



**UNIVERSITY  
OF LONDON**

# **Information systems management**

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Undergraduate study in  
**Computing and related programmes**

This guide was prepared for the University of London by:

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# Introduction

This guide is designed to support study of the subject **318 Information systems management**. This subject is a half unit. The subject guide consists of:

- study notes
- multiple choice questions
- sample examination questions
- a sample examination paper (see Appendix 1).

In this introductory chapter, the following aspects of the subject are covered:

- the subject guide content and structure
- course textbooks and further reading
- guide to effective study
- the examination.

## The importance of information systems management

**Information systems management** is an important subject because it teaches you the management, rather than the technical, principles that you will need to know in order to ensure that an organisation can get the most out of its information systems. The objective of this subject is to provide you with the knowledge that will enable you to make decisions on which information systems to invest in and how to make sure that they are successfully implemented into the organisation.

## The subject guide

This subject guide is designed to help you learn. It will identify those issues that are important in this subject. This subject guide is in no way a substitute for the recommended subject textbooks which are detailed below. Rather, it aims to highlight particular areas of study and to provide you with supplementary study material to assist your learning.

The subject guide is divided into sections and chapters, each of which may be viewed as separate but inter-related areas of study. Each chapter is supported by a breakdown of learning objectives and outcomes.

As the focus of this course unit is on management issues, we are concerned here with studying the principle activities of management which are broadly seen as planning, implementation and control. The subject guide is therefore divided into a brief introduction to the subject and then three major sections to reflect each of these activities.

## Recommended study time

The recommended minimum study time for this subject is approximately two hours a day for 10 days a month.

## Essential reading

Turban, E., D. Leidner, E. McLean and J. Wetherbe *Information Technology for management: transforming organizations in the digital economy*. (Hoboken, NJ: Wiley, c.2008) sixth edition [ISBN 9780471729].

Laudon, K.C. and J.P. Laudon *Management information systems: managing the digital firm*. (Upper Saddle River, N.J.: Pearson/Prentice Hall, 2007) tenth edition [ISBN 0131579843 (pbk)].



## Further reading

The following books are suggested as Further reading to broaden your understanding of the issues relating to information systems management.

Earl, M.J. *Management strategies for Information Technology*. (New York; London: Prentice Hall, 1989) [ISBN 9780135516645].

Robson, W. *Strategic management and information systems*. (London: Pitman, 1997) [ISBN 0273615912].

## Recommended websites

<http://www.brint.com/> (Last accessed July 2009)

<http://www.ft.com/home/uk> (Last accessed July 2009)

<http://www.computerweekly.com/Home/Default.aspx> (Last accessed July 2009)

## The readings

Although this unit is accompanied by this subject guide, you should read widely on the subject to gain a complete, balanced understanding of the issues as many of the concepts covered in this unit are challenging.

## Guide to effective study

The role of this subject guide is to complement the recommended textbooks and suggested Further readings. The subject guide should be regarded as the ‘glue’ that holds these disparate information sources together. To study this subject effectively, it is important that you fully understand the complementary nature of this study material. In other words, this subject guide is not meant to cover everything that the examination may contain. In fact, the best way to make full use of the complementary nature of this guide is to read it alongside the readings at the start of each chapter.

The guide is mainly concerned with summarising, highlighting or drawing attention to the points covered in a more exhaustive manner in the Essential reading. The guide can therefore help you to concentrate your efforts on the major points and issues in the subject. Throughout the guide you will find reference to specific examples of organisations who have used their information systems in some noteworthy way. It is important that you research these examples yourself. Details of some of the examples will be found in the essential textbooks; for others you will need to conduct your own research to find out the details. You should also remember that information systems management is a dynamic subject and that you therefore need to identify up-to-date examples of appropriate systems.

## Assessment exercises

At the end of each chapter, a number of self-assessment exercises are provided. These are in the form of sample examination questions and multiple choice, true or false and ‘fill in the gaps’ questions. You are advised to complete these self-assessments in order to apply the skills and knowledge you have acquired and to establish how well you have understood the issues and concepts raised during each chapter. Answers to these questions can be found in Appendix 2.

## The examination

**Important:** the information and advice given in the following section is based on the examination structure used at the time this guide was written. However, the University can alter the format, style or the requirements of an examination paper without notice. Because of this we strongly advise you to check the rubric/instructions on the paper you actually sit.

Appendix 1 to this subject guide contains a Sample examination paper. The sample paper is included to give you an idea of the number and type of questions that the examination will include. The examination will contain five questions of which you will be required to answer two. Each question will consist of two parts (a and b) and you will be required to answer **both** parts of the question. You will be given two hours and 15 minutes to answer the examination paper.

## Coursework

You will be required to do two pieces of coursework for this subject. The coursework consists of essay type questions. The questions are set at the beginning of each academic year and then sent out to students.

## Notes

## Section 1 – Introduction

# Chapter 1: The evolving role and importance of information systems management in the digital economy

### 1.1 Introduction

This course unit is concerned with the management aspects of information systems. It is less concerned with technical issues and concentrates on how organisations can get the most out of their information systems by the application of sound management principles. The title of this unit is **Information systems management** – by which is meant:

- the **planning, implementation and control** of information systems to enable an informed response to the opportunities of modern information technology.

By an **Information system** we mean:

- the people and procedures that collect, transform, utilise and disseminate information through the use of Information technology. Like other systems it consists of inputs, processes, outputs and feedback loops.

Finally, by **information technology** we mean:

- the hardware, software, communications and other electronic devices which enable these processes to take place.

This chapter describes how the role and importance of information systems management has evolved over the years. It discusses:

- the business drivers which propel organisations to invest in information systems
- how these systems are transforming the ways in which business functions
- how they need to be efficiently managed in order to attain maximum benefit from the investment.

#### 1.1.1 Learning outcomes

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the evolving role of information systems management
- describe the business drivers in the digital economy
- discuss the importance of effective management of information systems.

#### 1.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand how the evolution of information systems technology requires new management approaches
- understand the role of information systems in the digital economy.

### 1.1.3 Essential reading

Turban, Chapter 1.

### 1.1.4 Further reading

Laudon and Laudon, Chapter 1.

Carr, N. 'IT doesn't matter', 2003, *Harvard Business Review* 85(5): pp.41–49.

Shrage, M. 'How IT can differentiate your business from the competition', *CIO Magazine*, August, 2003.

## 1.2 The role of information systems in the digital economy

The rapid advancements in technology have resulted in equally rapid changes in the role of information systems in the digital economy. In recent years we have seen information systems change the way in which the business world functions at various levels.

- At the **international** level – nations use information systems to compete in the international arena.
- At the **industry** level – entire industries are being restructured as a result of the capabilities of information systems.
- At the **organisational** level – whereas in the past information systems supported operational level decisions, they now support decision making at the management and strategic levels as well.
- At the **inter-organisational** level – the ways in which organisations interact with one another has been revolutionised as a result of enabling information and communicating technologies (ICT).
- At the **personal** level – the way in which people go about their day-to-day business as well as their professional lives has changed as a result of ICT.
- At the **interpersonal** level – interpersonal interaction and communication have evolved with the use of ICT.

At the organisational level, the evolution in technology has led to a number of changes in the challenges, opportunities and responsibilities faced by managers. The batch systems which were around in the 1950s and 1960s were managed by the IT department. The major focus for managers of these departments was on the provision of accurate, timely and reliable information. In the mid-1960s, systems moved from being batch to on-line systems. This led to increased business involvement in their management and the challenge became to provide real time information to meet business needs. Further major changes in technology occurred with the arrival of personal computer systems in the 1980s instigating the need to manage the proliferation of end user computing. However, the greatest change in technology has been that of networking. This occurred in the late 1980s requiring both the IT department and senior management to be involved in the provision of appropriate integrated intra and inter-organisational systems. Table 1.4 (p.3) in Turban identifies general developments and trends in technology as well as the development and trends in networked computing.

Whereas the role of early systems was to support the operational activities in the organisation, modern systems are able to transform the ways in which the organisation functions and competes in its environment. Understanding and knowing these developments enables the organisation

to develop appropriate business strategies and responses and to position the business accordingly in the digital economy. Table 1.1 in Turban describes the major characteristics of the digital economy.

### 1.3 Business drivers of information systems

It is suggested that as much as half of all business investment in the USA each year involves information systems and technologies. It is therefore important to consider the factors that are driving this level of expenditure. Turban suggests that the environmental pressures on organisations to adopt information systems can be divided into **market**, **technological** and **social** pressures.

#### 1.3.1 Market pressures

- **Global economy and strong competition**  
Telecommunications and the internet have shaped the global economy, opening up new market opportunities and enabling organisations to outsource their operations to areas where labour is cheaper.
- **Need for real time operations**  
Decisions need to be made very quickly in the digital economy in order to keep pace with the fast changing business landscape. An organisation needs to be agile in order to respond to these changes.
- **Changing nature of the workforce**  
The workforce is becoming more diverse, with an increase in the number of knowledge workers and an increasing number of teleworkers.
- **Powerful customers**  
Customers are becoming better informed and more demanding as choice and competition increases.

#### 1.3.2 Technological pressures

- **Technological innovation and obsolescence**  
New or improved technologies provide opportunities for differentiated products and services. Others replace existing technologies.
- **Information overload**  
As the amount of information available increases, the only way to handle this information overload is to invest in more technologies.

#### 1.3.3 Social pressures

- **Social responsibility**  
Organisations are under increased pressure to play a responsible role in wider environmental issues such as the control of pollution and care of the environment.
- **Compliance with government regulations**  
Several social responsibility issues are concerned with compliance with government regulations such as laws on privacy and data protection.
- **Terrorist attacks and protection**  
Information systems play a role in identifying potential sources of attack. Organisations are under increased pressure to protect themselves from terrorist attacks.
- **Homeland security**  
Many governments share information which enables them to identify potential cross-border threats and to protect themselves accordingly.

## 1.4 The importance of effective information systems management

It is clear from the role that information systems perform, and the business drivers which propel them, that they need to be carefully managed and controlled. However, in May 2003 an article written by Nicholas Carr was published in the *Harvard Business Review* entitled 'IT doesn't matter'. The article proposed that, as the core functions of IT are available to all, IT no longer has a scarcity value and therefore is merely a commodity and should be managed as such. In Carr's opinion, information systems are a cost of doing business; all organisations have to invest in these systems; but they no longer provide organisational differentiation (Carr, 2003).

This article led to a great deal of debate in the academic community with many academics arguing against this point. In particular, these arguments suggested that while the technology might, of itself, not be able to achieve a competitive advantage for an organisation, the appropriate management of the information systems could in fact make a difference to an organisation's competitiveness (Schrage, 2003).

Essentially, the argument concerned whether information systems are a source of differentiation. In the 1970s many claims were made, and examples given, of how information systems could provide organisations with a competitive advantage. In the next chapter we will examine the competitive potential of information systems.

### A reminder of your learning outcomes

By the end of this chapter, and the relevant reading and activities, you should be able to:

- discuss the evolving role of information systems management
- describe the business drivers in the digital economy
- discuss the importance of effective management of information systems.

### Sample examination question

Identify and briefly describe three major IT characteristics in the digital economy.

## 1.5 Assessment questions

### Multiple choice questions

1. Advantages of the new economy's way of doing business over the old way include all of the following **except**:
  - A. lower cost
  - B. greater speed
  - C. IT-based competitive advantage
  - D. less convenience.
2. The digital economy has brought about \_\_\_\_\_ changes in business.
  - A. marginal
  - B. significant
  - C. ethical
  - D. planned.
3. Which of the following factors is **not** an example of a major type of business pressure on companies?
  - A. Homogenous workforce.
  - B. Powerful customers.
  - C. Regulatory compliance.
  - D. Terrorist attacks and homeland security.
4. The collection of computing systems used by an organisation is broadly termed:
  - A. information technology
  - B. electronic commerce
  - C. value-added network
  - D. extranet.
5. The expected benefits of an adaptive enterprise include all of the following **except**:
  - A. reduced risk
  - B. improved quality of service
  - C. reduced total cost of ownership
  - D. lower IT infrastructure costs.

### True or false

6. Most response activities to competitive pressures can be greatly facilitated by information technology.
7. Information technology (IT) has become the major facilitator of business activities in the world today.

### Fill in the gaps

8. A(n) \_\_\_\_\_ information system is one that provides real-time access to information or data.
9. The \_\_\_\_\_ enterprise can respond properly and in a timely manner to changes in the business environment.



10. The three principle activities of management are:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

## Section 2 – Planning

### Chapter 2: IT strategy and planning

#### 2.1 Introduction

Planning is deciding what to do before you do it. It is often said that if a business fails to plan, it plans to fail. In business, good planning is an essential element of business success. By planning the future, a business sets out its future objectives together with the resources and actions needed to achieve these objectives. Sometimes a distinction is made between strategic and tactical planning. Strategic planning defines what it is that the business wishes to achieve. Tactical planning defines how the business is going to achieve its strategic plans. As such, strategic planning may be seen as a more visionary and creative process whereas tactical planning contains the detail.

Information systems play an essential role in many aspects of a business. It has been suggested that as much as half the profits of a business may result from closely aligning IT with the business (Luftman, 2003). It is therefore extremely important that planning for information systems is closely linked with business planning. As a result, information systems managers need to know and understand what the business strategy is and to be able to ensure that the information technology can support this strategy.

Defining a strategy is a creative process; it cannot be prescribed. However, a structured approach and the consideration of a number of models can be used to assist in developing a strategy which may be monitored and subsequently updated. Some of the basic elements to include in this strategy are where the organisation wants to be in terms of its IS, where it is now and how to map a path between the two.

In this chapter, we consider planning for an IT strategy to support the business in achieving competitive advantage.

##### 2.1.1 Learning outcomes

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the importance of developing an IT strategy
- assess the competitive potential of IT for an organisation.

##### 2.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand the importance of using information systems to support business objectives
- understand how information systems may be used to enhance an organisation's competitive position.

##### 2.1.3 Essential reading

Turban, Chapter 13.

### 2.1.4 Further reading

Laudon and Laudon, Chapter 3.

Luftman, J.N., et al. *Managing the information technology resource*. (Upper Saddle River, NJ: Pearson Education, c2004) [ISBN 0131227211].

Earl, M.J. *Management strategies for information technology*. (Prentice Hall International (UK) Ltd., 1989) [ISBN 0135516560 (pbk)].

Porter, M.E. *Competitive advantage*. (New York: Free Press, 2004) [ISBN 9780743260879].

## 2.1 The competitive potential of information systems

The aim of an organisation is often to have an advantage over the competition. When an organisation is doing better than the competition we call this state of affairs 'having a competitive advantage'.

As early as the 1980s, organisations became aware that information systems could affect their competitive position. Early examples of competitive systems are well-documented and include the SABRE system developed by American Airlines and the Cash Management System developed by Merrill Lynch. More recently we have seen organisations like Dell Computers and Harrah's Entertainment gain a competitive advantage from their information systems. Many other examples exist and are documented in your textbooks and elsewhere.

If information systems assist an organisation to gain a competitive advantage then the IT manager needs to be aware of the business strategies and to ensure that the IT is aligned to these strategies. A number of frameworks are available to assist the manager in brainstorming about the potential strategic application of IT to business problems. These are discussed below.

### 2.2.1 Generic strategies

In developing its competitive strategy, an organisation will consider what 'thrusters' it plans to use. Michael Porter highlighted three of these thrusters, namely: **cost leadership**, **product differentiation** and **niche strategies** (Porter, 2004).

#### 2.2.1.1 Cost leadership

A cost leadership strategy involves the organisation concentrating its efforts on producing a particular good or service at a lower cost than the competition. This allows it to gain a greater margin per unit or to set lower prices for its products or services in order to attract more customers (e.g. Wal Mart in the US).

#### 2.2.1.2 Differentiation

This strategy involves making the product or service distinct from the competition by giving it some special feature or enhancement that makes it more desirable in the eyes of the customer. This can be either a tangible feature or an intangible one, such as a reputation for high quality (e.g. Dell Computers).

#### 2.2.1.3 Niche

A niche strategy involves the identification of a niche in the market and the tailoring of existing, or the development of new, products to fit that niche (e.g. Saga Holidays).

#### 2.2.1.4 Further generic strategies

More recently, a number of other generic strategies have been added.

- Growth – increase market share, attract more customers or sell more products (e.g. electronic auctions).
- Alliance – collaborate with business partners through joint ventures, alliances, partnerships, etc. This allows organisations to focus on their core competencies. These alliances may be with the organisation's suppliers or may involve a number of organisations in the alliance (e.g. Star alliance).
- Innovation – this is similar to differentiation in that it introduces new products or services but its impact is more dramatic. Innovation suggests that something is so new or different that it changes the nature of the industry (e.g. Citibank's ATMs).
- Entry barriers – these make it difficult for other organisations to enter your market space by introducing innovative products or services (e.g. Cisco's dynamic configuration tool).
- Customer relations – these focus on the needs of the customers. Customer satisfaction is seen as paramount in successful businesses. Creating strong linkages with customers can mean that if they go elsewhere for their product or service they incur switching costs. Encouraging customer loyalty can also be used (e.g. Amazon).
- Core competencies – a core competency is an activity for which a firm is a world-class leader. A competitive advantage may be gained by using information systems to enhance this core competency such as being able to share knowledge across business boundaries.
- Network-based strategies – two network based strategies are network economics and virtual organisations. Information systems networks provide the opportunity for firms to form alliances in innovative ways and establish communities of users which may provide them with a competitive advantage.

### 2.2.2 Value chain analysis

An important conceptual framework that can help an organisation identify competitive information systems is the value chain developed by Michael Porter (Porter, 2004). It views a firm as a series, or chain, of basic activities that add value to its products and services and thus adds a margin of value to the firm. The value chain divides the firm's activities into those that it must carry out in order to function effectively. Nine value activities are identified. Each of these activities adds value to the final product. In order to be competitively advantaged the business must carry out these activities at a lower cost than its competitors or must use these activities to create a product that is differentiated from those of its competitors and thereby be able to charge a premium price for the product. The nine activities are divided into two categories – primary activities, which are concerned with the direct generation of the organisation's output to its customers, and support activities which contribute to the operation of the primary activities (see Figure 1A.1, Turban p.37).

Michael Earl suggests the scope for exploitation of IT in the value chain is fourfold, applying either technology directly or its information processing capability to either value activities or their linkages (Earl, 1989).

- The technology can physically automate and improve the physical tasks in any activity (e.g. computer controlled machine tools in assembly operations).
- The technology can physically connect or control activities across linkages (e.g. communications linkages between production and distribution centres).
- Information systems can help perform, support or manage value activities (e.g. financial planning, or using information technology to collect information provided by many of the firm's activities to generate forecasts on future performance).
- Information systems can optimise or co-ordinate activities across linkages (e.g. CAD-CAM systems for computer integrated manufacturing).

The key is to ascertain the cost of each activity and to analyse whether there is an opportunity to reduce costs or to add value through IT. An example of how IT systems may support each stage of the value chain for the airline industry is given in Turban (Figure 13.3, p.528).

### **2.2.3 Five forces of industry competition**

The competitive forces model identifies the various external forces which an organisation must balance in order to compete successfully (See Figure 13.2 in Turban on p.523). The model looks at the forces which operate in the particular industry in which the organisation functions. In general, the following forces operate in each industry sector.

- The threat of entry of new competitors.
- The bargaining power of suppliers.
- The bargaining power of customers.
- The threat of substitute products or services.
- The rivalry among existing firms.

The strength of each of these forces will be determined by a number of factors (See Figure 13.2 in Turban, p.523).

The question for the information systems manager is: how can IT influence these forces? An example of how the internet influences industry structure is given in Turban (See Figure 13.2, p.523).

### **2.2.4 Strategic resources and capabilities**

Another strategy an organisation may use to improve its competitive position is to ensure that it has superior resources and capabilities. IT can be used in a number of ways to support this strategy. For example, effectiveness may be increased by using IT to reduce the number of staff an organisation needs to employ by automating some of the tasks. Alternatively, IT may be used to reduce costs by improving efficiency.

Turban discussed the important characteristics of resources for an organisation as value, rarity and appropriability. However, if the organisation wishes to achieve a sustainable competitive advantage (i.e. to maintain its competitive advantage over a prolonged period of time), these characteristics need to be extended to include inimitability, imperfect mobility and low substitutability.

The major ways in which information systems can contribute to these resources is through technology resources, technical capabilities and managerial resources.

### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- discuss the importance of developing an IT strategy
- assess the competitive potential of IT for an organisation.

### **Sample examination question**

Discuss two strategies for competitive advantage that are enabled by IT.

## 2.3 Assessment questions

### Multiple choice questions

1. Which of the following does not describe IT strategic alignment?
  - A. The alignment of IT and business is the number one issue facing CIOs.
  - B. Many IT initiatives have failed because they were not aligned to the business strategy.
  - C. Achieving IT alignment is a simple process.
  - D. If IT is not properly aligned with the organisation's strategy, then large investments in IS can have a low payoff.
2. Which of the following is not a key factor in getting and keeping IT aligned with the organisation?
  - A. The CIO having strong relationships with other senior executives.
  - B. Treating end users as customers.
  - C. The IT department has good relationships with end user departments.
  - D. Introducing new IT as a competitive weapon.
3. One way to analyse the strategic potential of information systems is to consider their influence on one or more forces in Porter's competitive forces model. Which of the following is not one of those forces?
  - A. Bargaining power of customers.
  - B. Rivalry among existing firms in the supply chain.
  - C. Threat of substitute products or services.
  - D. Threat of new entrants.
4. Which of the following is not a way the internet changes the structure of an industry?
  - A. Reducing barriers to entry, such as the need for a sales force, access to channels, and physical assets.
  - B. Reducing switching costs, such as switching buyers.
  - C. Lowering fixed cost relative to variable cost, increasing pressures for price discounts.
  - D. Reducing the leverage of intervening companies because the internet provides a channel for suppliers to reach end users.
5. For firms in the same industry, critical success factors (CSFs) will vary depending on each of the following **except**:
  - A. whether the firms are market leaders or weaker competitors
  - B. where the firms are located
  - C. what competitive strategies they follow
  - D. the IT architectures.
6. Which of the following is a barrier to entry?
  - A. Retail banking: the cost for a customer in moving accounts to a different bank.
  - B. Airline industry: the cost of aircraft fuel.
  - C. Food retailing: the cost for a supermarket chain in changing suppliers.
  - D. Shipbuilding: the cost of an up-to-date construction facility.

7. How can the internet change the structure of an industry?
  - A. Shift bargaining power away from end customers.
  - B. Widen the geographic market, increasing the number of competitors.
  - C. Increase differences among competitors as offerings are difficult to keep proprietary.
  - D. Reduce competition based on price.

**True or false**

8. The internet greatly decreases the bargaining power of customers or buyers in the market.
9. A study of chief information officers (CIOs) sponsored by the Society for Information Management found that the number one issue facing CIOs was the alignment of IT and business.

**Fill in the gaps**

10. Airlines in global alliances such as OneWorld and Star Alliance compete for ticket sales on some routes, but once the ticket is sold they may co-operate by flying passengers on competitor's planes to avoid half-full planes. This is an example of \_\_\_\_\_.
11. \_\_\_\_\_ has been widely used by major corporations to facilitate IT planning that involves much uncertainty. It also has been particularly important to e-commerce planning.
12. When a company selects a narrow-scope market segment and attempts to be the best in that market, the company has a \_\_\_\_\_ strategy.
13. By offering different and 'better' products, companies can charge higher prices, sell more products, or both. These are benefits of the \_\_\_\_\_ strategy.
14. The \_\_\_\_\_ model is useful in conducting a company analysis, by systematically evaluating a company's key processes and core competencies.
15. \_\_\_\_\_ are the things that must go right in order to ensure the organisation's survival and success.



## Notes

## Chapter 3: Formal planning techniques

### 3.1 Introduction

The previous chapter highlighted the importance of ensuring that the plan for the information systems fits in with the organisation's overall plan and strategy. It focused on one aspect of alignment; namely, providing information systems in order to assist the organisation in achieving a competitive advantage. This chapter looks more broadly at planning for information systems. It emphasises once again the importance of aligning information systems to the business objectives at all levels – both internally and externally – and considers a number of techniques and frameworks to assist in this process.

#### 3.1.1 Learning outcomes

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the importance and challenges of aligning information systems and business objectives
- describe the various components of an information systems plan
- describe the personnel involved in information systems planning
- describe how to formulate an information systems plan
- describe the frameworks available to support the planning process
- discuss interorganisational information systems planning
- discuss multinational information systems planning.

#### 3.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand the importance of aligning IS strategy and business objectives
- understand the components of an information systems plan
- understand the methodologies available to facilitate IT planning.

#### 3.1.3 Essential reading

Turban, pp.531–542.

#### 3.1.4 Further reading

Laudon and Laudon, p.388.

### 3.2 IT strategic alignment

The failure of many information systems projects is seen to result from a failure to align the business objectives with the information systems' objectives. In determining the information systems strategy, managers should consider aligning the IS function's strategy, structure, technology and processes with those of the business units so they are working to achieve the same goals.

Strategic alignment is challenging as it requires a clear understanding of the business strategy (where the business is going), the IS strategy (what is required) and the IT strategy (how it can be achieved). See Figure 13.1 on p.521 in Turban which illustrates this relationship.

### **3.3 Components of an information systems strategy**

There are a number of components which are typically included in an IS plan. These include:

- a statement of the business strategy
- a statement of the current systems
- proposed new developments
- management strategies
- implementation strategies for the IS plan
- resource requirements.

### **3.4 Personnel involved in information systems planning**

If information systems are to be aligned with the business objectives then it is important that the personnel involved in developing the plans are drawn from both the IT department and from other business functions. The team should therefore be made up of:

- specialist planning staff
- general information systems' staff
- a coalition team drawn from a number of business functions.

### **3.5 Formulating an information systems strategy**

Information systems planning has evolved over the years. In the early years, planning mainly considered how information systems could support the operational level of the business. Over time, as the technology became more sophisticated, the emphasis shifted to providing IT support for management decision making. Since the 1990s, the focus has been on how IT can support the business in achieving its business goals.

A structured approach and models may be used to assist in developing the information systems strategy, which may be monitored and subsequently updated. Some of the basic elements to include in this strategy are: where the organisation wants to be in terms of its IS; where it is now; and how to map a path between the two. Top down planning techniques are used to determine where the organisation wants to be in terms of its future information systems. Bottom up planning helps the organisation to understand where it is now in terms of its current information systems.

### **3.6 Tools and methodologies for IT planning**

There are several tools, methodologies and frameworks available to assist an organisation in determining its IS Strategy. Some of these are discussed below.

#### **3.6.1 Top down planning**

##### **3.6.1.1 The business systems planning model**

This is a top down approach to information systems planning. It proposes the identification of business plans and goals, followed by deduction of information systems needs using an analytical approach with inputs from management at various levels.

Top down planning asks the following questions:

- What are the aims, objectives and goals of the business?
- What information systems are needed to support these aims, objectives and goals?

It proposes a business perspective describing:

- the business strategy, in terms of the internal and external environment
- the key figures, such as customers, suppliers, competitors, etc.
- the information needs derived from the analysis of the business environment
- a description of the potential use of IT in the business area.

Business systems planning is a specific example of top down planning that considers the business processes, and derives the data classes to support these processes, which become the building blocks of the information architecture. The information architecture is then used to determine the organisational database requirements and applications. (See Figure 13.4 in Turban on p.533).

#### **3.6.1.2 Critical success factors**

Identifying critical success factors is also an example of a top down planning technique. It is a well-known and widely used business planning technique. Critical success factors are the limited number of things which the business must do right in order to be successful. There should be no more than six such factors. The business starts by identifying its highest level aims, objectives and goals and then identifies the factors which are critical to achieve these aims. The IT manager then determines the information systems needed to help and support the business in achieving these critical success factors. For example, if the business aim is to have excellent customer satisfaction, the critical success factors may include: excellent staff, fast customer response times, etc.

#### **3.6.1.3 Scenario planning**

Scenario planning is used in situations where the future is uncertain. For example, it may be used to try and determine future customer requirements. The planners create a scenario and then consider how potential changes in future events or requirements may impact on this scenario. This type of planning has been particularly important in e-commerce planning. The typical steps in scenario planning are set out in Turban on p.536.

### **3.6.2 Bottom up information systems planning**

In planning what information systems will be needed in the future, account must also be taken of the systems which are already in place. Bottom up information systems planning audits the current position of the information systems. It addresses questions such as the following.

#### **What is the coverage of existing systems?**

Examination of current systems may suggest either that some could already be better exploited for business purposes, such as gaining strategic advantage, or be built upon to yield significant added value.

**What is the business value of our existing systems?**

This question needs to be asked of the business users to ascertain their view on the value of the information system to the business.

**What is the technical value of our existing systems?**

This question is asked of the technical staff and assesses how good the system is technically (e.g. how reliable is it)? How user-friendly is it?

The systems audit grid (or 'evaluation grid') represents an appraisal framework for the current systems. The horizontal axis considers the technical conditions of a system, while the vertical axis provides a view of the business value of the system. Prescriptive actions are then suggested on the basis of these assessments.

If the system is rated by both business and technical users as being of low quality, it should be eliminated. If the system is rated highly by business users but poorly by technical experts, it is a risk to the business and should be renewed. If the system is high on technical quality but low on business value it needs to be reassessed before getting rid of it. For example, it may be that it could be enhanced to provide business value by adding some functionality. It should be remembered that where a system is rated highly by both technical and business people, it should be maintained and potential enhancements should be considered.

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### 3.7 Interorganisational IT planning

In recent years, we have seen major increases in the number of interorganisational systems. IT planning may get more complex when there is more than one organisation involved. Some interorganisational systems may involve thousands of partners. IT planners may use customer, supplier or other business partner focus groups to help them determine requirements. Virtual planning teams may be created to work together and the partners may adopt the same enterprise software.

### **3.8 IT planning for multinational corporations**

Multinational corporations have to deal with the different legal, political and social issues which operate in the various countries in which they are represented. In many instances, it may therefore be appropriate to decentralise their IT planning to be dealt with at a local level.

### **3.9 Resource allocation**

The end result of the planning process will be the future information systems requirements for the organisation. In order to implement these requirements, resources will be needed. Obtaining resource within an organisation is typically a competitive issue. As there are invariably insufficient resources to meet all the organisation's requirements, the IT department will be bidding against other departments to obtain funding. In some instances the need to invest in IT is clear-cut (such as when infrastructure investments are needed and the funding for the IT department's requirements will almost certainly be met). However, in other circumstances the IT department will have to make a case for obtaining the funding. In some cases the IT department may recoup some of its costs by using a chargeback system where some or all of the cost incurred is charged to users.

### **3.10 Difficulties of IT planning**

Planning is a time consuming and resource-intensive process. Many organisations argue that by the time the plan is complete, the technology has evolved and the plan is obsolete. Other difficulties are getting the correct personnel involved, difficulties in aligning business and IT goals, changing requirements, etc.

### **3.11 E-planning**

E-planning differs from IT planning in that it is more concerned with planning applications to exploit business opportunities rather than planning infrastructure. It is also frequently conducted more quickly and less formally. Planning for individual applications is similar to other IT planning. However e-planning may also involve planning a portfolio of applications. Tjan describes a portfolio strategy for planning e-applications (this is described on p.541 of Turban).

### **A reminder of your learning outcomes**

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the importance and challenges of aligning information systems and business objectives
- describe the various components of an information systems plan
- describe the personnel involved in information systems planning
- describe how to formulate an information systems plan
- describe the frameworks available to support the planning process
- discuss interorganisational information systems planning
- discuss multinational information systems planning.

### **Sample examination question**

Do you think that IT planning is justified?

### 3.12 Assessment questions

#### Multiple choice questions

1. Porter's five forces model can be generalized to include all but which of the following?
  - A. Innovation, growth, alliance and time.
  - B. The threat of new competitors
  - C. The bargaining power of suppliers.
  - D. The bargaining power of customers.
  - E. The threat of substitute products or services.
2. The success of IT steering committees largely depends on \_\_\_\_\_, which is a formal set of statements and policies for IT alignment, level of acceptable risk, and allocation of resources.
  - A. an IT tactical plan
  - B. an application portfolio
  - C. IT governance
  - D. IT imitability.
3. Which of the following is not a characteristic of critical success factors (CSF)?
  - A. The CSF approach to IT planning helps identify the information needs of managers.
  - B. CSFs are numerous things that must go right to ensure the organisation's survival or success.
  - C. CSFs exist in business units and departments as well as in the organisation.
  - D. CSFs vary by broad industry categories, such as manufacturing, service, or government.
4. For firms in the same industry, critical success factors (CSFs) will vary depending on each of the following **except**:
  - A. whether the firms are market leaders or weaker competitors
  - B. where the firms are located
  - C. what competitive strategies they follow
  - D. the IT architectures.
5. Which of the following is not a key factor in getting and keeping IT aligned with the organisation?
  - A. The CIO having strong relationships with other senior executives.
  - B. Treating end users as customers.
  - C. The IS department having good relationships with end user departments.
  - D. Introducing new IT as a competitive weapon.

**True or false**

6. A study of chief information officers (CIOs) sponsored by the Society for Information Management found that the number one issue facing CIOs was the alignment of IT and business.
7. American Airlines' reservation system, SABRE, and Caterpillar's equipment maintenance system, are examples of innovative supersystems. A drawback of these and other supersystems is that they are expensive and easy to duplicate.

**Fill in the gaps**

8. The \_\_\_\_\_ committee is a group of managers and staff representing various organisational units that establishes IT priorities and ensures that the IS department is meeting the firm's needs.
9. \_\_\_\_\_ has been widely used by major corporations to facilitate IT planning that involves much uncertainty. It also has been particularly important to e-commerce planning.
10. \_\_\_\_\_ consists of developing the hardware, software, data communications and networks, facilities, personnel and financial plans needed to execute the master development plan as defined in the requirements analysis.



## Notes

## Chapter 4: Business process management

### 4.1 Introduction

A business process is a collection of related activities that produce something of value. Because business processes are the reality of what an organisation does, it is important that they are constantly managed. Business process management refers to activities undertaken by the business to optimise its processes. Good process management can reduce product design time by 50 per cent and other benefits which are reported. See Turban, p.323. Process management requires thinking about the business only in terms of its activities.

#### 4.1.1 Learning outcomes

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss business process management
- define business process re-engineering
- identify re-engineering principles and difficulties
- identify IT support for process management.

#### 4.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand business process management
- understand business process re-engineering
- understand IT support for process modelling.

#### 4.1.3 Essential reading

Turban, pp.322–27.

#### 4.1.4 Further reading

Laudon and Laudon, pp.102–05.

Davenport, T. and J. Short ‘The new industrial engineering: Information technology and business process redesign’, *Sloan Management Review*, Summer 1990.

Hammer, M. ‘Reengineering work: don’t automate, obliterate’, *Harvard Business Review*, July 1990, 104–112.

Venkatraman, N. ‘IT-induced business reconfiguration’ in Scott Morton, M.S. (ed.) *The Corporation of the 1990s* (New York; Oxford: Oxford University Press, 1991) [ISBN 9780195063585].

### 4.2 Process modelling

Business process modelling provides a map of the processes within an organisation and shows how a system will work after it is built. There are a number of ways in which processes may be represented, as well as the relationships between them, including diagrams, pictures, etc.

### 4.3 Measuring processes

For the organisation to measure the success of a process management initiative, it needs to be able to measure the efficiency and effectiveness of

the processes. Two well-known examples of techniques used for managing and measuring processes are Total Quality Management (TQM), which focuses on the continual measuring and monitoring of process quality, and Six sigma which is a framework for identifying, measuring and managing process variations that cause defects. ISO 9000 is the international organisation for standards for quality management systems and serves as a benchmark for measuring processes.

#### **4.3.1 Total quality management (TQM)**

Total quality management is a strategy which aims to raise awareness of the importance of quality throughout the organisation and ensure that it is embedded throughout the organisation's activities and processes. It aims to remove inconsistencies in processes so that high performance standards can be achieved. The strategy typically consists of four steps, namely: focusing on continuous process improvement to make processes visible, repeatable and measurable; a focus on intangible effects on processes and ways to optimise and reduce their effects; examining the way the customer uses the product which leads to improvements in the product itself; broadening management concerns beyond the immediate product.

#### **4.3.2 Six sigma**

Six sigma focuses on preventing variations in process which cause defects. It is a five-step methodology which consists of the following stages.

1. Define process improvement goals.
2. Measure key aspects of the current process.
3. Analyse alternatives.
4. Design details and optimise the design.
5. Verify the design.

### **4.4 Information technology support for business process management**

Computer aided software engineering (CASE) management tools can support business process management. An example of this is by keeping objects in repositories so that managers can keep models current.

Business process management (BPM) software allows for the direct execution of the business process. Turban (pp.326–27) provides a number of examples of BPM software available commercially.

### **4.5 Re-engineering processes**

From time to time existing business processes need some modification. Some processes may be obsolete or it may be that they could be streamlined or combined to omit redundant steps. On the other hand entirely new processes may need to be added.

Business process re-engineering describes how organisations may achieve radical improvements over a short period of time using process-focused methods. It is the analysis and design of workflows within and between organisations.

‘The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements, such as cost, quality, service and speed.’ (Hammer, 1990)

The concept is also frequently referred to simply as **business engineering**, **business re-engineering** or **business process re-design**.

Two important concepts in these definitions are ‘radical’, which distinguishes this movement from others (such as the quality movement where improvement is continuous), and ‘process’, which is any set of activities designed to produce a specified output.

#### **4.6 Steps in effective re-engineering**

There is no single method for implementing business process re-engineering. However, there are a number of steps in the process which may be identified.

- Identify the business vision and process improvement objectives.
- Select the processes for improvement.
- Understand and measure existing processes.
- Re-design the process.
- Manage the implications of the process redesign.

#### **4.7 Re-engineering principles**

There are a number of activities that can be performed to alter a process. These are:

- add a new process
- delete a process
- expand a process
- reduce a process
- combine processes
- split a process.

#### **4.8 Key success factors in process re-engineering**

Research suggests that the following factors contribute to the overall success of process re-engineering initiatives.

- Effective use of teams.
- Commitment of appropriate time and resources.
- The right focus (a clear understanding of the scope and goals of the initiative).
- Strong communications program to keep people up to speed on the initiative.
- Realistic planning and schedules.
- Effective training and education.

#### **4.9 Benefits of re-engineering**

There has been a great deal of controversy as to the extent of benefit achieved through re-engineering. Venkatraman (1991) suggests that the degree of benefit is dependent on the degree of transformation.

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**Level 1: Localised exploitation**

Localised exploitation is where IT is used in different parts of an organisation, which are isolated from each other. (For example, the automation of accounts, payrolls or personnel records.) However, it does not link these systems together in any way.

**Level 2: Internal integration**

Internal integration is where the IT systems in different parts of the organisation are linked together. For example, where accounts, customer records and stock control are all linked together, the resulting integrated system is an example of Level 2.

Levels 1 and 2 are seen as evolutionary changes in that they occur over time and are a natural progression of events. Levels 3, 4 and 5 are revolutionary; they are discontinuous from the way things have been done in the past.

**Level 3: Business process redesign**

A business process may be seen as a set of interconnected activities. An example of a process would be processing an expense form. The claimant submits a form which is then checked. A certain amount is approved. Authorisation is made to pay. A cheque is issued and sent to the claimant. Note that a process may be conducted within a single organisational function or it may span several functions. It is common for the order of execution of processes to be undertaken sequentially. At Level 3, the organisation considers process innovation – stepping back from a process and considering its overall business objective and then introducing creative or radical changes to it to achieve order of magnitude improvements in the way that the objectives are achieved.

**Level 4: Business network redesign**

Level 3 is concerned with redesigning the process within the organisation's boundaries. Level 4 extends those boundaries to include external entities, such as suppliers or customers. At this level there is a radical change in the relationships between organisations induced by the use of IT. For example, terms and conditions of contracts may be altered.

**Level 5: Business scope redefinition**

At this level the business uses IT to come up with an entirely new product, rather than using IT to support or enhance an existing product. The organisation moves into new markets at this level. An example of this is American Airlines with their SABRE system.

**4.10 Problems experienced in business process re-engineering**

Research suggests that a number of organisations have experienced difficulties in conducting BPR initiatives. Major obstacles to BPR include:

- resistance to change
- gaining cross-functional co-operation
- inadequate work place skills
- sustaining top management support
- poor project leadership
- high staff turnover.

**A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- discuss business process management
- define business process re-engineering
- identify re-engineering principles and difficulties
- identify IT support for process management.

**Sample examination question**

Discuss what is meant by the concept of business process re-engineering (BPR) and describe the typical steps involved in conducting a BPR initiative.

## 4.11 Assessment questions

### Multiple choice questions

1. The heart of business process management (BPM) is re-engineering. What makes re-engineering so valuable to BPM?
  - A. The organisation can save a tremendous amount of money by re-engineering processes before automating them with expensive enterprise resource planning (ERP) software.
  - B. Re-engineering reduces the number of participants in supply chain processes, which reduces complexity.
  - C. Re-engineering increases total quality through continuous improvement initiatives.
  - D. Six sigma and ISO 9000 decrease risk and uncertainty in business processes.
2. Business process re-engineering is:
  - A. the gradual change of processes within the organisation
  - B. radical re-design of existing processes
  - C. using engineering systems within an organisation
  - D. adding new processes to an organisation.
3. Venkatraman's five levels graph suggests:
  - A. the greater the degree of process transformation the greater the benefit
  - B. the greater the degree of process transformation the lesser the benefit
  - C. neither of the above
  - D. process transformation and benefit are independent.

### True or false

4. Total Quality Management is a radical re-design of processes within the organisation.
5. According to the Business Project Management Institute an effective BPM strategy can reduce product design time by 75 per cent.

### Fill in the gaps

6. The automating of a single process within an organisation, not linked to any other process is called \_\_\_\_\_.
7. \_\_\_\_\_ is a different mental paradigm because it focuses only on activities and is independent of people and departments.
8. \_\_\_\_\_ is a management strategy aimed at embedding awareness of quality in all organisational processes.
9. \_\_\_\_\_ is a methodology to manage process variations that cause defects, defined as unacceptable deviation from the mean or target, and to work systematically towards managing variation to prevent those defects.

## Section 3 – Implementation

### Chapter 5: Managing implementation and change

#### 5.1 Introduction

It is frequently claimed that information systems fail at the implementation stage. In other words, it is felt that the organisation has correctly selected the right information system to achieve its aims but when it is introduced into the organisation things go wrong. For example, the system does not work properly or it fails to produce the expected benefits.

The term implementation is used to mean different things in the context of information systems management. Walsham (1993) states that it may refer to the technical implementation ensuring that the system development functions adequately in a technical sense. This is not the approach we are concerned with on this course. We are concerned with the human and social aspects of implementation. By implementation we mean ‘all organisational activities working toward the adoption, management and routinization of an innovation, such as an information system’ (Laudon, 2008, p.573).

##### 5.1.1 Learning outcomes

By the end of this chapter, and the relevant reading and activities, you should be able to:

- discuss what is meant by successful implementation
- identify key issues in managing information systems implementations
- discuss the effect of the interaction between people and technology
- discuss resistance to change
- identify factors that influence implementation success.

##### 5.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand what is meant by the implementation of an information system
- understand key issues that impact on the success of an IS implementation.

##### 5.1.3 Essential reading

Laudon and Laudon, Chapter 14, pp.573–82.

##### 5.1.4 Further reading

Kozlowski, S.W.J. and K.J. Klein (2000) ‘A multilevel approach to theory and research in organizations: contextual, temporal and emergent processes’, in Klein, K.J. and S.W.J. Kozlowski (eds) *Multilevel theory, research, and methods in organizations: foundations, extensions, and new directions*. (San Francisco: Jossey-Bass, c2000) [ISBN 0787952281], pp.3–90.

Lapointe, L. and S. Rivard ‘A multilevel model of resistance to information technology’, *MIS Quarterly*, Vol. 29, No. 3, September 2005, pp.461–91.



Orlikowski, W. 'The duality of technology: rethinking the concept of technology in organizations', *Organization Science*, Vol 3, No.3, 1992, pp.398–424.

Tyre, M.J. and W. Orlikowski 'Windows of opportunity, temporal patterns of technological adaptation in organisations', *Organization Science*, Vol. 5, No. 1, 1994, pp.98–118.

Walsham, G. *Interpreting information systems in organizations*. (Chichester: Wiley, c1993) [ISBN 0471938149].

## 5.2 Defining successful implementation

It is difficult to define what constitutes a successful information systems implementation. The following criteria are frequently used to determine whether the implementation has been successful.

- High levels of system use – if a system is used frequently, it may be considered successful.
- User satisfaction with the system – if the users express their satisfaction, it may be considered successful.
- Achieved objectives – if the system has achieved the objectives that were set out, it may be considered successful.
- Financial payoff – if the income arising from the introduction of the system exceeds the expenditure, it may be considered successful.

## 5.3 Managing information systems implementation

If the implementation of the system is to be successful its introduction into the organisation should be viewed as a project which needs to be scoped and managed. Project management refers to 'the application of knowledge, skills, tools and techniques to achieve specific targets within specified budget and time constraints' (Laudon, p.386). Responsibilities need to be determined. Frequently nobody sees the responsibility for organisational implementation as their responsibility. Walsham states that a significant subgroup of the IS analysts should take responsibility for organisational implementation issues with the support of senior management and various stakeholder groups. At least one member of senior management should accept the responsibility for continuing in-depth contact with the other groups involved, including the IS project team. The responsibility for the implementation should therefore be taken on by a combination of IS project team members and senior management. Project leaders will need both technical and administrative experience (Walsham, 1993). IS implementations may be intensely political. The implementation process may therefore require a high degree of coalition building between the various stakeholder groups.

The implementation process may be facilitated through the design of an organisational impact analysis. This explains how a proposed system will affect organisational change, attitudes, decision making and operations. Ergonomics should also be taken into consideration (i.e. the interaction of people and machines in the work environment, including the design of jobs, health issues and the end user interface).

## 5.4 Interaction between people and technology

Whether the implementation of an information system will be successful or not is often difficult to predict in advance. This is partly due to the fact that when the system is introduced there may be unanticipated interactions between the people and the technology, resulting in the technology not

being used in the way it was originally intended. An obvious example of this is in the widespread use of sms messages. When mobile phones were introduced nobody predicted that the use of instant messaging would become so popular; this use only emerged over time.

Orlikowski proposes that the results of an IT implementation depend on the interaction of both technology and people over an extended period of time. Research shows that the results of technological implementations frequently have an emergent rather than a planned character. Information systems are both a product of human action and an influence on human action. People initiate design and use of the IT system. Designers construct the technology in accordance with management's requirements and users react – positively or negatively – and make choices about which features of the technology to use. In doing so they socially construct the technology and determine which features of the technology will become established. The technology then shapes human action so it becomes part of their working environment (e.g. use of the internet). This process continues and thus technology and social environment continuously shape each other (Orlikowski, 1992).

## 5.5 Technology acceptance model (TAM)

The TAM suggests that the extent to which an individual accepts a new technology is influenced by two factors: the perceived usefulness of the technology and its perceived ease of use. Usefulness is defined as the extent to which the individual believes the system will enhance their job performance. Ease of use is defined as the extent to which using it will be free from effort (Davis, 1989).

## 5.6 Resistance to change

The introduction of a new IT system may frequently result in user resistance. It should be kept in mind that resistance may have positive as well as negative effects. On the positive side it may be the way in which users are expressing the reality that the system is in some way flawed. Tyre points out that early resistance to a system may present a 'window of opportunity'; that is, a chance to put things right (Tyre, 1994). Especially because the resistance at this stage is likely to be to features of the system itself rather than to the significance of the system.

Negative resistance to the system may come from an individual or a group. The following are some common reasons why individuals resist the implementation of a new system.

1. **Parochial self-interest**, which includes:
  - fear of computers
  - change to areas of an individual's working life
  - alterations to interpersonal relationships
  - change to job content
  - change to decision-making and power structures.
2. **Misunderstanding** of why the system has been introduced and a lack of trust in management.
3. **Different assessments** between what the management and the user believes the system will achieve.

#### **4. Low tolerance for change**

Some of the suggested strategies for overcoming negative resistance to IT may be through:

- communication
- education
- incentives
- persuasion
- user participation and involvement
- facilitation and support
- negotiation and agreement.

#### **5.6.1 Resistance as a process**

Resistance to a new information system may be a dynamic process rather than a static event. Lapointe and Rivard suggest that the level of resistance varies at different stages of the implementation process (Lapointe and Rivard, 2005).

When a system is first introduced users will assess its features and potential impact. These assessments are then used to project the consequences of using it. If these consequences are perceived to be threatening, resistance will occur.

In the initial stages, resistance behaviours tend to be those of indifference, lack of interest and passive resistance. However, where resistance occurs in the later stages of the implementation process, resistant behaviour tends to form into coalitions and aggression.

#### **5.6.2 Group resistant behaviours**

What starts out as individual resistance behaviour may merge later into group resistance. Group resistance behaviours may be seen as the aggregate of individual resistance behaviours. Composition is the process whereby group resistance emerges from 'individual members' shared perceptions, affect, and responses' (Klein and Kozlowski, 2000, p.33). This type of resistance occurs early in the implementation process.

Compilation occurs where the initial individual views of the system vary. Even if some of the individuals had initially liked the system, over time they join with others resisting the system as a homogenous group.

Group resistant behaviours which evolve from individual resistance behaviours vary in early and late stages of implementation. In early stages, the process is one of compilation and in later stages it is one of composition.

It is therefore important when 'studying group resistance to IT in the early stages of implementation, independent, individual behaviours need to be analysed rather than considering the group as a unified entity. In later stages, it then becomes important to understand how and why individual resistance behaviors converge.' (Lapointe and Rivard, 2005, p.484)

## **5.7 IT tools for managing implementation**

Finally, consideration should be given to using formal planning and control. Tools for managing the implementation process include program evaluation and review technique (PERT), critical path methods (CPM) and Gantt charts.

### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- discuss what is meant by successful implementation
- identify key issues in managing information systems implementations
- discuss the effect of the interaction between people and technology
- discuss resistance to change
- identify factors that influence implementation success.

### **Sample examination question**

A new information system may not be accepted by end users. Why do you think this might occur? Suggest possible ways in which a manager may deal with such a situation.

## 5.8 Assessment questions

### Multiple choice questions

1. In this course unit implementation refers to:
  - A. the human and social aspect of implementation
  - B. the technological implementation of an information system
  - C. the tools used to manage an information system
  - D. the regulations for controlling the use of information systems.
2. Ergonomics is the study of:
  - A. the application of economic principles to information systems management
  - B. the interaction of people and machines
  - C. the impact of information systems on an organisation
  - D. user satisfaction.
3. According to the technology acceptance model, which of the following impacts on whether an individual accepts a new technology?
  - A. The capability of the technology.
  - B. Ease of use.
  - C. Group acceptance of the technology.
  - D. Networking capabilities.
4. Orlikowski suggests that the results of an IT implementation:
  - A. can be planned in advance
  - B. are emergent rather than planned
  - C. can be predicted to be late
  - D. can be predicted to be over budget.

### True or false

5. Resistance to the introduction of a new information system is always a negative occurrence.
6. A Gantt chart graphically depicts project tasks and their interrelationships.
7. User concerns and designer concerns are usually the same at the beginning of the project but may diverge later as the system is built.

### Fill in the gaps

8. The acronym PERT stands for \_\_\_\_\_.
9. \_\_\_\_\_ is the process whereby group resistance emerges from individual members' shared perceptions, affect and responses.
10. \_\_\_\_\_ occurs when the individual views of the system vary initially but over time they join with others in resisting the system.

## Chapter 6: Ethical and social issues

### 6.1 Introduction

It is important as an information systems manager that you are aware of some key ethical principles and steps in conducting an ethical analysis. Ethics refers to principles of right and wrong. Ethical decisions differ from legal decisions. Legal decisions are governed by laws and regulations whereas ethical decisions are not based on mandatory choices. As information systems have evolved so rapidly in recent years, legal systems have not always been able to keep up with these rapid advances. Managers therefore frequently need to make decisions based on ethical principles rather than on the law.

#### 6.1.1 Learning outcomes

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the importance of ethics in managing information systems
- conduct an ethical analysis
- discuss a range of ethical principles
- discuss key ethical dilemmas.

#### 6.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand the importance of ethics
- understand ethical principles and dilemmas
- understand conducting ethical analysis.

#### 6.1.3 Essential reading

Laudon and Laudon 10th edition, Chapter 4.

#### 6.1.4 Further reading

Turban, Chapter 1, pp.12–13.

### 6.2 Five moral dimensions

Laudon and Laudon identify the following five moral dimensions of the Information Age.

- Information rights and obligations.
- Property rights.
- Accountability and control.
- System quality.
- Quality of life.

#### Information rights and obligations

Information rights concern issues such as privacy which is the right of the individual to be left free of surveillance. While this right is frequently protected by laws such as the Fair Information Practice law in the United States and the EU Data Protection Directive in Europe, there are many instances where these rights are not explicitly covered by law and hence give rise to ethical dilemmas.

**Property rights**

Property rights concern rights associated with intellectual property, trade secrets, copyright and patents.

**Accountability and control**

Accountability and control refers to the measures which are in place to ensure that somebody is identified who is held responsible for any damage caused by an information system.

**System quality**

System quality determines the standards of systems and data quality which are necessary to ensure protection of data and information.

**Quality of life**

Despite the many positive effects of information systems, they also have the potential for negative impacts. These include the potential for the lines between work and leisure to become blurred, the development of a dependency on computers for many aspects of both work and social life, access discrepancies and even health issues such as repetitive strain injury, carpal tunnel syndrome, computer vision syndrome and technostress.

### **6.3 Key technology advances that raise ethical issues**

The speed of technology advancement in recent years has resulted in a whole new range of ethical dilemmas. Examples of these advances include the doubling of computer power every 18 months, data storage and data mining techniques as well as networking capabilities.

### **6.4 Ethical analysis**

When a manager is faced with an ethical dilemma there are a number of steps which are needed to be taken in order to address the issue, namely:

- identify and describe clearly the facts
- define the conflict or dilemma and identify the higher order values involved
- identify the stakeholders
- identify the options that you can reasonably take
- identify the potential consequences of your options.

### **6.5 Some ethical principles**

As making ethical decisions is not clear cut, the manager needs to base these decisions on some well-founded and established ethical principles. The decision may be based on one of the following.

The golden rule – this means that you should do to others only what you would have done to yourself.

Kant's categorical imperative – this basically states that if an action is not right for everyone it is not right for anyone.

Descartes' rule of change – this holds that if an action cannot be taken repeatedly it should not be taken at all.

The utilitarian principle – this suggests that the action which achieves the greatest value should be taken.

The risk aversion principle – this holds that the action which causes the least harm should be taken.

The no free lunch rule – this means that you should assume that all tangible and intangible objects are owned by somebody.

### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- discuss the importance of ethics in managing information systems
- conduct an ethical analysis
- discuss a range of ethical principles
- discuss key ethical dilemmas.

### **Sample examination question**

Discuss how ethical issues create pressures or constraints on organisational operations and the use of IT.



## 6.6 Assessment questions

### Multiple choice

1. In the information age, the obligations that individuals and organisations have concerning information they possess falls within the moral dimension of:
  - A. property rights
  - B. system quality
  - C. accountability and control
  - D. information rights and obligations
  - E. quality of life.
2. Accountability is:
  - A. the acceptance of the potential costs, duties and obligations for the decision one makes
  - B. system and social institution mechanisms to determine who took responsible action
  - C. a body of laws that permits individuals to recover damages done to them by others
  - D. all of the above
  - E. none of the above.
3. Liability:
  - A. is a political concept rather than an ethical concept
  - B. is a body of laws that permits individuals to recover the damages done to them by others
  - C. applies only to individuals, not to organisations
  - D. all of the above
  - E. none of the above.
4. Professional codes of conduct:
  - A. are established by professional organisations
  - B. are needed because professionals make special claims to knowledge, wisdom and respect
  - C. establish professional entrance qualifications and competence
  - D. all of the above
  - E. both A and B.
5. Descartes' rule of change assumes that:
  - A. if an action is not right for everyone to take, then it is not right for anyone
  - B. if an action cannot be taken repeatedly, then it is not right to be taken at any time
  - C. one can put values in rank order and understand the consequences of various courses of action
  - D. one should take the action that produces the least harm or incurs the least cost
  - E. none of the above.

6. The claim of individuals to be left alone, free from surveillance or interference from other individuals or organisations is known as:
- A. privacy
  - B. information rights
  - C. the utilitarian principle
  - D. all of the above
  - E. only a and b.

**Fill in the gaps**

7. A computer-use induced stress whose symptoms are aggravation, hostility towards humans, impatience and enervation is called \_\_\_\_\_.
8. The use of computers to combine data from multiple sources and create electronic dossiers and detailed information on individuals is called \_\_\_\_\_.
9. A process in which laws are well known and understood, and there is an ability to appeal to high authorities to ensure that laws are applied correctly, is called \_\_\_\_\_.
10. A common computer related injury that affects the median nerve through the writer's bony structure is known as \_\_\_\_\_ syndrome.

## Notes

## Section 4 – Control

### Chapter 7: Information technology economics

#### 7.1 Introduction

The decision to invest in an information system needs to be based on economic considerations in just the same way as any other investment decision is made. This chapter considers the ‘productivity paradox’ which states that despite the enormous investment in information systems, they fail to demonstrate increases in productivity. This paradox has resulted in many organisations not bothering to conduct formal evaluations of their information systems. However, with the high capital investment made in information systems it is essential that organisations consider their costs and benefits. The chapter outlines a number of frameworks to assist the manager in making IT investment decisions.

##### 7.1.1 Learning outcomes

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the productivity paradox
- describe various approaches to evaluating IT investments.

##### 7.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand the productivity paradox
- understand the difficulties of evaluating information systems investments
- understand a number of approaches to IT evaluation.

##### 7.1.3 Essential reading

Turban, Chapter 14.

##### 7.1.4 Further reading

Laudon and Laudon, Chapter 13.

#### 7.2 The productivity paradox

Despite the enormous investment in IT in recent years, it is difficult to demonstrate that these investments really improve overall productivity. This phenomenon is known as the productivity paradox. A number of explanations have been offered for this paradox. These include the following.

- Difficulties in measuring benefits – many of these are intangible (such as improved decision making or communication) and are therefore difficult to measure in objective terms. Turban discusses the problems of identifying and handling intangible benefits on pages 568 and 569.
- Gains achieved in one department or organisation from an IT investment may result in losses elsewhere.
- Productivity gains may be offset by high costs where the overall IT project costs too much and secondary impacts may cause losses.

- A time lag frequently exists in realising benefits from IT investment (i.e. the benefits of the system are not immediately obvious but may take some years to realise).
- The system does not yield the anticipated benefits as a result of some change that occurs between the planning stages and the implementation of the system.

### 7.3 Reasons for IT investment

There are a wide range of reasons why organisations invest in information systems. These range from essential investments in infrastructure to investment for the purposes of gaining competitive advantage. Turban provides examples for these reasons on p.566.

### 7.4 Methods for evaluating and justifying IT investment

There are numerous methods which organisations might employ in appraising their IT investments.

#### 7.4.1 Financial approaches

Financial approaches use traditional financial appraisal techniques for determining IT value. These include the following.

- **Return on investment (ROI)** – which is calculated by dividing net annual income gained by the project by the cost of the assets invested in the project.
- **Net present value** – which compares the total value of the benefits with their associated costs and converts the future value of benefits to their present value equivalents. A project which gives a net present value of greater than zero is worth investing in.
- **Internal rate of return** – this is the discount rate that produces a net present value of zero.
- **Payback period** – this calculates the time required for the net cash outflows to equal the net cash inflows.

#### 7.4.2 Multicriteria approaches

Whereas financial approaches consider only the financial impact of the system, multicriteria approaches also take into account the non-financial impacts. Examples of these techniques include information economics and value analysis.

#### 7.4.3 Ratio approaches

A frequently used method of determining IS spend is ratio analysis. The criterion in this analysis is to either compare a company's investment levels with those of the previous year or with the norm for other organisations in their market sector.

#### 7.4.4 Portfolio approaches

These methods apply portfolios to plot several investment proposals against decision making criteria.

#### 7.4.5 Total cost of ownership

Whatever model is used to evaluate the IT investment, all models require that some estimate is made of the overall costs involved in investing in the system. The total cost of ownership (TCO) model is used to identify the

costs of technology assets over the entire project life-cycle. In particular, these models consider the costs of people, technology and processes and include acquisition, operations and control costs.

#### **7.4.6 Total benefit of ownership**

This is similar to the total cost of ownership model but it considers the benefits and includes both the tangible and the intangible benefits.

#### **7.4.7 The business case approach**

A business case is a written document which is frequently developed when a new company is being set up and the founders are trying to raise finance. Similarly a business case may be used by managers to set out their request for funding for IT projects. The business case justifies the need for the new system and the resources needed to accomplish its objectives. There are a number of software packages available to assist managers in the preparation of business cases. The business case will typically consider potential additional revenues. Typical revenues generated by IT include those from sales, transaction fees, subscription fees, advertising fees, affiliation fees, etc.

### **7.5 Economic aspects of web-based systems**

Web-based applications are being widely developed but in many instances no formal analysis of these systems are undertaken. Turban considers the economics of web-based systems in terms of:

- cost reduction and productivity increase
- reach versus richness
- measuring IT payoffs.

#### **A reminder of your learning outcomes**

By the end of this chapter, the relevant reading and activities, you should be able to:

- discuss the productivity paradox
- describe various approaches to evaluating IT investments.

#### **Sample examination question**

Traditional financial methods to evaluate investment decisions are net present value (NPV), internal rate of return (IRR), and payback period. Explain each of these methods.

## 7.6 Assessment questions

### Multiple choice

1. The discrepancy between measures of investment in IT and measures of output at the national level has been called:
  - A. digital divide
  - B. productivity paradox
  - C. price-to-performance ratio
  - D. Moore's Law.
2. How do economists define productivity?
  - A. Outputs divided by units produced.
  - B. Inputs divided by units produced.
  - C. Outputs divided by inputs.
  - D. Inputs divided by outputs.
3. How do investments in IT infrastructure differ from investments in specific IT applications?
  - A. Investments in IT infrastructure are made to exist for a long time and the infrastructure is shared by many applications throughout the enterprise.
  - B. Investments in IT applications are more critical to the organisation.
  - C. Investments in IT applications are much larger than investments in infrastructure.
  - D. Investments in IT infrastructure cannot be economically justified.
4. Which of the following is **not** a traditional tool used to evaluate investment decisions?
  - A. Internal rate of return.
  - B. Net present value.
  - C. Payback.
  - D. Regression.
5. Which is **not** true about return on investment (ROI)?
  - A. The ROI measure is a percentage.
  - B. The lower the ROI, the better.
  - C. ROI is the most common traditional tool for evaluating capital investments.
  - D. ROI is calculated essentially by dividing net annual income attributable to a project by the cost of the assets invested in the project.
6. Which of the following is a written document that is used by managers to get funding for a specific application or project?
  - A. Business case.
  - B. Investment proposal.
  - C. Management model.
  - D. Revenue model.

7. An approach for IT cost evaluation is the total cost of ownership (TCO). The types of costs included in the TCO formula for a PC include all of the following **except**:
  - A. acquisition cost: hardware and software
  - B. activity-based costing: virus damage
  - C. control cost: standardisation and security
  - D. operations cost: maintenance, power consumption and installation.
8. The NPV and ROI methods work well with which of the following benefits?
  - A. Low-risk.
  - B. Intangible.
  - C. Tangible.
  - D. Chargeback.

**True or false**

9. Investments in IT infrastructure, such as data centres and networks, are evaluated differently to investments in IT applications because infrastructures exist for a shorter time than applications.
10. The value of information can be expressed as net benefits with information minus net benefits without that information.
11. An analyst could ignore intangible benefits, but doing so implies that their value is zero and may lead to the organisation rejecting IT investments that could substantially increase revenues and profitability.
12. Investments in IT are inherently less risky than investments in other areas.

**Fill in the gaps**

13. The discrepancy between measures of investment in IT and measures of output at the national level has been called the \_\_\_\_\_.
14. Economists define **productivity** as outputs divided by \_\_\_\_\_.
15. In a(n) \_\_\_\_\_ analysis, analysts evaluate IT investments by converting the value of future benefits to their present-value equivalent.
16. An IT project with an estimated NPV greater than \_\_\_\_\_ would be a candidate for acceptance.
17. To include intangible benefits in traditional financial approaches, it is necessary to \_\_\_\_\_ those benefits.



## Notes

## Chapter 8: Business performance management

### 8.1 Introduction

Business performance management (BPM) is a framework for ‘organizing, automating and analysing business methodologies, metrics, processes and systems to drive the overall performance of an enterprise’ (Turban p.457). It essentially refers to the integration of various aspects of the organisation to provide a strategic overview. Examples of BPM systems include the balanced scorecard and dashboards.

#### 8.1.1 Learning outcomes

By the end of this chapter, and the relevant reading and activities, you should be able to:

- explain business performance management
- describe the balanced scorecard
- discuss dashboards.

#### 8.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand business performance management
- gain knowledge of the balanced scorecard and dashboards.

#### 8.1.3 Essential reading

Turban, pp.457–462.

#### 8.1.4 Further reading

Eckerson, W.W. *Performance dashboards: Measuring, monitoring, and managing your business*. (John Wiley and Sons, 2006) [ISBN 9780471778639].

### 8.2 The business performance management process

Business performance management is a process which involves the following major steps.

- Define what needs to be measured, when and how.
- Devise metrics for measuring performance.
- Devise a system for monitoring performance.
- Define a system for analysing performance and comparing actual achievements against standards.
- Take appropriate action.

### 8.3 The balanced scorecard

The balanced scorecard is an example of a performance management system. It checks that the operational activities conducted in the organisation are aligned with the overall business strategy. Traditionally, organisational performance was measured by financial indicators. The balanced scorecard extends financial performance measures to take account of other non-financial objectives. These include:

- the customer – how the customer views the organisation
- the internal business process which the organisation needs to excel at in order to impress its shareholders and customers
- learning and growth – how dynamic the organisation is.

The balanced scorecard is used not only as a performance measurement but also as a methodology for translating an organisation's financial, customer and internal processes and learning and growth objectives into a set of actionable initiatives.

There are a number of steps in which the objectives of the balanced scorecard are accomplished. Turban suggests the following.

- Identify the objectives for each perspective.
- Define measures for each objective.
- Assign targets to the measures.
- Define the strategic measure to meet each objective.
- Identify and assign each initiative and its responsibilities.
- Provide a strategic map to link the objectives.

## **8.4 Dashboards**

Dashboards are visual displays of information for monitoring the organisation's performance. The way in which the information is displayed resembles the display of the information on the dashboard in a motorcar. The dashboard consolidates and displays organisational information in an easily readable form so that management can monitor performance. It is a single view of the status of a variety of metrics. There are three types of dashboards:

- operational dashboards
- tactical dashboards
- strategic dashboards.

### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- explain business performance management
- describe the balanced scorecard
- discuss dashboards.

### **Sample examination question**

What are the major business performance management applications?

## 8.5 Assessment questions

### Multiple choice

1. The objective of which of the following is to optimise the overall performance of an organisation?
  - A. Advanced analytics.
  - B. Business performance management.
  - C. Reporting.
  - D. Web mining.
2. Which of the following organises and presents information in a way that is easy to read?
  - A. Mirrors.
  - B. Maps.
  - C. Dashboards.
  - D. Windows.
3. Which of the following are interactive user interfaces?
  - A. Business objects.
  - B. Dashboards.
  - C. Key performance indicators.
  - D. Middleware.

### True or false

4. The objective of business performance management (BPM) is to optimise the overall performance of an organisation.
5. Dashboards (like the dashboard of a car) organise and present information in a way that is easy to read.

### Fill in the gaps

6. From a high-level viewpoint, the \_\_\_\_\_ is both a performance measurement and management methodology that helps translate an organisation's financial, customer, internal process and growth objectives into a set of actionable initiatives.

## Notes

## Chapter 9: Outsourcing and supply chain management

### 9.1 Introduction

Successful information systems management requires not only managing the organisation internally but also managing its relationships with the outside world. Two areas of particular importance are the management of the organisation's outsourcing strategies and its supply chain.

Outsourcing refers to the delegation of some or all of the IT functions, including products and/or services to a third party. In general, these are functions which would be performed by the organisation itself. For many organisations, IT is not the core function of their business and is seen as a function which is difficult to manage. Hence often the most effective strategy for managing IT is to outsource it. The outsourcing relationship involves more than just purchasing from suppliers – it is seen by many organisations as a partnership. In recent years there has been an increase in a special type of outsourcing arrangement, namely, with an application service provider (ASP). An ASP is a third party which provides services over a wide area network from a central data centre.

Supply chain management is the 'efficient management of the end-to-end processes that start with the design of the product or service and end when it is sold, consumed or used by the end-consumer' (Turban p.304). Efficient management of the supply chain provides opportunities for reducing costs and risks and achieving competitive advantage. It also decreases inventory levels, speeds up delivery times and improves customer service.

#### 9.1.1 Learning outcomes

By the end of this chapter, and the relevant reading and activities, you should be able to:

- define outsourcing
- differentiate between different types of outsourcing arrangements
- discuss the advantages and disadvantages of outsourcing
- identify strategies for outsourcing
- discuss the importance of supply chain management.

#### 9.1.2 Learning objectives

Your learning objectives for this chapter are to:

- understand what is meant by outsourcing
- understand the advantages and disadvantages of outsourcing
- understand how strategies for outsourcing are defined
- understand the issues involved in supply chain management
- understand the role of logistics, inventory management and e-procurement.

#### 9.1.3 Essential reading

Turban, Chapter 14, pp.574–80.

Turban, Chapter 8, pp.302–22.

## 9.2 Types of outsourcing

Outsourcing is usually undertaken on a long-term basis. However, there are different types of outsourcing arrangements depending on the extent and number of IT functions which are outsourced. Four types of outsourcing arrangements are generally recognised.

1. **Total** outsourcing – where all the IT functions are outsourced.
2. **Selective** outsourcing – where one or more IT functions are outsourced but other functions are retained in house.
3. **Transitional** outsourcing – where an organisation outsources its ageing IT so that it can concentrate its efforts and resources on new IT projects.
4. **Transformational** outsourcing – where a vendor is hired to bring in new IT technologies and build the requisite skills and capabilities.

## 9.3 Advantages and disadvantages of outsourcing

The question of whether outsourcing is beneficial to the organisation has been a long-running source of speculation and debate. It is generally agreed that while there are many benefits to outsourcing there are also many disadvantages and risks associated with it.

Turban (p.577) provides a list of the potential benefits which include:

- financial – usually as a result of cost savings
- focus – outsourcing enables management to focus on their key competencies without being distracted
- technical – outsourcing may provide access to outside expertise and new information technologies
- human resources – reduced staffing levels within the organisation (particularly useful when demand for a product or service fluctuates)
- quality – outside partners are required to abide by strict service level agreements which may be more stringent than those which exist within departments within the organisation
- flexibility – the sale of assets supporting a previously outsourced function may be sold to improve cash flow.

Despite the many advantages of outsourcing there are also a large number of disadvantages and risks associated with it. The potential disadvantages include:

- loss of control over IT
- loss of knowledge and skills
- difficult relationships with third parties
- licensing issues
- contractual difficulties
- risks such as shirking, poaching and opportunistic repricing
- irreversibility of the process
- hidden costs.

## 9.4 Strategies for outsourcing

The decision to outsource is a strategic one. A balance needs to be established between the costs which may be saved from outsourcing and the loss of control, expertise and knowledge to the organisation.

There are three major decisions associated with managing outsourcing – to determine what to outsource, negotiate the contract and manage the relationship with the vendor.

Determining what to outsource requires the organisation to decide which systems are truly strategic and should therefore be kept in-house.

Negotiating the contract requires decisions on service level agreements, time-scales, copyright issues, staffing issues and termination of contract arrangements.

Managing the relationship with the vendor will depend on whether the vendor is seen as a partner or whether the relationship is primarily contractual.

In making these decisions, the organisation should consider the following.

- The aims of the project.
- Dividing the project into smaller pieces to reduce the risk.
- Designing contractual incentives that can be measured.
- Negotiating short term contracts to allow for 'get out' in the face of rapidly changing technology.
- Controlling sub-contracting of the primary contractor to further contractors.
- Only outsourcing part of the IT function.

## 9.5 Supply chain management

Both the processes internal to the organisation (such as inventory management, logistics and warehousing) and the external processes (which link the organisation to its customers and suppliers) need to be managed and co-ordinated. This is known as supply chain management. Supply chain management includes managing material, information and financial flows. However, this is not an easy task. The complexity and the multiple stakeholders in the supply chain make its management difficult. As well as selecting appropriate vendors, relationships with them need to be built. Supply chain performance is heavily dependent on the relationship between the various parties, trust being a key factor.

A well-known problem is the bullwhip effect which refers to the unanticipated changes in orders which take place along the supply chain. IT may help this by enabling the parties concerned to share information. Many organisations make use of a master data management system where one version of all the data is kept for access by the various stakeholders.

The internet provides opportunities for improving supply chain management. These include the formation of electronic marketplaces, electronic ordering and funds transfer and the provision of supply chain integration hubs.

Turban provides examples of organisations where information sharing has provided organisations with major benefits (pp.307–8).



### **9.5.1 Logistics**

Logistics is an important function of supply chain management. Logistics refers to all those activities associated with the acquisition, movement and storage of materials along the supply chain. E-logistics systems such as enterprise resource planning systems (ERP) can be used to facilitate the management of logistics. Drop shipping may be used where the supplier rather than the seller ships the product directly to the customer. Channel assembly is where distributors become manufacturers or aggregators of products.

### **9.5.2 Inventory management**

A major challenge to supply chain management is appropriate inventory management. Organisations need to decide how much inventory they should hold. Holding too much inventory is costly in terms of its storage. On the other hand organisations do not want to run out of inventory and lose opportunities for the manufacture and sale of their products. Collaborative fulfilment networks and e-procurement help address these issues.

### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- define outsourcing
- differentiate between different types of outsourcing arrangements
- discuss the advantages and disadvantages of outsourcing
- identify strategies for outsourcing
- discuss the importance of supply chain management.

### **Sample examination question**

List and explain the three types of flows in the supply chain.

## 9.8 Assessment questions

### Multiple choice

1. The goals of supply chain management are all of the following **except**:
  - A. to reduce uncertainty and risks along the supply chain
  - B. to decrease inventory levels
  - C. to decrease cycle time
  - D. to improve quality control.
2. Which of the following is not a major type of supply chain?
  - A. Build-to-order.
  - B. Continuous replenishment.
  - C. Purchasing.
  - D. Integrated make-to-stock (manufacture to inventory).
3. Which of the following is a major supply chain problem, in which lack of coordination or communication results in large, unnecessary inventories?
  - A. The bullwhip effect.
  - B. Downstreaming.
  - C. Upstreaming
  - D. Channel conflict.
4. Because outsourcing transfers some of the organisation's internal processes and resources to outside vendors, outsourcing decisions involve all of the following **except**:
  - A. complex legal contracts
  - B. payment schedules
  - C. differentiation
  - D. service-level agreements.
5. As part of its logistics strategy, Coca-Cola has always used distributors to produce the final product using a formula. Allowing the aggregation of individual components and modules to the distributor for final assembly is referred to as:
  - A. collaborative fulfillment
  - B. channel assembly
  - C. drop shipping
  - D. supply chain integration hub.

### True or false

6. All decision makers along the supply chain need to share information and collaborate.
7. A supply chain includes all of the interactions between suppliers, manufacturers, distributors, warehouses and customers. Although the supply chain is comprised of several businesses, the chain itself is viewed as a single entity.

## Notes

## Chapter 10: Security management

### 10.1 Introduction

As organisations become increasingly dependent on their information systems, ensuring the security of these systems has become an issue of paramount importance to management. Increased intra- and interorganisational connectivity provide greater opportunity for security breaches. The time-to-exploitation, which refers to the elapsed time between a vulnerability being discovered and its exploitation, has decreased dramatically, with far-reaching consequences for the business. Many examples of the consequences of IS security breaches can be found in your textbooks and in the literature.

As a result of the major impact on the business caused by security breaches, and the fact that an increasing number of security breaches result not from technical breaches but from the lack of appropriate implementation of security procedures, ensuring the security of information and information systems is no longer seen as solely the responsibility of the IT department. It is an issue for the entire organisation.

#### 10.1.1 Learning outcomes

By the end of this chapter, and the relevant reading and activities, you should be able to:

- describe the importance of IS security to the business
- identify the sources and methods of attack
- describe the importance of policies and procedures
- describe defence strategies
- describe control strategies
- describe business continuity planning
- discuss implementing security measures through audit and risk management
- discuss the relevance of computer forensics.

#### 10.1.2 Learning objectives

Your learning objectives for this chapter are to:

- gain awareness of the impact of IT security breaches
- understand the nature of attacks
- gain awareness of policies, procedures and control issues
- understand business continuity planning
- understand the role of audit and risk management
- gain awareness of computer forensics.

#### 10.1.3 Essential reading

Turban, pp.622–53.

#### 10.1.4 Further reading

Robson, W. *Strategic management and information systems: an integrated approach*. (London: Pitman, 1997) second edition [ISBN 0273615912].

## 10.2 Sources of attack

There are numerous sources of IT attacks. These may be intentional such as theft of data, hacking, cybercrimes, crackers or social engineering. However, in addition to intentional attacks there are also a number of unintentional security breaches. These may result from human error, system failures or environmental hazards. It is reported (Turban, p.629) that the vast majority of problems arise from human error, system malfunction and a failure to realise the impact of adding a new piece of software to a system. Of these problems human error is the most prevalent.

## 10.3 Methods of attack

There are a broad range of methods of attack. These include:

- attacks on computer facilities (e.g. data tampering, programming attacks, viruses, worms and botnets)
- fraud, which involves three elements: deception, confidence and trickery
- computer crimes such as identity theft and hardware theft.

## 10.4 Policies and procedures

Organisations need to define a set of policies and procedures for security which need to be led by a senior executive within the organisation. Turban (p.630) describe the following steps which need to be taken to ensure internal security control.

Step 1 Ensure senior management support.

Step 2 Define security policies and provide training.

Step 3 Introduce and enforce security procedures.

Step 4 Put the appropriate hardware and software in place.

## 10.5 Defence strategy

Organisations need to define their defence strategies. Turban suggests the defence strategy should have the following objectives.

1. Prevention and deterrence.
2. Detection.
3. Limitation of damage.
4. Recovery.
5. Correction.
6. Awareness and compliance.

## 10.6 Controls

There are a number of controls which organisations need to put in place in order to protect their systems. These may include:

- **General controls**

These are independent of the specific application. They define physical, access, biometric and administrative controls.

- **Application controls**

These protect specific applications. They include softbots, knowbots and intelligent agents.

- **Network security**

Internet security measures operate at three levels: perimeter security, authentication and authorisation. Frequently all three levels are covered in a single software product.

- **Perimeter security**

This is provided through firewalls, malware controls, intrusion detection systems and virtual private networks.

- **Authentication security**

This prevents unauthorised access to systems, usually requiring access through a PIN or password.

- **Authorisation**

Requires that the user has permission to use the system and defines the activities which they are permitted to undertake.

- **Wireless networks**

These need additional security measures to protect against attacks such as wireless packet analysers and rogue access points.

In addition, control may be exercised by external or internal authority.

- **External control**

There are a number of mandatory procedures which are government regulated and which organisations must comply with. These include the SOX and HIPAA in the United States, the Data Protection Act in the UK and Japan's Federal Privacy Act. There are also a number of regulations which are industry based, such as the Payment Card Industry Data Security Standard (PCI) for the credit card industry.

- **Internal control activities**

Internal control is designed to achieve reliability of financial reporting, operating efficiency, compliance with regulations, laws and policies and the safeguarding of assets. There are five primary internal control activities:

1. Segregation of duties and dual custody
2. Independent checks
3. Appropriate systems of authorisation
4. Physical safeguards
5. Audit trails.

These controls must be continuously monitored so as to send out the message to employees that the organisation is keeping track of their activity.

## 10.7 Business continuity planning (BCP)

The business continuity plan is also frequently referred to as the disaster recovery plan. Because no security system guarantees 100 per cent prevention of attack the organisation needs to put in place contingency actions that it will take in the event of a security breach. Turban highlights the following key points about BCP.

- Each business function should have a business continuity plan.
- Recovery planning is part of asset protection.
- The focus should be on the recovery of a total loss of capabilities.
- Scenario analysis should be undertaken.
- All critical applications and recovery procedures should be identified.
- The plan should be written to meet the needs of effectiveness and auditing.
- The plan itself should be kept securely.

It is suggested that the business continuity plan should contain the following elements (Robson, 1997).

- Introduction and index.
- Definition of a computer disaster.
- Assumptions.
- Disaster exclusions.
- Inventories.
- Emergency budgets.
- Invocation.
- Logistics.
- Maintenance and testing.
- Appendices.

## 10.8 Implementing security

### 10.8.1 Auditing

An audit ensures that the systems perform to their specification and that procedures are conformed with. It enables an auditor to ensure that the correct processing takes place on an on-going basis and that problems are dealt with correctly. Auditors need to ensure that there are sufficient controls in the system, that they are effective and that responsibilities are clearly identified and documented. Auditing is particularly important for websites where the potential exists to violate copyright laws and other regulations. Audit should be continuous and should cover both automated and manual processes as well as products.

### 10.8.2 Risk management

The management of risk may be considered as a process consisting of four major stages.

1. Risk identification.
2. Risk analysis.
3. Risk control.
4. Disaster recovery.

#### **Risk identification**

The first step in risk management is to identify the potential source of the risks. The major risks to IS projects tend to be those that are associated with technology risk, business risk and project implementation.

- **Technological risk** may occur as a result of accidental or deliberate damage and may be either physical or logical.
- **Business risk** is that the project fails to meet the business needs.
- **Project implementation** is the degree of risk to an IS project that will depend on the size of the project, the degree of structure and the complexity of the technology being deployed in the project.

**Risk analysis**

Once risks have been identified, they need to be analysed in some way. Risk analysis may be done using either qualitative or quantitative techniques. A simplified formula for analysing risk is:

$$\text{Expected loss} = P1 \times P2 \times L$$

Where:

P1 = probability of attack

P2 = probability of attack being successful

L = loss occurring if attack is successful

e.g. P1 = .02; P2 = .10; L = 1,000,000

Then expected loss = £2,000

This formula may then be extended to consider to reflect the possible frequency of attacks.

$$\text{Loss} \times \text{frequency} = \text{Annual loss exposure}$$

**Risk control**

This is the activity of putting in place steps to control or lessen the effect of risk elements. These include the following.

- **Avoidance**  
Is there a way in which the risk can be avoided altogether? For example, by supplying an uninterrupted power supply which provides for power cuts.
- **Reduction**  
Is there a way in which the risk can be minimised. For example, through having a comprehensive security policy. Adequate security and backup procedures must be in place.
- **Risk transfer**  
Can the risk be transferred to a third party? For example, an insurance company? Or can the project be outsourced?

**Disaster recovery**

In the event of a disaster occurring there must be a plan to mitigate the impact.

The purpose of a recovery plan is to keep the organisation running after the disaster; it may be seen as part of asset protection. What-if scenarios should be conducted and each risk identified should have a person responsible for its management.

## 10.9 Computer forensics

There are a wide range of crimes which involve computers; for example, when the crime involves money this is referred to as e-fraud or computer fraud. The search, discovery and recovery of e-evidence is referred to as computer forensics (Turban, p.651). E-evidence refers to any document, file, etc. which may be used to prove or disprove a case – examples are provided in Turban (pp.652–53). In cases involving fraudulent financial reporting a forensic accounting investigation may be conducted.



### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- describe the importance of IS security to the business
- identify the sources and methods of attack
- describe the importance of policies and procedures
- describe defence strategies
- describe control strategies
- describe business continuity planning
- discuss implementing security measures through audit and risk management
- discuss the relevance of computer forensics.

### **Sample examination question**

List four symptoms or red flags of fraud at a company.

## 10.10 Assessment questions

### Multiple choice questions

1. The time-to-exploitation of today's most sophisticated spyware and worms has:
  - A. not been estimated
  - B. decreased from months to days
  - C. increased from days to weeks
  - D. not changed.
2. In its 2006 study on information security, the Computing Technology Industry Association said that \_\_\_\_\_ were responsible for nearly 60 per cent of information security breaches in organisations in 2005 – up from 47 per cent the year before?
  - A. Cybercriminals.
  - B. Human errors.
  - C. Spyware and phishing.
  - D. Viruses and other malware.
3. Effective enterprise-wide IT security and internal control begins with:
  - A. senior management commitment and support
  - B. security policies and training
  - C. security procedures and enforcement
  - D. software and hardware security tools.
4. To be effective, the company's acceptable use policy (AUP) needs to define the responsibilities of every user by specifying each of the following **except**:
  - A. acceptable actions
  - B. unacceptable actions
  - C. federal laws
  - D. the consequences of noncompliance.
5. Computer forensics refers to the search, discovery and recovery of e-evidence. What is the most common form of e-evidence?
  - A. Chat room conversations.
  - B. E-mail.
  - C. File downloads.
  - D. Website visits.

### True or false

6. Responsibility for internal control and compliance rests directly on the shoulders of end users.
7. There is no such thing as small fraud, only large fraud that was detected and stopped early.
8. Fraud can be better controlled within a company by assigning responsibility for managing specific business processes to only one individual.

**Fill in the gaps**

9. To calculate the proper level of protection, managers responsible for a digital asset need to assess its \_\_\_\_\_.
10. Building an effective IT security program requires security policies. Most critical is the \_\_\_\_\_ policy that informs users of their responsibilities and the consequences of failing in their responsibilities.
11. One of the worst and most prevalent crimes is \_\_\_\_\_. These crimes make use of individuals' social security or credit card numbers.
12. Effective accounting information systems are needed to provide a(n) \_\_\_\_\_ trail that allows frauds to be discovered and makes them difficult to conceal.
13. The search, discovery, and recovery of e-evidence is referred to as \_\_\_\_\_.

## Chapter 11: Managing the IS department

### 11.1 Introduction

The role of the IS department and its relationship with the rest of the organisation has changed dramatically over the years. Whereas the major function of the department is still the provision of service to the remainder of the organisation, the increasing need for IS to enable the organisation to achieve its business objectives means that the department has extended its roles and capabilities in recent years and needs expertise and knowledge in both technical and business issues. The success of the IS department will depend on it having strong leadership, appropriate managerial and technical skills and good relationships with the business. However, it still needs to retain its ability to act as a service department offering services to the rest of the organisation.

In the following section we consider the role of the chief information officer who heads up the IS department, the relationship between the IS department and end users and the service level agreements which define the relationship between the IS department and the rest of the organisation.

#### 11.1.1 Learning outcomes

By the end of this chapter, and the relevant reading and activities, you should be able to:

- describe the role of the IS department
- discuss the role of the chief information officer (CIO)
- discuss the management of end users
- describe the role of service level agreements.

#### 11.1.2 Learning objectives

Your learning objective for this chapter is to:

- understand the key skills and requirements to manage an IS department.

#### 11.1.3 Essential reading

Turban, Chapter 13, pp.542–47.

#### 11.1.4 Further reading

Laudon and Laudon, Chapter 14.

### 11.2 The role of the chief information officer

As the importance of information systems has changed in recent years, so the role of the chief information officer has also become more critical in organisations. In many organisations the CIO is now a member of the most senior team in the organisation. A major part of the CIO's job is to ensure that the information systems meet the business needs. It is therefore essential that the CIO has both technical and managerial skills, as well as being a good communicator and someone who is comfortable with interpersonal relationships. They need to be analytic, creative, intuitive and able to solve problems. As the web-based era continues, the role of the CIO becomes ever more challenging as technology and its management changes, executive attitudes change and interaction with vendors increases.

### **11.3 Managing end users**

The relationship between the IS department and end users is an important one. The nature of this relationship has changed over the years as technology and knowledge of computing has changed. Unfortunately the relationship between end users and the IS department is frequently confrontational. Turban (p.546) suggests that management may take a number of approaches to managing this relationship.

### **11.4 Service level agreements**

Service level agreements set out the formal agreement between what is required by the end users and the IS department's commitment to meet them; as well as the responsibilities for each side. Targets should be agreed as well as the way in which performance will be measured (in a similar way that they would be between suppliers and customers). The benefits of service level agreements are that they provide a conceptual focus for both the end users and the IS department, formalise relationships, provide a focal point for discussions and improve understanding of user concerns. They are an objective measure and record of the services required.

### **11.5 The information centre**

Some organisations have established information centres that aim to assist end users by providing them with appropriate tools and ensuring urgent applications are built quickly. A focus of information centres is that they are customer-orientated, providing a friendly and helpful attitude towards users. These information centres are frequently referred to as service centres.

#### **A reminder of your learning outcomes**

By the end of this chapter, and the relevant reading and activities, you should be able to:

- describe the role of the IS department
- discuss the role of the chief information officer (CIO)
- discuss the management of end users
- describe the role of service level agreements.

#### **Sample examination question**

Discuss two ways to improve collaboration between the IS department and end users.

## 11.6 Assessment questions

### Multiple choice

1. Which of the following is not an effective way to improve the relationship between the IT department and end users?
  - A. Having end users from key business units on steering committees.
  - B. Providing end users with the latest technologies.
  - C. Creating information centres.
  - D. Using service-level agreements.
2. Information centres were developed in response to:
  - A. increased information requirements
  - B. cost pressures
  - C. systems development backlog
  - D. a need for alignment between the IS department and the business.

### True or false

3. Treating other business units and end users as customers of the information systems department is important to the development of good relations with them.
4. A study of chief information officers (CIOs) sponsored by the Society for Information Management found that the number one issue facing CIOs was the alignment of IT and business.
5. The information centre is set up to help users get certain systems built quickly and to provide tools that users can use to build their own systems.

### Fill in the gaps

6. \_\_\_\_\_ agreements are formal agreements regarding the division of computing responsibility between end users and the IS department and the expected services to be provided by the IS department.
7. A(n) \_\_\_\_\_ is set up to help users get certain systems built quickly and to provide tools that can be employed by users to build their own systems.

## Notes

# Appendix 1: Sample examination paper

## CIS 318 Information systems management

**Duration: 2 hours 15 minutes**

**Instructions: Answer two out of the following five questions. You must answer both parts (a and b) of the question.**

### Question 1

- a) An imaginary organisation called TIPO does not have a suitable director of information systems in post. The organisation has recently become aware of the potential for using information systems to improve their business performance and wishes to appoint a suitable candidate to this new position.

Write an advertisement for the post, setting out a detailed description of the job and the personal characteristics expected of the successful candidate.

(13 marks)

- b) Describe three internet based technologies that impact on either communications or working styles within a firm. What are the opportunities and risks associated with such technologies?

(12 marks)

### Question 2

- a) Select an organisation which has gained competitive advantage from the use of an information system or systems. Provide an analysis on why this organisation was successful and the role played by the information system in contributing to this success.

(13 marks)

- b) Describe the essential elements of an information systems strategy.

(12 marks)

### Question 3

- a) You are on the interviewing panel for the appointment of a new information systems director for the organisation which you work for. Your organisation has recently experienced resistance to the introduction of a new accounting system. You would like to explore this issue in the interview and have drawn up the following question to put to the candidate. What answer would you like to hear?

‘Why do you think we are experiencing so much resistance to the introduction of our new accounting system and how might we address this problem?’

(12 marks)

- b) Describe, giving examples, ways in which information systems are changing the business environment.

(13 marks)



**Question 4**

- a) Identify examples of types of systems which an organisation might use to support decision making at the operational level, the tactical level and the strategic level.

(13 marks)

- b) Discuss your views on whether the evaluation of information systems projects requires a multi-dimensional approach.

(12 marks)

**Question 5**

- a) Write a mission statement for an imaginary clothing retailer in London called CLOTHESRUS and identify the critical success factors for CLOTHESRUS to achieve their mission. For each critical success factor you have identified suggest an information system which might assist the organisation in achieving this success. Once the information systems have been specified, suggest the next steps that the organisation should take.

(12 marks)

- b) The staff working in a consulting organisation have requested that they be given clear guidance on whether the organisation has the right of access to all e-mail messages sent from the office during working hours.

As the information systems manager, discuss the steps that you would take in order to address this dilemma and discuss the various ethical principles you could explore to help guide you in your decision.

(13 marks)

## Appendix 2: Answers to assessment exercises

### Chapter 1

#### Sample examination question – key points

Candidates could elaborate on three of the following points.

**Globalisation:** Global communication and collaboration; global electronic marketplaces; global customers, suppliers and partners.

**Digital systems:** From TV to telephones and instrumentation, analogue systems are being converted to digital ones.

**Speed:** A move to real-time transactions, thanks to digitised documents, products and services. Many business processes are expedited by 90 per cent or more.

**Information overload:** Although the amount of information generated is accelerating, intelligent search tools can help users find what they need.

**Markets:** Markets are moving online. Physical marketplaces are being replaced by electronic markets; new markets are being created, increasing competition and market efficiency.

**Digitisation:** Music, books, pictures, films and other media are digitised for fast and inexpensive distribution.

**Business models:** New and improved business models and processes provide opportunities for new companies and for innovative processes and industries.

**Innovation:** Digital and internet-based innovations continue at a rapid pace. More patents are being granted than ever before.

**Obsolescence:** The fast pace of innovations creates a high rate of obsolescence.

**Opportunities:** Opportunities abound in almost all aspects of life and business.

**Fraud:** Criminals employ a number of innovative schemes on the internet. Cybercons are everywhere.

**Wars:** Conventional wars are changing to cyberwars which are fought over the internet.

#### Assessment questions

1. D
2. B
3. A
4. A
5. D
6. True
7. True
8. Real time
9. Adaptive
10. Planning, implementation and control.

## Chapter 2

### Sample examination question – key points

See Turban, pp.524, 546 and 547.

#### Assessment questions

1. D
2. B
3. C
4. D
5. B
6. B
7. E
8. True
9. True
10. Alliance strategy
11. Scenario planning
12. Niche
13. Differentiation
14. Value chain
15. Critical success factors.

## Chapter 3

### Sample examination question – key points

There is no single right or wrong answer to this question. Some points that may be made are that planning is a waste of time as it takes too long and by the time that the plan is ready for implementation the world has moved on and the plans are obsolete. It is also expensive to undertake formal planning. On the other hand, it may be argued that planning provides a roadmap of where the organisation is going and provides milestones to see whether objectives have been achieved. It also helps to align IT and business strategies. Planning should be done in a flexible way so that the plans may alter as appropriate with the changing environment.

#### Assessment questions

1. A
2. C
3. B
4. D
5. D
6. True
7. False
8. Corporate steering
9. Scenario planning
10. Resource allocation.

## Chapter 4

### Sample examination question – key points

Business process re-engineering is a term used to describe how organisations achieve radical improvements over a short period using process-focused methods. The typical steps involved include the following.

1. Develop the vision.
2. Understand and measure the existing process.
3. Identify new processes.
4. Define IT.
5. Implement change.
6. Measure results.

It is a good idea to also think of examples to illustrate the above.

### Assessment questions

1. A
2. B
3. A
4. False
5. False
6. Localised exploitation
7. Process thinking
8. Total quality management
9. Six sigma.

## Chapter 5

### Sample examination question – key points

Resistance to change can be positive or negative. It occurs because of:

- parochial self-interest
- misunderstanding and a lack of trust
- different assessments
- low tolerance for change.

Methods of dealing with this resistance to change include education, facilitation, etc.

### Assessment questions

1. A
2. A
3. B
4. B
5. False
6. False
7. False
8. Program evaluation and review technique
9. Composition
10. Compilation.

## Chapter 6

### Sample examination question – key points

Ethical issues may create pressures, or at least constraints, on the operations of an organisation. Ethics relates to standards of right and wrong, and information ethics relates to standards of right and wrong in information processing practices.

Organisations must deal with ethical issues relating to their employees, customers and suppliers. Ethical issues are very important since they have the power to damage the image of an organisation and to destroy the morale of the employees. Ethics is a difficult area because ethical issues are not cut-and-dried.

The use of IT raises many ethical issues. These range from the monitoring of electronic mail to the potential invasion of privacy of millions of customers whose data are stored in private and public databases.

### Assessment questions

1. D
2. B
3. B
4. D
5. B
6. A
7. Technostress
8. Profiling
9. Due process
10. Carpal tunnel.

## Chapter 7

### Sample examination question – key points

In a net present value (NPV) analysis, the values of future benefits are converted (discounted) to their present value equivalent. Then the present value of future benefits is compared to the costs to determine whether the benefits exceed the costs. A project with an estimated NPV greater than zero may be a candidate for acceptance. One with an estimated NPV less than zero would probably be rejected.

If an investment requires and produces a number of cash flows over time, the internal rate of return (IRR) can be calculated. IRR is the discount rate that makes the NPV of those cash flows equal to zero. Some companies set a minimum acceptable IRR (or hurdle rate) based on their own cost of capital and the minimum percentage return they'd like to see from their investments.

The payback period is the point at which the yearly benefits of a project equal the costs.

**Assessment questions**

1. C
2. A
3. D
4. B
5. A
6. B
7. C
8. C
9. True
10. True
11. False
12. False
13. Productivity paradox
14. Inputs
15. Net Present Value
16. Zero
17. Quantify.

**Chapter 8****Sample examination question – key points**

The major business performance management (BPM) applications include: budgeting, planning, and forecasting; profitability analysis and optimisation; scorecarding; financial consolidation; and statutory and financial reporting.

**Assessment questions**

1. B
2. C
3. B
4. True
5. True
6. Balanced score card.

**Chapter 9****Sample examination question – key points**

There are typically three types of flows in the supply chain: materials, information and financial. In managing the supply chain, it is necessary to co-ordinate all the flows among all the parties involved in the chain.

1. **Material flows.** These are all the physical products – raw materials, supplies and so forth – that flow along the chain. The concept of material flows also includes reverse flows – returned products, recycled products and disposal of materials or products.
2. **Information flows.** This includes all data related to demand, shipments, orders, returns and schedules and changes in the data.
3. **Financial flows.** The financial flows are all transfers of money, payments, credit card information and authorisation, payment schedules, e-payments and credit related data.

### **Assessment questions**

1. D
2. C
3. A
4. C
5. B
6. True
7. True

## **Chapter 10**

### **Sample examination question – key points**

Students need to elaborate on four of the following:

- Missing documents.
- Delayed bank deposits.
- Holes in accounting records.
- Outstanding cheques or bills.
- Disparity between accounts payable and receivable.
- Employees who do not take vacations.
- A large drop in profit.
- A major increase in business with one particular customer.
- Customers complaining about double billing.
- Repeated duplicate payments.

### **Assessment questions**

1. B
2. B
3. A
4. C
5. B
6. False
7. True
8. False
9. Risk exposure
10. Acceptable use
11. Identity theft
12. Audit
13. Computer forensics.

## Chapter 11

### Sample examination question – key points

To improve collaboration, end users representing important business units can be members of the steering committee. Other means of improving IS department end user relationships include the use of service-level agreements (SLAs) and the creation of information centres (IC).

The corporate steering committee is a group of managers and staff representing various organisational units that is set up to establish IT priorities and to ensure that the IS department is meeting the needs of the enterprise.

The IC is set up to help users get certain systems built quickly and to provide tools that can be employed by users to build their own systems. Furthermore, the concept of the IC suggests that the people in the centre should be especially oriented towards the users in their outlook.

Service-level agreements (SLAs) are formal agreements regarding the division of computing responsibility between end users and the IS department and the expected services to be rendered by the IS department. A service-level agreement can be viewed as a contract between each end user unit and the IS department.

### Assessment questions

1. B
2. C
3. True
4. True
5. True
6. Service level
7. Information centre.



## Notes

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