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Introduction

The objective of this guide is to provide lecturers and other instructors with a handbook to support them in their teaching of business information systems (BIS). It is intended, in conjunction with the FT Management web site (www.ftmanagement.com/bis), to support the book Business Information Systems: Technology, Development and Management for the e-business. This book was conceived as a single source book that undergraduate business students would refer to throughout their course, without the need to purchase a separate book for different topics such as information technology (IT); information systems (IS); information management; systems analysis and design; and strategy development.

We hope you find the book and the guide useful. If you have any comments or suggestions, please contact us via the FT Management web site (www.ftmanagement.com/bis).

Organisation of materials

Each chapter of the book is accompanied by a body of material intended to support lecturers in their teaching of BIS. In addition, this introduction sets out the overall structure of the book and suggests how it might be used with different groups of learners.

All materials are available in two forms: as ready-to-print documents and as material that can be viewed via the Internet. The documents available for printing are provided in Adobe Acrobat (PDF) format. This means that the Adobe Acrobat Reader is required in order to view or print documents. This software is available free of charge from www.adobe.com

Each document is made up of several different sections:

- **Title page.** This lists the title of the chapter.
- **Chapter summary.** This provides an overview of the chapter. This overview includes a brief summary of learning objectives, a list of the topics covered, a description of the business issues addressed by the material.
- **Notes.** Some additional comments and notes regarding the material presented.
- **Activities.** Specimen answers for all of the activities presented within the chapter. Activities are listed in the order in which they appear within the material.
- **Case studies.** Specimen answers for all of the case studies presented within the chapter. Case studies are listed in the order in which they appear within the material.
- **Exercises.** Specimen answers for all of the activities presented at the end of the chapter. This material is broken down into four smaller sections: self-assessment questions, discussion questions, essay questions and examination questions.

Notes

1. All solutions are presented in the order that the activities appear in the text.

2. Please note that these are indicative responses and are intended for guidance only. The specimen answers provide no more than a brief summary of the major points that one might expect to see in a good response. Please note that there may be alternative responses that are equally valid.

3. Additional support materials can be found at the web site that accompanies the text: www.ftmanagement.com/bis.
1. About The Book

This book, *Business Information Systems: Technology, Development and Management for the e-business*, is intended to provide a comprehensive, yet accessible, guide to choosing the right systems for an organisation, developing them appropriately and managing them effectively. The book was conceived as a single source book that undergraduate business students would refer to throughout their course, without the need to purchase a separate book for different topics such as IT; information management; systems analysis and design; and strategy development. It covers, in detail, the software and hardware technologies which form IS, the activities involved in acquiring and building new IS, and the elements of strategy required to manage IS effectively.

Key skills necessary to participate in the implementation of IT in businesses are developed and these skills, which form the main themes of the book, are:

- understanding of the terms used to describe the components of BIS to assist in selection of systems and suppliers;
- assessing how BIS applications can support different areas of an organisation;
- managing IS development projects;
- systems analysis and design;
- developing an IS or e-business strategy and managing its implementation.

The book assumes no prior knowledge of IS or IT. New concepts and terms are explained as simply as possible, with clear definitions given in the margins of the book. It explains the importance of information in developing a company business strategy and assisting decision making. The use of relevant hardware and software components of computer systems are defined and explained in the context of a range of business applications.

The book also explains the benefit of specialised innovative applications such as the Internet and intranets; office automation using groupware and workflow products, such as Lotus Notes, and marketing analysis using tools such as data warehouses and geographical information systems. The application of IS to business process re-engineering and initiatives is also described.

After using the book as part of IS modules on their course, students will be able to:

- evaluate and select IT solutions for deployment within different functional parts of a business to achieve benefits for the business;
- actively participate in IT projects, applying skills such as selection of suppliers, procurement of hardware and software, systems analysis and design, and project management;
- communicate effectively with IT specialists when collaborating on a task or project;
- use IT to access a wide range of information sources for research and acquisition of knowledge.

*Changes for the second edition*

The logical structure of the first edition has been retained, but many changes have been incorporated based on lecturer and student feedback. The most significant change for the
second edition is the integration of more material on the concept of e-business throughout the book. The main changes are as follows:

- New chapters on e-business applications (Chapter 6) and management (Chapter 14) have been included.

- E-business concepts and topics have been integrated into many chapters. Particular topics which are covered in more depth include the e-business concept (Chapter 1), knowledge management (Chapter 1), new digital technologies such as mobile and interactive TV access (Chapter 5), drivers and barriers impacting e-business adoption (Chapter 6), user-centred design for the web (Chapter 11), and legal and ethical issues of Internet usage (Chapters 15 and 17).

- The majority of cases have been updated by articles from the Financial Times and Computer Weekly, many of which relate to e-business topics.

- Systems theory has now been integrated into the introductory chapters while other chapters have been simplified to ensure a succinct coverage of key topics.

- Navigation within chapters has been improved through a redesigned page at the start of each chapter including a summary of the management context plus clear cross-referencing to the main sections and case studies.

**The structure of this book**

The book is divided into three parts, each covering a different aspect of how BIS are used within organisations to help achieve competitive advantage:

- **Part 1** focuses on the hardware and software technologies, known collectively as IT, which make up IS. It is intended for introductory courses in IT and BIS.
- **Part 2** explains how IS are acquired and developed by considering the activities involved with each of the stages of developing an IS. This part is intended for more advanced courses in systems analysis and design.
- **Part 3** describes how IS need to be managed, and a strategy developed, to ensure they effectively support the mission of the business. This part is appropriate for courses which consider the strategic management of IS.

Each part is self-contained and is the equivalent of what might be covered in a single module, or course, in a programme of study.

**Part 1: Introduction to business information systems**

Part 1 introduces the basic concepts of BIS. Its main focus is the technology that forms BIS, but it starts by reviewing the importance of information and what makes good-quality information. Many people who work in the IT industry tend to believe it is the technology part of IT that is important, whereas most business people will tell you it is the information part of IT that is crucial to business performance. As Philip Evans and Thomas Wurster, writing in the Harvard Business Review of September 1997 put it: ‘... every business is an information business... information is the glue that holds together the structure of all businesses.’
To enable a business user to communicate effectively with their suppliers of IT, a knowledge of the often bewildering terminology used to describe the components of IS and a basic idea of how these components interact is important. To aid understanding, basic concepts and characteristics of IS are reviewed in Chapter 2. Hardware, software, communications and networking technologies are then described in subsequent chapters. The different aspects of IT are introduced as follows:

- **Chapter 1: Basic concepts – understanding information** provides an introduction to how information is used within a business and to the e-business concept.
- **Chapter 2: Basic concepts – an introduction to business information systems** introduces the different types of BIS and how they can be used to gain strategic advantage.
- **Chapter 3: Hardware** describes the issues in the selection of different hardware components of IS which are used to capture, process, store and output information.
- **Chapter 4: Software** reviews the selection and use of general-purpose applications software, such as word processors, spreadsheets and databases, which are often referred to as productivity software.
- **Chapter 5: Networks, telecommunications and the Internet** explains how BIS are linked using telecommunications links which form networks within and between businesses.
- **Chapter 6: E-business applications** explains the concept of e-business in more detail and illustrates how technologies are applied in different types of businesses. The business applications are considered from several perspectives: how IS support decision making at different levels of the organisation, such as at senior management level and an operational level; how IS are used in different functional areas of an organisation to support different processes such as sales order processing, manufacturing or recruitment.

**Part 2: Business information systems development**

Part 2 focuses on how BIS are acquired and built. A basic understanding of this is necessary to every business user of BIS so that they can appreciate the context of their use of the system and this can be of particular importance when they are involved in testing or using a new system since they will need to understand the reasons for introducing new systems as well as their limitations. A more detailed understanding of building BIS is important to users and managers who are responsible for, or are involved in, a systems development project. In this case they will need to know the different stages of systems development to help plan the project or work with the developers of the system. They will also need to be aware of the different alternatives for sourcing IS, such as buying pre-written ‘off-the-shelf’ systems or specially written ‘bespoke’ systems, to decide which is best for their company or department.

This book provides a reference framework known as the systems development lifecycle which puts all the activities involved with building a system into a business context. Chapters give guidelines on how best to approach system development, giving examples of activities that need to occur in order to avoid any pitfalls and enabling a quality system to be produced which meets the needs of the users and the business. The chapters in Part 2 are sequenced in the order in which activities occur in the systems development lifecycle:

- **Chapter 7: An introduction to acquiring and developing BIS** gives an introduction to alternatives for acquiring new systems. It also introduces the software development lifecycle which acts as a framework for the next chapters.
• Chapter 8: Initiating systems development covers the initiation phase of system development when the need for the new system and the feasibility of different development methods are assessed.

• Chapter 9: BIS project management describes how project management can be used to ensure the new system is built within the time and budget constraints, while also providing the features and quality required by the business and end users.

• Chapter 10: Systems analysis details systems analysis techniques, including methods of capturing the requirements for the system, and then summarising them using different diagramming techniques.

• Chapter 11: Systems design reviews different aspects of the design of IS from overall architectural or system design to aspects of detailed design, such as database and user interface design.

• Chapter 12: System build, implementation and maintenance describes the final stages of a systems development project when the system is released to end users, following programming, testing and installation, and is then maintained.

Part 3: Business information systems management

Part 3 considers issues involved with the management of IS within an organisation. Of these, probably the most important is ensuring that the strategy defined is consistent with the mission and objectives of the business. Techniques for achieving this are reviewed, together with trends in IS strategy, such as location of IS within a large company and outsourcing IS management to third-party companies. Key issues in implementing the strategy are detailed in the areas of ensuring IS are secure; managing end-user facilities such as desktop PCs, development tools and the help desk; managing a company intranet and its Internet presence and ensuring the company is acting within moral, ethical and legal guidelines.

The chapters are structured as follows:

• Chapter 13: BIS strategy stresses the importance of basing the IS strategy on the business strategy and looks at alternative techniques for achieving this. Setting investment levels and locating the IS function are also considered.

• Chapter 14: Managing e-business explores strategic issues, such as how the Internet is integrated into existing strategy, and discusses implementation and operational issues of creating and maintaining service levels, such that the competitiveness of business does not suffer through problems with the e-business infrastructure.

• Chapter 15: Managing information security describes how information and systems can be protected by controls from threats such as destruction, failure or loss as part of business continuity planning.

• Chapter 16: End-user computing – providing end-user services explains why managing use of systems and, in particular, development by end users is a significant trend in IS.

• Chapter 17: Ethical, legal and moral constraints on information systems discusses the importance of protecting personal data and other ethical, moral and legal requirements which must be met by the IS manager.
Who should use this book?

The book discusses key aspects of BIS development and management for students who need to understand the application of IT to assist businesses. It is designed for college students, undergraduate degree and postgraduate students taking courses with modules giving a grounding in the practical IT skills of selection, implementation, management and use of business information systems (BIS). The main types of reader will be:

- Undergraduates taking general business courses such as Business Administration and Business Studies or specialised business courses such as Accounting, Marketing, Tourism and Human Resources Management.
- Undergraduates on computer science courses in Business Information Systems or e-commerce which involve the study of business applications of information technology and the management of the development of IS.
- Students at college aiming for vocational qualifications such as the HNC/HND in Business Management or Computer Studies.
- Postgraduates students on MBA, Certificate in Management, Diploma in Management Studies or specialist masters degrees which involve courses on information management or IS strategy or electives in e-business and e-commerce.

Managers in industry involved in the development and use of IS who will also find the practical sections in this book of use are:

- Business analysts working with customers to identify business problems and propose solutions.
- Systems analysts and software designers specifying how the solution will be implemented.
- ‘Hands-on’ managers responsible for implementing IT solutions, either as a supplier or a client.

What does it offer to lecturers teaching these courses?

The book is intended to be a comprehensive guide to the business applications, development and management of BIS. As such, it can be used across several modules to help integrate different modules. Lecturers will find the book has a good range of excellent case studies to support their teaching. These include industry case studies of the applications of BIS together with problems encountered and simplified practical exercises for systems analysis and design. Web references are given in the text to important information sources for particular topics.

Student learning features

A range of features have been incorporated into this book to help the reader get the most out of it. They have been designed to assist understanding, reinforce learning and help readers find information easily. The features are described in the order in which you will encounter them.

At the start of each chapter:

- Chapter introductions: succinct summaries of why the topic is relevant to the management of IS and its content and structure.
• **Learning objectives**: lists describing what readers should learn by reading the chapters and completing the exercises.
• **Links to other chapters**: a summary of related information in other chapters.

In each chapter:

• **Definitions**: when significant terms are first introduced the main text contains explanations and succinct definitions in the margin for easy reference.
• **Web links**: where appropriate, web addresses are given as reference sources to provide further information on a particular topic. They are provided in the main text, where they are directly relevant, as well as at the end of the chapter.
• **Case studies**: real-world examples of how technologies are used to support businesses. Case studies are taken from around the world but there is a particular emphasis on the UK and Europe. They are referred to from related material within the text they support. Questions at the end of the case study are intended to highlight the main learning points from each case study.
• **Mini case studies**: short examples which give a more detailed example, or explanation, than is practical in the main text. They do not contain supplementary questions.
• **Activities**: exercises in the main text which give the opportunity to practice and apply the concepts and techniques described in the text.
• **‘Focus on’ sections**: used to consider topical issues of IS in more detail. Such sections may be used to support the essay or discussion-style questions, or may provide areas for further student research, perhaps giving ideas for student dissertations and projects.
• **Chapter summaries**: intended as revision aids which summarise the main learning points from chapters.

At the end of each chapter:

• **Self-assessment exercises**: short questions which will test understanding of terms and concepts described in the chapters.
• **Discussion questions**: require longer essay-style answers, discussing themes from the chapters, and can be used for essays or as debate questions in seminars.
• **Essay questions**: conventional essay questions.
• **Examination questions**: typical short-answer questions which would be encountered in an exam and can also be used for revision.
• **References**: these give details of books, articles or papers referred to within the chapter.
• **Further reading**: supplementary text or papers on the main themes of the chapter. Where appropriate a brief commentary is provided on recommended supplementary reading on the main themes of the chapters.
• **Web links**: extensive lists of relevant websites and particular articles together with a brief description of what information is available.

At the end of the book:

• **Glossary**: a list of all definitions of key terms and phrases used within the main text.
• **Index**: all key words, abbreviations and authors referred to in the main text.
Support material

The following free supplementary materials are available via the Pearson Education companion web site. This site contains advice, comment, support materials and hyperlinks to reference sites relevant to the text. There is a password-protected area for lecturers only. The web site address is: www.booksites.net/chaffey.
Chapter 1

Basic concepts – understanding information

CHAPTER AT A GLANCE

Main topics
➤ Data and information 4
➤ Creating information 6
➤ Qualities of information 12
➤ The business environment 14
➤ Managerial decision making 16

Focus on...
➤ Knowledge management 28

Case studies
1.1 Boots Insight team analyse customer data 9
1.2 The impact of agents on corporate intelligence 21

LEARNING OBJECTIVES

After reading this chapter, readers will be able to:
• distinguish between data, information and knowledge;
• describe and evaluate information quality in terms of its characteristics;
• classify decisions by type and organisational level;
• identify the information needed to support decisions made at different organisational levels.

MANAGEMENT ISSUES

The purpose of business information systems (BIS) is to produce high-quality information that can be used to support the activities of an organisation and its business partners. In order to gain a good understanding of BIS, managers must first understand the nature of information and how effective decisions are made. From a managerial perspective, this chapter addresses the following areas:
• the importance of managing information and knowledge as a key organisational asset.
• the transformation process from data to information of high quality;
• the process and constraints of decision making;
• the different kinds of decisions that managers make and how these affect the organisation.
Activities

Activity 1.1 (P. 7)
From the point of view of a student at a university, which of the following might be examples of information? Which might be examples of data?
(a) the date (data);
(b) a bank statement (information);
(c) the number 1355.76 (data);
(d) a National Insurance number (data);
(e) a balance sheet (information);
(f) a bus timetable (information);
(g) a car registration plate (data).

Most of the items listed are open to interpretation. It could be argued, for example, that a bus timetable is an example of data. However, if the timetable provides information concerning services to or from the campus, then it might be considered an example of information. The point of the activity is to emphasise the importance of context.

Activity 1.2 (P. 8)
When information is used effectively, it can bring about many of the improvements listed below. State and explain why each of the items listed illustrates a tangible or intangible value of information:
(a) improved inventory control (tangible);
(b) enhanced customer service (intangible);
(c) increased production (tangible);
(d) reduced administration costs (tangible);
(e) greater customer loyalty (intangible);
(f) enhanced public image (intangible).

In simple terms, this activity is intended to emphasise the notion that the tangible benefits of information can often be measured in terms of financial value. Items (a), (c) and (d) might be considered tangible benefits since it would be possible to quantify the benefits realised. As an example, if an organisation acts on certain information with the result that administration costs are halved, then we could suggest that the information has a value equivalent to half of the company’s administration costs.

Activity 1.3 (P. 8)
Using the Internet as a resource, find three case studies of the value of information in the context of a business organisation. As an example, you might locate a news story in Computer Weekly (www.cw360.com) describing the savings made as a result of implementing a new stock control system.

This activity is intended to reinforce the concept of the tangible/intangible value of information, and the notion that value can often be measured in financial terms. In addition, the activity introduces students to a valuable resource (Computer Weekly is the leading magazine for IS/IT
professionals). This activity might also be used as an introduction to the use of the Internet as an information resource.

Activity 1.4 (P. 9)
Consider the role of informal communication within an organisation such as a local government department or hospital.
1. In what ways can informal communication support the day-to-day activities of the organisation?
2. How important is the role of informal communication within the organisation? Could the organisation function effectively if informal communication were restricted?
3. How can informal communication be controlled or harnessed for the benefit of the organisation?
4. What negative results might occur if overly strict controls are imposed on informal communication?

1. Students might be expected to arrive at quite lengthy lists of items in response to this question. Some examples of appropriate responses include:

- can be used to find solutions to problems at a local level, for example within a department;
- can help to improve the overall efficiency of staff, for example senior staff members might provide advice and guidance to new members of staff;
- allows information to be transmitted between members of staff quickly. However, a disadvantage is that information can become distorted.

2. A strong case can be made for the argument that organisations require informal communication in order to function effectively. Informal communication enables the members of an organisation to respond to events quickly and appropriately. Some appropriate examples include:

- In highly competitive industries, informal communication can be used to gather intelligence concerning rival organisations. A casual conversation with a supplier, for example, might reveal information concerning a rival’s products.
- As more organisations adopt an approach based on centralising resources, more reliance is placed on informal means of communication. As an example, many banks and building societies now operate call centres, allowing customers to carry out transactions and make enquiries by telephone. Since the needs of customers are likely to vary a great deal, informal communication serves two purposes: it allows customers to express their individual needs and; allows the organisation to provide a response tailored to the specific requirements of the customer.
- New members of an organisation are often assigned mentors. The role of the mentor is to provide advice, guidance and information as the new staff member acclimatises to his/her new position. One of the reasons for assigning a mentor to a staff member is because much of the advice and information required by new staff members will not be found in formal company documents. For example, a company handbook would be unlikely to hold answers to every possible question a new employee might have.
3. Again, students might be expected to arrive at quite lengthy lists of items in response to this question. Some examples of appropriate responses include:

- Newsletters can be used as a forum for staff and management to express their opinions.
- Many organisations allow employees to put forward suggestions for new products or improved services. As an example, Rolls-Royce encourages employees to approach supervisors and managers with suggestions as to how the company can improve its products and services. Prizes are awarded to employees who put forward an idea for a new product or a means of reducing costs.
- Sales organisations often assign a member of staff to a specific group of clients in order to create and sustain good business relationships. Over time, the sales person will begin to learn about each client’s particular needs, enabling the organisation to offer a better service to individual clients. In turn, the client is likely to remain loyal to the company as all of his/her business needs are being met.

4. It is worth pointing out that it would be impossible to eliminate informal communication entirely from an organisation, for example one could never prevent employees from meeting at lunchtimes or social events.

As the earlier questions should have helped to make clear, the overall efficiency of the organisation may be reduced if informal communication is restricted. Although extreme, consider the example of a sales assistant in a supermarket needing to write a formal memo in order to find out the price of an item. In addition to reducing the efficiency of the organisation, this would also lead to a loss of customer satisfaction and a corresponding reduction in sales. This example should highlight an important point: attempts to restrict informal communication may impact on a wide variety of areas, ranging from customer satisfaction to productivity.

Although a great deal of research has been carried out in this area, common sense should also make it clear that human beings require some form of social contact with others. By reducing informal communication, one is likely to limit the contact that employees have with others. In turn, this is likely to reduce morale, which will almost certainly have an adverse effect on productivity.

As a final note for this question, it should be pointed out that organisations may sometimes need to place controls over informal communication. As mentioned in the text of the book, informal communication can lead to inaccurate or incomplete information being transmitted to a large number of people. Unfounded rumours, for example, might easily harm staff morale or reduce public confidence in the organisation.

**Activity 1.5 (P. 14)**
Visit the web sites of two different online booksellers. For each example, assess whether the information provided about a particular book is of ‘good’ or ‘poor’ quality. Explain your reasoning with reference to the characteristics of information described in this chapter, and in particular Table 1.1. Does the information provided differentiate between the offerings of the companies?
This activity shows how Table 1.1 can be applied to one example of decision making. It shows how of all the elements of information quality in Table 1.1, only some will be relevant in all cases. Before looking at the web sites, students should be encouraged to list which factors they think are important when selecting a book, e.g. relevance, depth, clarity, price, recency, etc.

Suitable web sites to look at are Amazon (www.amazon.com) and, in the UK, BOL (www.bol.com), WH Smith (www.bookshop.co.uk) and Streets Online (www.streetsonline.co.uk).

Students should then select one or two books and compare them across the sites for the criteria they have identified from Table 1.1.

### Activity 1.6 (P. 19)

Classify the following decisions by type (structured, semi-structured, unstructured) and organisational level (strategic, tactical, operational). In addition, determine whether or not the decision-making process could be automated, and if possible describe the name or type of BIS used.

(a) At what level should we set the budget for next year?
(b) Does this customer qualify for a discount on a large order?
(c) How should we deal with a takeover bid?
(d) Should we employ more staff to cope with an urgent order?
(e) Should we expand abroad?
(f) Should we launch an advertising campaign?
(g) Should we take a short-term loan to help our current cash flow position?
(h) What new markets should we move into?
(i) What should we do about a faulty machine?

(a) Strategic (plus tactical elements). Can be partially automated by use of spreadsheets and accounting figures from previous years.
(b) Operational. Decision can be taken automatically based on their credit history and the size of the order. If it was a very large order then it might be reviewed manually and it could be a tactical decision based on financial constraints.
(c) Strategic issue. Could not be readily automated.
(d) Operational issue. Could not be readily automated.
(e) Strategic. Could not be readily automated.
(f) Tactical. Could not be readily automated.
(g) Operational or tactical. Could not be readily automated.
(h) Strategic. Could not be readily automated.
(i) Operational. Could not be readily automated.

The activity highlights the overlap between tactical and strategic decisions and that these types of decision are difficult to automate.
**Activity 1.7 (P. 25)**

Using the Internet as a resource, locate at least two examples of how intelligent agent software is being used in business. Tip: find supplier sites using a search engine such as Google (www.google.com) using keywords from Case Study 1.1 or news sources such as the FT (www.ft.com) or Moreover (www.moreover.com).

This activity is intended to show practical examples of intelligent agents in action. Students should be prompted to critically evaluate the intelligent agents, asking whether they would really remove the need for human intervention, or whether some degree of human assessment is still required.

A good way to run this activity is to ask different groups of students to look for examples in the different areas of the article using different keywords. For example:

Auctions Phantom Bidder (www.phantombidder.com), AuctionSniper (www.auctionsniper.com)

Dynamic pricing (Example: GoToast (www.gotoast.com) for setting bids for Search engine advertising keywords).

Searching, See Deep Web (www.bughtplanet.com) and Copernic (www.copernic.com)

Data mining, good case studies at Autonomy (www.autonomy.com).

**Activity 1.8 (P. 31)**

The marketing department of a construction company is planning the creation of a competitive intelligence system. Its aim is to capture and disseminate information about 30 key competitors and also existing or potential customers served by account representatives. You are designing the system. Working in groups, agree an approach for:

1. Capturing data (who is involved, what information they need to collect).
2. Entering data (who is responsible for this, how they evaluate and categorise the different types of information entered).
3. Output requirements. Using the framework for quality of information in Table 1.1, what are the requirements in terms of types of content, frequency, who can access the data and filtering according to different criteria?
4. What types of hardware and software may be required for the system (reference to later chapters may be needed to answer this)?
This activity is intended to give students an appreciation of the complexity and practical issues involved with managing information within a medium to large company. The activity should highlight a structured approach to solving the problem based on the Input-Process-Output model introduced in Fig 2.2 (P. 38), so it may be best to defer it until that concept has been covered.

Students will find that to answer questions 1 and 2, it is first necessary to have an idea of the output required. Stage 3 should separately identify the types of information needed about competitors (e.g. size [turnover vs employees], specialism, national, or international, bids won, staff movements) and customers (size, industry, key decision makers, previous work or tenders). By considering real examples of data, students will gain an appreciation of different types of data referred to in the chapter, i.e. hard data, soft data, time-varying data, etc.
Case Studies

Case Study 1.1: Boots Insight team analyse customer data (P. 9)
Conduct any additional research needed and then answer the following questions.

1. Why do some consider customer relationship management (CRM) a "red herring"?
2. Advantage and Digital Wellbeing allow Boots to collect a great deal of information about customers. What benefits does the company gain from this information?
3. How do customers benefit from allowing Boots to gather information about them?

1. CRM involves a company forming a strong business relationship with its customers. The essential aim of CRM is to improve customer service without harming company profitability. As an example, a company might expand its product range even though this might increase the company's costs. Since customers are offered greater choice, they are likely to spend more on the company's products. In turn, increased sales will help to defer costs and may lead to higher profits. In this way, both the customer and the company benefit from the enhanced relationship.

The point made by the case study is simply that CRM has always existed in one form or another, irrespective of the name given to it. If we take a reductionist view, we might say that the existence of CRM is self-evident: companies that fail to create satisfactory relationships with customers, for example by failing to provide products that customers want to buy, are unlikely to remain in business very long. CRM merely describes a more sophisticated approach towards managing customer relationships, usually through the use of technology. As the case study shows, the use of technology allows data to be collected and processed more easily. However, it would still be possible to collect this data in other ways, although costs might be prohibitive.

2. A careful examination of the case study will raise a number of important points. Some of the advantages that might be noted include:

- A variety of new marketing opportunities can be identified. As an example, the case study mentions the use of digital television and multimedia kiosks.
- Services can be personalised for customers.
- The company can obtain a clearer view of what customers want. This allows existing products and services to be altered in order to satisfy existing customers and attract new ones.
- The data gathered can be used for modelling and simulation. This can help the company to plan for the future, perhaps by identifying new markets, products or services. The case study mentions the use of CDAS to assist with these kinds of activities.
- The company can identify important groups of customers, such as those that buy more products. This allows new products, special offers, etc. to be targeted at these groups.
- Ways of influencing customer behaviour can be identified in order to increase sales.
- Company decision making is enhanced through access to good-quality information.
- Product recalls can be handled more efficiently since it becomes easier to identify individual customers.
- Relationships with suppliers can be improved. Detailed information on sales, for example, will help to improve the way in which the company orders stock.
• Advertising campaigns can be targeted at specific groups of customers. This may help to reduce advertising costs and should make advertising campaigns more effective.

3. Some of the benefits to customers include:

• Customers will be offered products that meet their requirements more closely.
• Customers will receive discounts and special offers which match their buying habits.
• Stores will be designed to be more convenient for customers.
• Customers can obtain information about products and services more easily.
• Customers can obtain other information, such as general health information, easily and conveniently.
• Since advertising and special offers can be targeted more accurately, customers will receive only information that is relevant to them. Similarly, customers will not receive materials that are of no interest to them.

Case Study 1.2: The impact of agents on corporate intelligence (P. 21)

1. What is an intelligent agent?
2. "A disproportionate amount of time is currently invested in digesting and evaluating information, only to discover that it is of little or no use." Using the case study as a source of reference, explain why this might be. Your answer should refer to concepts related to the attributes of information quality.
3. What are the major limitations of intelligent agents?
4. In what ways might a typical home computer user make use of intelligent agents?

1. The case study provides two definitions that may be of use:

• An **agent** can be defined as "being anyone or thing that acts in representation for another party, ostensibly to produce an effect, but generally to benefit the represented party."
• **Intelligence** is defined as "that which has the capacity to acquire and apply knowledge with rational decision making."

In addition, the case study lists the characteristics of intelligent agents: a degree of autonomy, the ability to communicate with third parties or external sources, a limited reasoning ability, an ability to "learn".

Ideally, students are expected to use their own words to demonstrate an understanding of intelligent agents. A good response might include some of the following points:

• Intelligent agents are intended to provide users with high-quality information. The information returned by an agent should be accurate, relevant, concise, etc.
• Intelligent agents can support the decision-making process by helping to meet the *information needs* of managers.
• In general, intelligent agents can be thought of as specialised computer programs that have the ability to locate information according to criteria set by the user. In order to do this, the software must have the ability to make certain judgements about the information encountered, such as whether or not it is relevant to the user.
• In general, intelligent agents mimic human information-seeking behaviour.

2. This question asks students to refer to the descriptions of the attributes of information quality given in the text. These descriptions can be applied to the case study in a number of different ways and students might offer a wide range of responses. Some typical points that might be made include:

• A great deal of the information collected will not be relevant.
• If information cannot be found easily, this might be due to a number of different factors. For example, we might say that the information has little clarity. Remember that the text suggests that users should be able to locate specific items quickly and easily.
• It is likely that information will be presented in too much or too little detail.
• If information is presented in different formats (for example, the case study mentions e-mail and web pages), presentation is likely to be poor. Remember that this attribute suggests that information should take a form suited to the needs of the recipient. Clearly, recipients are likely to prefer information to be presented as a single, coherent document.

3. The case study indicates several areas that students might consider when forming a response. These include:

• It can be argued that the effectiveness of intelligent agents is limited by the level of autonomy given to them. Given a very high level of autonomy, the agent may start to return irrelevant or unwanted information. On the other hand, given a very low level of autonomy may mean that the agent ignores potentially useful information.
• The text explains that managers have different approaches towards decision making. The information returned by an intelligent agent may not be suited to a manager's cognitive style.
• Managers are able to make use of experience and judgement. Whilst an intelligent agent may be able to make rudimentary decisions, it is difficult to see how they can reproduce and apply the experience of a manager with many years in a given industry.
• The case study discusses the problem of trust in relation to intelligent agents. Two points can be made from these comments. Firstly, it may be difficult to address the issue of how much confidence users place in the information returned by an agent. Secondly, security may become difficult to manage - the case mentions, for example, allowing agents to deal with credit card information.

4. In general, home users are likely to use intelligent agents for two main purposes:

• Searching for information via the Internet. Examples might include carrying out research for a school or university project, locating information on holiday destinations, finding the latest news stories, gathering financial information, and so on.
• Shopping. Agents can be used to locate products and suppliers. In addition, they can be used to carry out comparison shopping (where prices from major suppliers are compared in order to locate the lowest price for a given item).
Exercises (PP. 32 – 33)

Self-assessment exercises

1. What are the three dimensions of information quality?

Time, content and form.

2. How can the value of information be measured?

The value of information can be measured in two basic ways:

- by the improvements it brings to managerial decision making (intangible value);
- by attempting to place a financial value on the information (tangible value).

These points might be expressed with two simple formulae:

- (tangible value) value of information minus cost of gathering information;
- (intangible value) improvements in decision behaviour minus cost of gathering information.

3. What are the functions of management?

A classic definition of the functions of management comes from Henri Fayol (1841–1925):

*To manage is to forecast and plan, to organise, to command, to coordinate and to control.*

Note that Fayol’s definition is often considered insensitive – nowadays few people would appreciate being told that their managers ‘command’ them. Instead, it is more appropriate to place an emphasis on the notion that managers coordinate – or facilitate – the activities of staff.

In general, much of a manager's work involves making decisions about the best ways to achieve the organisation's objectives. It should also be noted that there is a direct link between a manager’s decision making and planning activities.

4. What are the stages involved in making a decision?

Some models of decision making are based on four stages. Other approaches suggest that the evaluation of the decision is a fundamental part of the process. The stages of decision making are:

- intelligence;
- design;
- choice;
- implementation;
- evaluation.
5. How will a manager’s cognitive style affect the decisions that he or she makes?

In general:
• a manager’s cognitive style will influence the type of information they require;
• the analytical manager is suited to making regular, routine decisions where the rules governing the decision are clear (structured decisions);
• the intuitive manager is more suited to unstructured decisions, where the rules governing the decision may not be clear.

The characteristics of analytical and intuitive managers can be summarised as shown in the table below.

<table>
<thead>
<tr>
<th>Analytical</th>
<th>Intuitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>More suited to structured decisions</td>
<td>More suited to unstructured decisions</td>
</tr>
<tr>
<td>High level of analytical thought</td>
<td>Relies heavily on prior experience, judgement and intuition</td>
</tr>
<tr>
<td>Can provide detailed justifications for decisions</td>
<td>More willing to accept qualitative information</td>
</tr>
<tr>
<td>Prefers quantitative information, will often overlook qualitative information</td>
<td>Examines situations as a whole, taking a holistic view</td>
</tr>
<tr>
<td>Examines situations at high level of detail but may overlook wider issues</td>
<td></td>
</tr>
</tbody>
</table>

6. Explain how the concept of knowledge management relates to data and information.

Students should distinguish knowledge from information by explaining that data is transformed into information, but knowledge is required to interpret and act on the information.

The answer should distinguish between explicit knowledge (e.g. how to deal with a customer complaint) and tacit knowledge (e.g. what actions to take given a set of sales figures).

7. What differences in perspective about managerial decision making are introduced by the e-business concept?

The e-business concept has led to top organisations providing an infrastructure for delivering good-quality (relevant, timely, in-depth across the whole business environment) information for managerial decision making. The e-business concept involves connecting an organisation with the whole of the business environment shown in Fig 1.2 (P. 15), i.e. it provides more timely information flows about customers, suppliers, employees and external influences.

On a practical level, information is made available to employees through intranets, to suppliers through extranets and to customers through extranets and the public web site. This information is delivered through web browser or e-mail alerts/newsletters.
Discussion questions

1. Some people argue that employees should be restricted in terms of the information they have access to in the course of their duties. Others argue that they are able to work more efficiently if they have access to all of an organisation’s information resources. Using relevant examples, make a case for one side of this argument.

Some of the points that might be raised are shown in the table below.

<table>
<thead>
<tr>
<th>For open access</th>
<th>Against open access</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>It may not be possible to determine what information an employee might need.</td>
<td>Organisations have a duty to protect sensitive information; customers and clients</td>
<td></td>
</tr>
<tr>
<td>Preventing full access may hinder the employee when carrying out his/her duties.</td>
<td>would lose confidence in the organisation if it became known that their privacy was not</td>
<td></td>
</tr>
<tr>
<td>Wider access to information may help the organisation to become more accountable</td>
<td>protecting in some way.</td>
<td></td>
</tr>
<tr>
<td>to employees and shareholders.</td>
<td>Allowing free/open access to all information might lead to abuses, e.g. employees</td>
<td></td>
</tr>
<tr>
<td>Providing wider access to information can help employees to examine issues from</td>
<td>Open/free access may harm the organisation's competitive position since rivals may</td>
<td></td>
</tr>
<tr>
<td>a wider perspective. An improved understanding of the organisation may help</td>
<td>gain access to sensitive information.</td>
<td></td>
</tr>
<tr>
<td>to foster innovation.</td>
<td>Providing open/free access to information can make it harder to locate specific</td>
<td></td>
</tr>
<tr>
<td></td>
<td>items. In addition, it might lead to unnecessary confusion.</td>
<td></td>
</tr>
</tbody>
</table>

Some relevant examples that students might quote include:

- The late 1980s saw a great deal of public concern arise over the issue of ‘insider trading’ – the use of privileged stock exchange information for personal gain. Over the past decade, a number of public figures have become the subject of highly publicised investigations, including high-ranking politicians and business people.
- Access to confidential information has resulted in a number of cases where employees have attempted to defraud their employers of extremely large sums. For example, several cases are described briefly in Chapter 18.
- Some people believe that access to the Police National Computer (PNC) is regularly abused by police officers seeking to gain information for personal reasons. Commonly quoted examples include checking to see whether a potential boyfriend or girlfriend has a criminal record; checking whether a second-hand car has been reported stolen before buying it and locating addresses or telephone numbers on behalf of other people. In reality, however, there are extremely strict controls imposed on the use of the PNC. If genuine abuses of the system occur, they are infrequent and risk some extremely severe penalties.
2. It has been said that decision needs should determine information needs. Is this always true or is there a case for an organisation gathering all available data and information?

Some of the points that might be raised are shown in the table below.

<table>
<thead>
<tr>
<th>Gathering only relevant data</th>
<th>Gathering all data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• May be difficult to identify precisely what information is needed.</td>
<td>• Expensive to collect, store and process information that may never be needed.</td>
</tr>
<tr>
<td>• Parameters of decision likely to be well defined and clear.</td>
<td>• Less chance that important information may be overlooked.</td>
</tr>
<tr>
<td>• Information not gathered until the circumstances of the situation are known and understood.</td>
<td>• May prove distracting – decision maker must sift through information to find relevant items.</td>
</tr>
<tr>
<td>• More efficient – fewer resources used since only relevant information is collected.</td>
<td>• Decision maker may find new alternatives or gain better understanding of problem to be solved.</td>
</tr>
<tr>
<td>• Allows decision maker to focus more closely on specific area being considered.</td>
<td>• Information gathered might be useful for other purposes, e.g. used to support other decisions.</td>
</tr>
<tr>
<td>• On balance, likely to lead to fastest decision being made.</td>
<td></td>
</tr>
</tbody>
</table>

3. Select an article of your choice from a newspaper, journal or magazine. Analyse the information contained within the article using concepts related to the attributes of information quality. Use the web links provided at the end of this chapter to locate suitable articles.

Depending on the article chosen, students should be encouraged to make judgements about the qualities of information present in the article. As an example, students might make some of the following observations about a newspaper article:

- Timely - the newspaper is printed each day.
- Concise - given the format in which it is presented.
- Accuracy - some newspapers have a reputation for embellishing facts.
- Reliable - some newspapers have a reputation for embellishing facts.
- Frequency - we expect news to be provided daily.
- Order - we expect the most “important” news stories to be presented first.

4. ‘Knowledge management is nothing new, it is merely a repackaging of existing information management techniques.’ Discuss.

A suggested structure for this answer is:

- Definition of knowledge management.
- Explanation of concept of tacit and explicit knowledge.
• Summary of what is new about KM, i.e. focus on making use of information (applying intelligence that is part of managers’ experience and skill-set). Use examples of applications (e.g. Hansen et al, 1999 article in chapter references). It is a structured rather than ad-hoc approach to capturing and disseminating knowledge.
• Assess whether or not it is repackaging using examples of applications and practice. For example, information on best practice has always been shared, with or without the KM label.
• To conclude, discuss whether or not KM has caused a change in practice or change in perspective. A combination of the two, but mainly in perspective.
Essay questions

1. Select an organisation you are familiar with. Identify at least one major decision that the organisation has taken recently. Describe the decision-making process that took place, paying particular attention to the following points:
   (a) Describe how managers became aware that a problem existed and that a decision was required.
   (b) Describe what information was gathered so that managers could achieve a good understanding of the problem.
   (c) Provide examples of any alternative solutions that were considered and explain why these were eventually rejected.
   (d) Explain why the final solution was selected and describe how it was implemented.
   (e) Discuss how the solution was evaluated and whether or not it was successful.

This type of essay question is normally used for diagnostic purposes and to help students learn how to produce structured papers. The notes below provide an indication of the contents of each section and identify areas where extra credit might be awarded.

(a) A concise description of the organisation and the problem that arose. The mechanism by which problems are identified and prioritised should be described. In a sales organisation, for example, the existence of a problem would become known when managers examined sales reports. The severity of the problem would help to define what type of decision was required, what constraints existed and who should be responsible for solving the problem. In general, extra credit might be given if students identified the level at which the decision should be taken (strategic, tactical, operational) and the type of decision (structured, unstructured, semi-structured).

(b) In all cases, managers are likely to make use of a wide variety of information sources. The student’s response should reflect this by considering the diverse range of sources that a manager might make use of. For example, even when making a structured decision, a manager might use his/her own experience to help evaluate the likelihood of success for a given course of action. In order to earn extra credit, the student should describe the type of information (internal, external), its form (e.g. written report) and its characteristics (form, time and content dimensions) for each of the sources identified. Additional credit might be given if the student evaluates the information and offers a judgement as to its importance (in the context of the decision being taken).

(c) It is important for the student to justify why a given approach was rejected. In describing the range of potential solutions considered, the student should structure his/her material carefully. A good answer will describe a set of criteria by which each solution was evaluated. The material should then show how these criteria were applied to each potential solution.

(d) The description of the solution that was eventually chosen should refer back to the material in the previous section. The student should attempt to show how the chosen solution meets the selection criteria described earlier. In addition, a good answer will describe how this particular approach overcomes the shortcomings of the potential solutions considered earlier.
(e) It is largely irrelevant whether or not the chosen solution was successful. However, if the solution was unsuccessful, the student should attempt to explain why this was the case. In addition, the student should try to identify which selection criteria are to blame. The evaluation of the decision should be structured carefully and use (relevant) evidence to justify any conclusions drawn. If the solution was successful, the student should describe how this judgement was reached. For example, in a sales organisation, increased sales would indicate that the solution chosen was the correct one. Extra credit should be given if the student shows that they realise that the successful solution may have been only one of a number of alternatives. Using the example of the sales organisation again, how do we know that a different solution would not result in even higher sales?

2. The survival of a large organisation depends on access to high-quality information. Discuss this statement, providing relevant examples where necessary.

Essentially, this question asks students to describe the characteristics of information and apply this material in a practical manner. Students should recognise that ‘high-quality information’ means that they are required to discuss the characteristics of information. Students are also required to make judgements based on the examples they give, determining whether a given piece of information is of ‘high’ or ‘poor’ quality. These judgements should be supported by explaining the outcome of the situation described.

As an example, airlines often used sophisticated software applications to predict demand for seats on particular flights. If the predicted demand is low, a variety of methods is used to sell tickets at discounted prices in order to ensure that the flight is fully booked. Success can be measured very simply: if there are any empty seats when the flight departs, then the actions taken were not entirely successful. In addition, if the airline finds that it needs to turn away passengers because the flight is full, they may have sold too many tickets at discounted prices. The ideal situation is a flight that is fully booked, with the smallest number of passengers travelling at discounted fares. Clearly, in order to achieve this ideal situation, the airline must have access to information that is accurate and timely. In this way, we can demonstrate a direct link between quality of information and the success (or failure) of a given activity.

Extra credit might be given if a student provides a number of examples that demonstrate very clearly how the characteristics of the information used have an impact on a company’s activities. Students should also attempt to write in a structured manner, being consistent in the way in which they analyse the information described.

3. The Microsoft Corporation is arguably the most successful company in the world. Conduct any research necessary to complete the following tasks:
   (a) Provide an overview of the company and its activities.
   (b) Selecting appropriate examples, describe the company’s physical and conceptual resource bases.
   (c) Identify and describe some of the factors in the company’s business environment. Provide examples of factors that act either to support or obstruct the company’s activities.
(a) This section is a matter of research. Students should describe the overall structure of the company and outline its history. This material should also pay attention to factors such as the company’s stated objectives (mission statement) and its major sources of revenue.

(b) Detailed research is likely to lead to a more comprehensive response. Areas that students might investigate include:
- Subsidiary companies owned by the organisation provide access to, or ownership of, key technology.
- Microsoft owns a significant number of patents that protect revenues by restricting the actions of competitors.
- Employees or associates of the company have specialist expertise that enhance its activities.
- In examining Microsoft’s business environment, students may choose to investigate certain areas in depth. Some possible avenues of research include:
  - The actions of competitors, such as attempts by Netscape Corporation to regain control of the Internet browser market.
  - The company’s legal difficulties, such as patent disputes (such as disputes concerning the Java language originally developed by Sun) and the recent anti-trust action (started in 1998 following allegations that Microsoft enjoys an unfair advantage over competitors).
  - Strategic alliances, such as that formed between Microsoft and Intel.

(c) In this section, students should also attempt to describe how factors in the business environment act to influence Microsoft’s activities.

4. Write a report on how knowledge management could enhance an organisation of your choice.

This question is intended mainly for mature students who have experience of a management role in an organisation.

The concept of knowledge management, as described on PP. 29–30, will need to be explained at the start.

A clear process will need to be demonstrated for introducing KM, e.g.
- Audit of KM capture, dissemination, tools and process
- Identification of weaknesses in tools, process and particular types of knowledge
- Propose prioritised solutions for KM looking at tools and process separately.

There is a range of structures that could be used to assess current use and future potential of knowledge management in an organisation. For example:
- Management decision-taking level from strategic to operational
- By department
- By type of knowledge required by managers, e.g. competitors, suppliers, employees
- By decisions that need to be taken, e.g. marketing budgets, recruitment, strategy, etc.
Examination questions

1. It is generally agreed that one of the key functions of management is decision making. Using specific examples, you are required to:
   (a) Describe the types of decisions that managers are required to take.
   (b) Explain the stages involved in making a decision.
   (c) Describe the characteristics of decisions taken at different levels in an organisation.

(a) Students should indicate an understanding of structured, unstructured and semi-structured
decisions. In addition, they should describe some of the characteristics of business decisions
including the level at which the decision is taken, information requirements, time scale and
frequency. In terms of information requirements, students should describe factors such as
frequency, scope and level of detail.

(b) The student should describe an accepted model of decision making, such as the table below.
Extra credit might be given if the student describes the significance of evaluation as part of the
decision-making process. The student may also reproduce the table below.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligence</td>
<td>Awareness that a problem exists</td>
</tr>
<tr>
<td>Design</td>
<td>Awareness that a decision must be made</td>
</tr>
<tr>
<td></td>
<td>Identify all possible solutions</td>
</tr>
<tr>
<td></td>
<td>Examine possible solutions</td>
</tr>
<tr>
<td>Choice</td>
<td>Examine implications of all possible solutions</td>
</tr>
<tr>
<td>Implementation</td>
<td>Select best solution</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Implement solution</td>
</tr>
<tr>
<td></td>
<td>Evaluate effectiveness or success of decision</td>
</tr>
</tbody>
</table>

(c) The student should describe the characteristics of decisions taken at different levels in an
organisation (see table below), expanding on any points made earlier. Clear distinctions should be
made between decisions taken at each level in the organisation: strategic, tactical and operational.
Extra credit should be given if relevant examples are given in support of the student’s response.
Extra credit may also be given if the student reproduces the material given in Chapter 1 (PP. 17-19)
of the text.

<table>
<thead>
<tr>
<th>Management level</th>
<th>Type of decision</th>
<th>Timescale</th>
<th>Impact on organisation</th>
<th>Frequency of decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic</td>
<td>Unstructured</td>
<td>Long</td>
<td>Large</td>
<td>Infrequent</td>
</tr>
<tr>
<td>Tactical</td>
<td>†</td>
<td>Medium</td>
<td>Medium</td>
<td>†</td>
</tr>
<tr>
<td>Operational</td>
<td>Structured</td>
<td>Short</td>
<td>Small</td>
<td>Frequent</td>
</tr>
</tbody>
</table>
2. An understanding of the nature of information is fundamental to the study of information systems. Using specific examples, you are required to:
(a) Define information.
(b) Describe the characteristics that will be present in information of high quality.
(c) Describe how the value of information can be determined.

(a) Students should supply one or more of the following definitions:

*Data that have been processed so that they are meaningful.*
*Data that have been processed for a purpose.*
*Data that have been interpreted and understood by the recipient.*
*Information acts to reduce uncertainty about a situation or event.*

However, a more complete answer should be expected, where students attempt to make some or all of the following points. Information:
- involves transforming data using a defined process;
- involves placing data in some form of meaningful context;
- is produced in response to an information need and therefore serves a specific purpose;
- helps to reduce uncertainty, thereby improving decision behaviour.

(b) Students should provide a list of information characteristics, ideally grouping them by category (time, form, content). Each of the characteristics listed should be accompanied by a brief description. Extra credit should be awarded if students provide relevant examples of each characteristic.

(c) Students should distinguish between tangible and intangible value, ideally providing a relevant example of each. Although the formulae shown below need not be reproduced, students should still demonstrate an understanding of the two concepts they illustrate: (i) information may have a value that can be directly measured (in financial terms); (ii) information can have value if it helps to improve decision making.

*Value of information minus cost of gathering information.*
*Improvements in decision behaviour minus cost of gathering information.*

3. Information can be transmitted via formal and informal means. Using specific examples, you are required to:
(a) Describe the advantages and disadvantages of each method.
(b) Discuss each method in terms of the attributes of information quality that are likely to be present.

(a) Students are encouraged to provide a relatively general description of formal and informal communication. A good response will link to managerial decision making, covering areas such as cognitive style and type of decision (structured, unstructured, semi-structured). It may be appropriate for students to describe the advantages and disadvantages of each type of communication by using tables or brief lists.
(b) Students should provide a brief description of the characteristics of information and then apply this to formal and informal communication. Extra credit may be given if the student makes several direct comparisons, for example information provided via formal communication is likely to be highly accurate, whilst information provided via informal communication may not be accurate.

4. In relation to the concept of knowledge management:
(a) Explain how knowledge differs from information.
(b) Describe two ways of classifying knowledge.
(c) Give an example of a business application for each of your answers in (b).

(a) The answer should highlight that knowledge is about how information is applied by managers as part of running a business.

(b) For instance, two of:
- explicit vs tacit
- By management need e.g. strategy, finance, marketing decisions
- Level (strategic, tactical, operational)
- By information type: customers, competitors, etc.

(c) Marks should be awarded for general technologies, e.g. expert systems, knowledge bases, intranets, but also demonstrating how they can be applied.