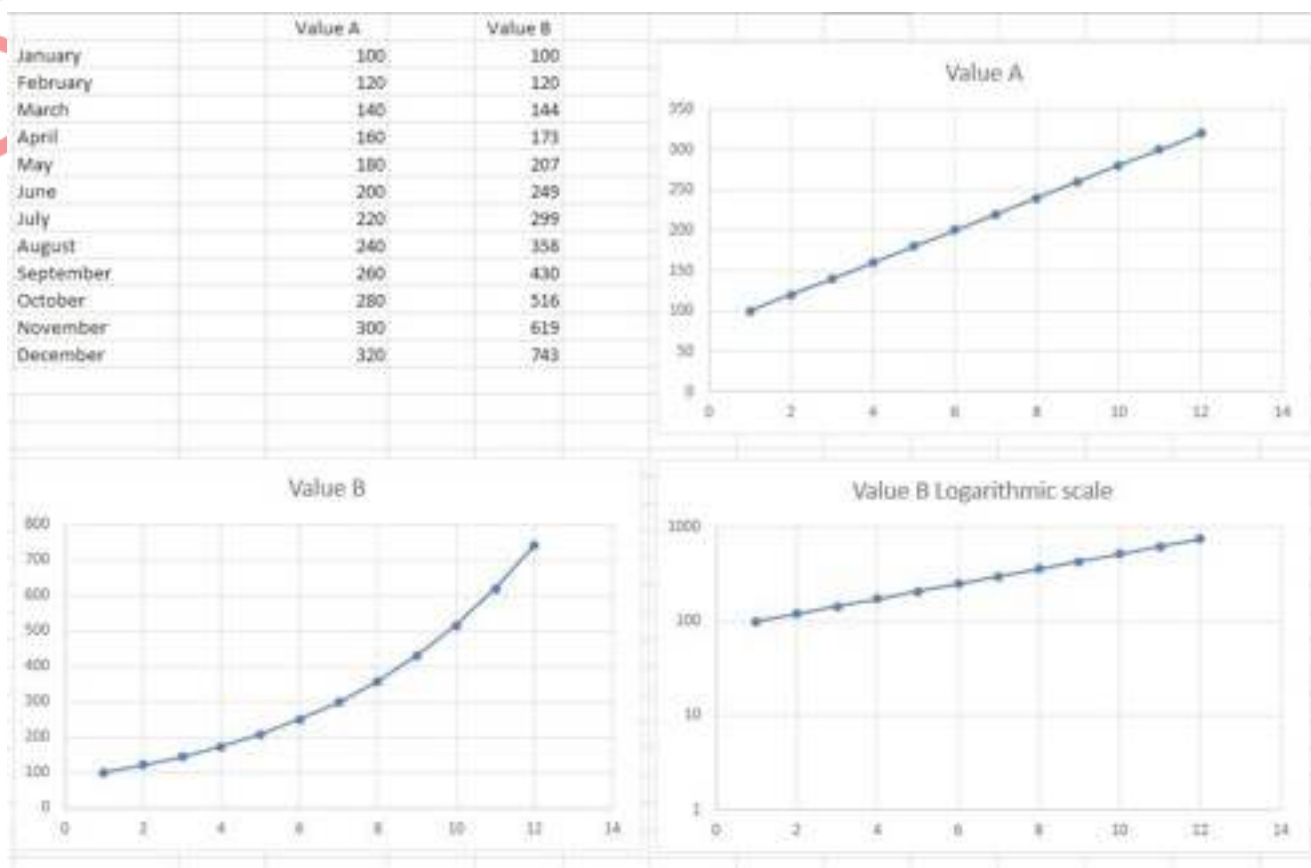
The diagram below shows the two types of growth in a table. Value A is increasing by a constant 20 per month. Value B is increasing at a constant 20% per month. You will see how rapidly Value B pulls ahead of Value A.

When Value A is plotted, it is a simple straight line showing a constant absolute increase per period, here 20 per month. The steeper the line, the greater the absolute growth per month.

If Value B is plotted then there is a 'ski-jump' pattern as the absolute increases get larger and larger because of the compounding effect. There is no easy way to tell by looking at the curve if the increase is a constant 20% or if it has begun to fall to say 18% or 15%.

To see if the % rate of growth is changing or is constant, the plot has to be made using a logarithmic scale. Note that on that graph the vertical axis divisions go 10, 100, 1000 is each division represents a multiple of 10. Note the constant exponential growth is represented by a straight line. Any change from 20% per month would show that line getting steeper or flatter.

Logarithmic scales are also very useful for accommodating data that cover a very wide range on the same graph.



EMPLOYABILITY AND TECHNOLOGY SKILLS

1. Introduction

The ACCA has introduced this new section into the syllabus for all of the Applied Skills and Strategic Professional examinations now that all the examinations in all locations will be computer based.

However, it does not require the same sort of learning as for other syllabus areas because it is primarily focused on ensuring that students are capable of using the Computer Based Exam software.

The level of skill needed to be able to use the CBE software can also be beneficial for your employment.

Many students will already have a high level of skill on computers and be familiar with the use of word processors and spreadsheets. However, those provided in the exam software might not be identical to those that you are familiar with and, in addition, it is essential that you are able to navigate the software efficiently so as not to waste time in the exam.

There are many excellent resources available on the ACCA website to assist you, and so in this chapter we will direct you to some of the relevant ACCA pages and explain their importance.

2. Navigating the exam and the tools available

The exam screen has a top bar and a bottom bar.

On the **top bar** there are options to call up an 'online calculator', to call up the 'scratch pad', and to 'flag for review'. You can also highlight or strikethrough text in the question or exhibits.

The online calculator is used in the normal way and can be switched at any time between a basic mode and a scientific mode. You can use your own calculator instead provided that it does not store or display text.

The scratch pad can be used to make notes and do your own rough workings, but nothing written on the scratchpad will actually be marked. You will also be provided with paper if sitting the exam in an exam centre and so you can use this for workings instead - the paper will be collected in at the end of the exam but, again, nothing on this rough paper will be marked. (Note: if you are sitting the exam remotely then paper is not allowed and you can only use the scratchpad.)

The 'flag for review' option enables you to put a mark against a question to enable you to quickly come back to it again later. This is for questions where you are unsure about your answer and want to do more work on it later should there be time.

On the **bottom bar** are the arrows for moving forwards or backwards through the questions. In addition there is a 'navigator' option which when chosen displays a list of all of the questions enabling you to go straight to a particular question.



Finally, there is the option of calling up the formula sheet and tables (which are online copies of the sheet that is printed at the front of these lecture notes).

3. Section A of the exam

This section comprises one 50 mark case study in which you will be required to prepare a report or similar business document and perform calculations on the information given in the question.

For calculations the program provides a spreadsheet in which to enter your calculations. For efficiency you should make use of the functions and formulae available in the spreadsheet (you do not need to type out separately the formulae used - the marker will be able to see them).

You can find details of the functions and formulae that are available in the ACCA booklet linked in section 5 of this chapter. Note that the spreadsheet provided does not have all the functionality of Excel. For example, you cannot insert or delete rows and columns. The 'Help/formula sheet/tables' button at the bottom left of the exam screen has a section setting out the names and formats of the spreadsheet functions.

For the report you are provided with a word processor and, again, details of the functions available such as underlining and 'copy and paste' are in the ACCA booklet.

4. Section B of the exam

This section comprises two 25 mark questions and each question will contain a combination of calculation and written parts. As with Section A you will be provided with a word processor and a spreadsheet where necessary.

5. ACCA Resources

You will find many resources on the ACCA website and the more you refer to the better.

Go first to the following page:

<https://www.accaglobal.com/gb/en/student/exam-support-resources/professional-exams-study-resources/p5/introduction.html>

On this page, under the heading "Resources" you will find a link to download "APM essentials on one page". Clicking on this will download a useful small chart headed up "How to approach

The Advanced Performance Management (APM) exam". One of the headings on this chart is 'Links to support resources' and clicking on each of the items listed in turn will take you to more detail. Each of these 'Key Resources' is worth reading.

In addition, it is important to visit the following page:

<https://www.accaglobal.com/gb/en/student/exam-support-resources/professional-exams-study-resources/p5/cbe-preparation.html>

On this page you will find useful information, but also towards the bottom of the page you will find a link to "CBE Guidance Document". This will download a leaflet which details everything



about the CBEs including, importantly, a list of the functions and formulae available in the spreadsheet and the word processor (and how to input the formulae in the spreadsheet).

You can watch a video illustrating the use of all these features by clicking on the link to “CBE workspace management video”.

There is also information on how to access the CBE specimen and practice exams:

<https://www.accaglobal.com/gb/en/student/exam-support-resources/professional-exams-study-resources/p5/cbe-question-practice.html>

You are strongly advised to make use of both the video and the practice resources so that you become familiar with the exam interface.

6. Revision Kit Live

On our main [Paper APM page you will find a link to a section called ‘Revision Kit Live’](#) in which you will find lectures working through several past exam questions.





PROFESSIONAL SKILLS

1. Introduction

From September 2022, the APM exam will include 20 Professional Skills marks: 10 in the case study Q1 in Section A and 5 in each of the 25-mark questions in Section B. The four professional skills relevant to AFM are: Communication; Analysis and Evaluation; Scepticism; Commercial Acumen.

- All four skills will be examined in Section A
- Each question in Section B will examine a minimum of two professional skills but **not** communication.

2. Communication

Q1 will always ask for a **report** requested by an organisation's senior management to address key financial management matters facing the organisation.

Professional marks will be available for:

- Report format and structure – use of headings/sub-headings and an introduction
- Style, language and clarity – includes:
 - ▶ appropriate tone of report response
 - ▶ presentation of calculations
 - ▶ appropriate use of the CBE tools
 - ▶ easy to follow and understand

Professional marks may also be available for:

- Effectiveness of communication – content of the report is relevant and tailored to the question scenario.
- Adherence to the specific requests made by the requested of the report (e.g. the chief executive).



3. Analysis and Evaluation

All questions will include this professional skill. It is common for APM questions to focus on the evaluation of a report, method, model, system, or technique, of which part may be the analysis of some data or information.

Remember: Any analysis or evaluation must be in **context** of the situation in which the organisation operates.

- Analysis can be demonstrated by:
- Appropriate use of the data/information:
 - ▶ to determine suitable calculations and/or
 - ▶ to support discussion and draw appropriate conclusion
- Appraisal of information objectively with a view to balancing costs/risks/benefits/opportunities, before advising on or recommending solutions or decision.
- Identifying where data appears to be omitted or where further analysis is needed to make a recommendation (e.g. decision-makers need to be aware if a full evaluation cannot be performed due to lack of data).

An evaluation is a **balanced** appraisal to determine the impact of a course of action (e.g. changing an organisation's reward system). Part of that is to demonstrate reasoned judgement to consider relevant factors, decide what to prioritise and then come to a suitable and justified conclusion.

4. Scepticism

Having a questioning approach is key for this skill: it leads to effective challenges of information, evidence provided and assumptions stated. This includes the ability to identify contradictory evidence and remaining sceptical about information that has been provided in the scenario.

APM often bases questions on theoretical performance management models, which include assumptions and therefore may not perfectly fit an organisation's situation – you need to be able to raise such issues.

APM often has stakeholders in question scenarios making statements about their beliefs and perceptions of a matter and you can be required to challenge those statements. These challenges, however, cannot simply be in the abstract. Reasons for issues and problems are needed before challenges can be upheld and deemed appropriate.

All of this means that you need to apply professional judgement to draw conclusions and make properly informed decisions which are appropriate to the business.



5. Commercial Acumen

All questions are set in commercially realistic scenarios; these can range from private to public sector organisations and also to not-for-profit organisations and regulated industries. Whatever the context, you need to understand what will and will not work; any advice or recommendations have to be **practical** and **plausible** in the given situation.

To demonstrate this skill you must **use** examples from the **scenario information** and/or other practical commercial considerations to illustrate the points being made.

Organisations do not operate in a vacuum so you need to be able to recognise **external constraints and opportunities** where relevant and also consider the validity/reasonableness of any assumption that the organisation may be working under, given the external environment. Awareness of internal constraints within an organisation should also be accounted for.

6. Resources

In the [Practice Platform](#) you will find:

APM Specimen from September 2022 onwards

APM Practice Exam 1 from September 2022 onwards

APM Practice Exam 2 from September 2022 onwards





ANSWERS TO EXAMPLES

Chapter 1

No examples

Chapter 2

No examples

Chapter 3

Example 1

	<i>Fixed Budget</i>	<i>Flexed Budget</i>	<i>Actual</i>	<i>Variances</i>	
Sales	100,000	120,000	122,000	2,000	(F)
Materials	50,000	60,000	60,000	--	
Labour	25,000	30,000	28,500	1,500	(F)
Variable o/h	12,500	15,000	15,000	-	
Fixed o/h	10,000	10,000	11,000	1,000	(A)
	97,500	115,000	114,500	500	(F)
Profit	\$2,500	\$5,000	\$7,500	2,500	(F)

Original budgeted profit	2,500	
Sales volume variance	2,500	(F)
Flexed budget profit	5,000	
Sales price variance	2,000	(F)
Labour variance	1,500	(F)
Fixed overhead variance	1,000	(A)
Actual profit	\$7,500	



Chapter 4

No examples

Chapter 5

No examples

Chapter 6

Example 1

	<i>X</i>	<i>Y</i>	<i>Z</i>
	<i>\$'000</i>	<i>\$'000</i>	<i>\$'000</i>
Gross margin	897	1,070.00	1,056.00
Less: Customer specific costs			
Sales visits (80/100/140 × \$420)	(33.60)	(42.00)	(58.80)
Order processing (200/320/700 × \$190)	(38.00)	(60.80)	(133.00)
Despatch costs (200/320/700 × \$350)	(70.00)	(112.00)	(245.00)
Billing and collections (200/320/700 × \$97)	(19.40)	(31.04)	(67.90)
Profit	<u>736.00</u>	<u>824.16</u>	<u>551.30</u>
Ranking	2	1	3

Example 2

	<i>Gollum</i>	<i>Sam</i>
	<i>\$</i>	<i>\$</i>
Revenue	25,000	21,000
Less: discount	2,500	3,150
Net revenue	<u>22,500</u>	<u>17,850</u>
Less: cost of shoes	(12,500)	(10,500)
customer transport cost	(5,000)	–
customer administration cost	(250)	(500)
Net gain	<u>4,750</u>	<u>6,850</u>
The difference on a unit basis is considerable.		
Number of pair of shoes sold	500	420
Net gain per pair of shoes sold	\$9.50	\$16.31



Example 3

Total fixed costs must have been budgeted as: $\$30 \times 1,000 + \$60 \times 200 = \$42,000$.

These are now split as $1/3 = \$14,000$ for set-up costs and the rest, $\$28,000$ for other costs

The cost driver/causer for set-up costs will be the activity of setting-up. There are $1,000/500$
 $200/100 = 4$ set-ups in the period, so the cost per set-up = $\$14,000/4 = \$3,500$.

For one set up, 500 units of A are made, so the cost per unit = $\$3,500/500 = \7 .

For one set up, 100 units of B are made, so the cost per unit = $\$3,500/100 = \35 .

	\$	<i>Product A</i>	<i>Product B</i>
Marginal cost		50	80
Set-up costs		7	35
Other fixed costs $\$28,000/(1000 + 2 \times 200) = \20 for A, $\$40$ for B		20	40
Total absorption cost		77	155
50% mark-up		38.5	77.7
Selling price		115.5	232.5

It can now be more clearly seen that set-up costs are a major component of Product B. These could be reduced if it were possible to have longer production runs.

Chapter 7

No examples

Chapter 8

No examples



Chapter 9

Example 1

Begin with a review of the summary information - notable points

- Growth in turnover
- Growth in PBIT
- Growth in PAT
- Growth in total assets, debtors approx. in line with turnover, creditors at a higher rate.
- Reduction of gearing (result of rights issue?) and reduced interest charge
- Dividend growth
- P/E ratio has overtaken industry average.

	Year 1	Year 2	Year3	Year 4
Profitability				
ROCE	26%	27%	20%	22%
Profit Margin	19.9%	19.8%	17.2%	19.2%
Asset Turnover	1.3	1.4	1.2	1.2
Gearing				
Gearing (book values)	50%	34.6%	6%	3.9%
Interest cover (times)	7.25	9.5	48.5	75.3
Liquidity				
Debtor days	73	76	71	70
Creditor days	68	76	81	83
Investor ratios				
Share Price* \$	9.63	11.40	9.66	11.95
Market Capitalisation \$m	86.67	102.60	115.92	143.4
Divi per share (p)	22.2	24.4	21.65	30.0
Divi yield	2.3%	2%	2.2%	2.5%

* $EPS = 5,100,000/9,000,000 = \0.5666 ; $P/e = 17$. Therefore price = $17 \times 0.5666 = \$9.63$



Chapter 10

Example 1

$$\text{Return from new project} = \frac{17,000}{100,000} = 17\%$$

- (a) For company:
17% > 15% (target)
Therefore company wants to accept

- (b) For division

$$\text{ROI (without project)} = \frac{82,000}{500,000} = 16.4\%$$

$$\text{ROI (with project)} = \frac{82,000 + 17,000}{500,000 + 100,000} = 16.5\%$$

ROI of division increases therefore divisional manager motivated to accept. Example 2

$$\text{Return from new project} = \frac{16,000}{100,000} = 16\%$$

- (a) For company: 16% > 15%
Company wants to accept

- (b) For division:

$$\text{ROI (without project)} = 16.4\%$$

$$\text{ROI (with project)} = \frac{82,000 + 16,000}{500,000 + 100,000} = 16.3\%$$

Example 3

- (1) RI (without project)

Profit	82,000
Less: Interest	
15% × 500,000	(75,000)
	US\$7,000

- RI (with project)

Profit	99,000
Less: Interest	
15% × 600,000	90,000
	US\$9,000

\$9,000 > \$7,000 manager motivated to accept



(2) RI (without project)	<u>US\$7,000</u>
ROI (with project)	
Profit	98,000
Less: Interest	
15% × 600,000	<u>90,000</u>
	<u>US\$8,000</u>

\$8,000 > \$7,000 manager motivated to accept

In both cases the decisions are goal congruent

Example 4

(a)		<i>d.f. at 10%</i>	<i>P.V.</i>
0	(250,000)	1	(250,000)
1 – 5	72,500	3.791	<u>274,847</u>
			24,847

NPV positive: company accepts

(b)		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Bal sheet value		<u>250,000</u>	<u>200,000</u>	<u>150,000</u>	<u>100,000</u>	<u>50,000</u>
Net cash flow		72,500	72,500	72,500	72,500	72,500
Less: Depreciation		(50,000)	(50,000)	(50,000)	(50,000)	(50,000)
Profit		22,500	22,500	22,500	22,500	22,500
Less: Interest at 10%		(25,000)	(20,000)	(15,000)	(10,000)	(5,000)
Residual value		<u>(2,500)</u>	<u>2,500</u>	<u>7,500</u>	<u>12,500</u>	<u>17,500</u>

If manager thinks short-term, may reject project

(c) Annual depreciation + interest	<u>250,000</u>	
	3.791	= \$65,946

		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Bal sheet value		<u>250,000</u>	<u>209,054</u>	<u>164,013</u>	<u>114,468</u>	<u>59,969</u>
Net cash flow		72,500	72,500	72,500	72,500	72,500
Less: Depreciation		(40,946)	(45,041)	(49,545)	(54,499)	(59,949)
Profit		31,554	27,459	22,955	18,001	12,551
Less: Interest at 10%		(25,000)	(20,905)	(16,401)	(11,447)	(5,997)
Residual value		<u>6,554</u>	<u>6,554</u>	<u>6,554</u>	<u>6,554</u>	<u>6,554</u>

Even if manager thinks short-term, he is motivated to accept.



Example 5

	2014	2013
	\$m	\$m
Profit after tax	88	71
Non-cash expenses	15	20
Research and development	11	10
After tax interest (0.7 × 8); (0.7 × 6)	5.6	4.2
Adjusted profit	US\$119.6	US\$105.2

Adjusted Capital Employed

	2014	2013
Capital employed at start of the year	400	350
Non cash expenses	20	
Research and development	10	
Non-capital leases	16	16
	US\$446	\$366

Weighted average Cost of Capital:

$$2013: (15\% \times 0.7) + (9\% \times 0.7 \times 0.3) = 12.39\%$$

$$2014: (17\% \times 0.7) + (10\% \times 0.7 \times 0.3) = 14.00\%$$

$$\text{EVA } 2013 = 105.2 - (366 \times 0.1239) = \$59.85\text{m}$$

$$\text{EVA } 2014 = 119.6 - (446 \times 0.14) = \$57.16\text{m}$$

Chapter 11 - 12**No examples**

Chapter 13

Example 1

(a)	Selling price		20
	Costs:	A	10
		B	4
			<u>14</u>
	Profit		<u>US\$</u>

(b)		A			B
	Selling price	12		Selling price	20
				Transfer in price	12
	Costs	<u>10</u>		Costs	4
	Profit	<u>\$2</u>		Profit	<u>16</u>
					<u>US</u>

Example 2

(a) Transfer price = $15 \times 1.2 = \$18$ p.u.

(b)	Selling price		30
	Costs:	A	15
		B	5
			<u>20</u>
	Profit		<u>\$10</u>

(c)		A			B
	Total Profit	18		Selling price	30
	Cost	<u>15</u>		Transfer in price	18
	Profit	<u>\$3</u>		Costs	5
				Profit	<u>23</u>
					<u>\$7</u>

Example 3

(a) Transfer price = $20 \times 1.2 = \$24$ p.u.

(b)	Selling price		30
	Costs:	A	20
		B	8
			<u>28</u>
	Profit		<u>\$2</u>

(c)		A			B
	Total Profit	24		Selling price	30
	Cost	<u>20</u>		Transfer in price	24
	Profit	<u>\$4</u>		Costs	8
				Loss	<u>\$ (2)</u>



Example 4

For A: T.P. > 20

For B: T.P. < 30 - 8
< 22

Sensible T.P. between \$20 and \$22 p.u.

Example 5

For A: T.P. > 15

For B: T.P. < 35 - 10
< 25

Sensible range between \$15 and \$25 p.u.

Example 6

For A: T.P. > 20

For B: T.P. < 25 (as in previous example)
< 22

Sensible range. between \$20 and \$22 p.u.

Example 7

(a) For A: T.P. > 8

For B: T.P. < 14

Sensible range between \$8 and \$14 p.u.

(b) For A: T.P. > 8

For B: T.P. < 20 - 4
< 16

Sensible range between \$8 and \$16 p.u.

Example 8

	X	Y
Contribution	\$20	\$30
Hours	5	10
Contribution per hour	\$4	\$3

Therefore, if no transfers to B then A would sell exactly and generate \$4 per hour contribution. To make transfers of Y worthwhile, A need to charge at least $70 + (10 \times 4) = \mathbf{\$110 \text{ p.u.}}$



Chapter 14

Example 1

	0	1	2	3	4	5
Sales		2,000	2,140	2,290	2,450	2,622
Materials		(864)	(933)	(1,008)	(1,088)	(1,175)
Labour		(735)	(772)	(810)	(851)	(893)
Net operating flow		401	435	472	511	554
Tax on operating flow		(100)	(109)	(118)	(128)	(139)
Cost	(1,800)					
Scrap						1,000
Tax on saving on capital allowed		113	84	63	47	(107)
Working Capital	(200)					200
Net cash flow	(2,000)	414	410	417	430	1,508
d.f. @ 10%	1	.909	0.826	0.751	0.683	0.621
P.V.	(2,000)	376	339	313	294	936
NPV = \$258						

The NPV is positive and so the project should be accepted.

	0	1	2	3	4	5
Net cash flow	(3,000)	401	510	494	1,700	(167)
d.f. @ 5%	1	.952	0.907	0.864	0.823	0.784
P.V.	(3,000)	382	463	427	1,399	(131)
NPV = \$258						

Example 2

	0	1	2	3	4	5
Net cash flow	(2,000)	414	410	417	430	1,508
d.f. @ 15%	1	.870	0.756	0.658	0.572	0.497
P.V.	(2,000)	360	310	274	246	749
NPV = \$ (61) at 15%						

NPV @ 10% = \$258 (from example 1)

$$\text{IRR} = 10\% + [258 / (258 + 61)] \times [15 - 10] = 14\%$$



Example 3

	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>
Net cash flow	(1,000)	600	700	(200)
Discount outflows to time 0 at 10% @ 10%	1			0.751
P.V.	(1,000)			(150)
PV outflows	(1,150)			
Invest inflows at 10% until time 3		x 1.1 x 1.1	x 1.1	
Terminal value of inflows	1,496	726	770	

At IRR NPV = 0, so $1,150 = 1,496 / (1 + r)^3$

$$(1 + r)^3 = 1,496 / 1,150 = 1.3$$

$$1 + r = \sqrt[3]{1.3} = 1.09; \quad r = 0.09 \text{ or } 9\%$$

Chapter 15

No examples

Chapter 16**Example 1**

Selling price = \$20 p.u.

Target return = 40% of selling price

Target Cost = **\$12 p.u.**

Example 2

Target return = 30% × 5M = \$1.5M p.u.

Expected revenue = 40,000 × \$67.50 = \$2.7M

Target cost = (2.7m - 1.5m) / 40,000 = \$30 pu

Chapter 17-18

No examples



