

## Introduction to e-commerce

### LEARNING OBJECTIVES

- To understand the complexity of e-commerce and its many facets.
- To explore how e-business and e-commerce fit together.
- To identify the impact of e-commerce.
- To recognise the benefits and limitations of e-commerce.
- To use classification frameworks for analysing e-commerce.
- To identify the main barriers to the growth and development of e-commerce in organisations.

### WHAT IS ELECTRONIC COMMERCE?

Even today, some considerable time after the so called 'dot com/Internet revolution', electronic commerce (e-commerce) remains a relatively new, emerging and constantly changing area of business management and information technology. There has been and continues to be much publicity and discussion about e-commerce. Library catalogues and shelves are filled with books and articles on the subject. However, there remains a sense of confusion, suspicion and misunderstanding surrounding the area, which has been exacerbated by the different contexts in which electronic commerce is used, coupled with the myriad related buzzwords and acronyms. This book aims to consolidate the major themes that have arisen from the new area of electronic commerce and to provide an understanding of its application and importance to management.

In order to understand electronic commerce it is important to identify the different terms that are used, and to assess their origin and usage.

According to the editor-in-chief of *International Journal of Electronic Commerce*, Vladimir Zwass, 'Electronic commerce is sharing business information, maintaining business relationships and conducting business transactions by means of telecommunications networks'.<sup>1</sup> He maintains that in its purest form, electronic commerce has existed for over 40 years, originating from the electronic transmission of messages during the Berlin airlift in 1948.<sup>2</sup> From this, electronic data interchange (EDI) was the next stage of e-commerce development. In the 1960s a cooperative effort between industry groups produced a first attempt at common electronic data formats. The formats, however, were only for purchasing, transportation and finance data, and were used primarily for intra-industry transactions. It was not until the late 1970s that work began for national Electronic Data Interchange (EDI) standards, which developed well into the early 1990s.

EDI is the electronic transfer of a standardised business transaction between a sender and receiver computer, over some kind of private network or value added network (VAN). Both sides would have to have the same application software and the data would be exchanged in an extremely rigorous format. In sectors such as retail, automotive, defence and heavy manufacturing, EDI was developed to integrate information across larger parts of an organisation's value chain from design to maintenance so that manufacturers could share information with designers, maintenance and other partners and stakeholders. Before the widespread uptake and commercial use of the Internet, the EDI system was very expensive to run mainly because of the high cost of the private networks. Thus, uptake was limited largely to cash-rich multinational corporations using their financial strength to pressure and persuade (with subsidies) smaller suppliers to implement EDI systems, often at a very high cost. By 1996 no more than 50,000 companies in Europe and 44,000 in the USA were using EDI, representing less than 1 per cent of the total number of companies in each of the respective continents. According to Zwass, electronic commerce has been re-defined by the dynamics of the Internet and traditional e-commerce is rapidly moving to the Internet.

With the advent of the Internet, the term e-commerce began to include:

- Electronic trading of physical goods and of intangibles such as information.
- All the steps involved in trade, such as on-line marketing, ordering payment and support for delivery.
- The electronic provision of services such as after sales support or on-line legal advice.

- Electronic support for collaboration between companies such as collaborative on-line design and engineering or virtual business consultancy teams.

Some of the definitions of e-commerce often heard and found in publications and the media are:

Electronic Commerce (EC) is where business transactions take place via telecommunications networks, especially the Internet.<sup>3</sup>

Electronic commerce describes the buying and selling of products, services, and information via computer networks including the Internet.<sup>4</sup>

Electronic commerce is about doing business electronically.<sup>5</sup>

E-commerce, ecommerce, or electronic commerce is defined as the conduct of a financial transaction by electronic means.<sup>6</sup>

The wide range of business activities related to e-commerce brought about a range of other new terms and phrases to describe the Internet phenomenon in other business sectors. Some of these focus on purchasing from on-line stores on the Internet. Since transactions go through the Internet and the Web, the terms *I-commerce* (Internet commerce), *icommerce* and even *Web-commerce* have been suggested but are now very rarely used.

Other terms that are used for on-line retail selling include *e-tailing*, *virtual-stores* or *cyber stores*. A collection of these virtual stores is sometimes gathered into a '*virtual mall*' or '*cybermall*'.

## WHAT ABOUT E-BUSINESS?

As with e-commerce, *e-business* (electronic business) also has a number of different definitions and is used in a number of different contexts. One of the first to use the term was IBM, in October 1997, when it launched a campaign built around e-business. Today, major corporations are rethinking their businesses in terms of the Internet and its new culture and capabilities and this is what some see as e-business.

E-business is the conduct of business on the Internet, not only buying and selling but also servicing customers and collaborating with business partners.

E-business includes customer service (e-service) and intra-business tasks.

E-business is the transformation of key business processes through the use of Internet technologies. An e-business is a company that can adapt to constant and continual change.<sup>7</sup>

The development of *intranet* and *extranet* is part of e-business.

E-business is everything to do with back-end systems in an organisation.

In practice, e-commerce and e-business are often used interchangeably.

### **E-COMMERCE, E-BUSINESS, WHO E-CARES?<sup>8</sup>**

Some analysts and on-line business people have decided that e-business is infinitely superior as a moniker to e-commerce. That's misleading and distracts us from the business goals at hand. The effort to separate the E-commerce and E-business concepts appears to have been driven by marketing motives and is dreadfully thin in substance.

Here's the important thing: E-commerce, E-business or whatever else you may want to call it is a means to an end.<sup>9</sup>

The different names, definitions and words referred to in the previous sections are merely a sample of the glossary that has originated from marketing departments to sell a concept, the media to describe a sensational 'new' phenomenon, consultants to justify their fees and recommendations, and business to validate and implement the new technology. In fact there is no one definitive meaning of e-commerce or e-business that is universally established. The different terms are used to illustrate different perspectives and emphases of different people in different organisations and business sectors. Some argue that it makes little sense to have a restrictive definition for the term e-commerce since it is unlikely that there will be agreement on a single unique definition. 'Attempting to define E-commerce or E-business is guaranteed to generate Byzantine debates with meaningless origins. It reminds me of trying to answer the following question: "If one synchronized swimmer drowns, would the others follow?"'<sup>10</sup>

Because of this trend, it is necessary when undertaking any electronic commerce, electronic business or any other e-related project or assignment, to clearly define any term in the context and environment in which it is being used.

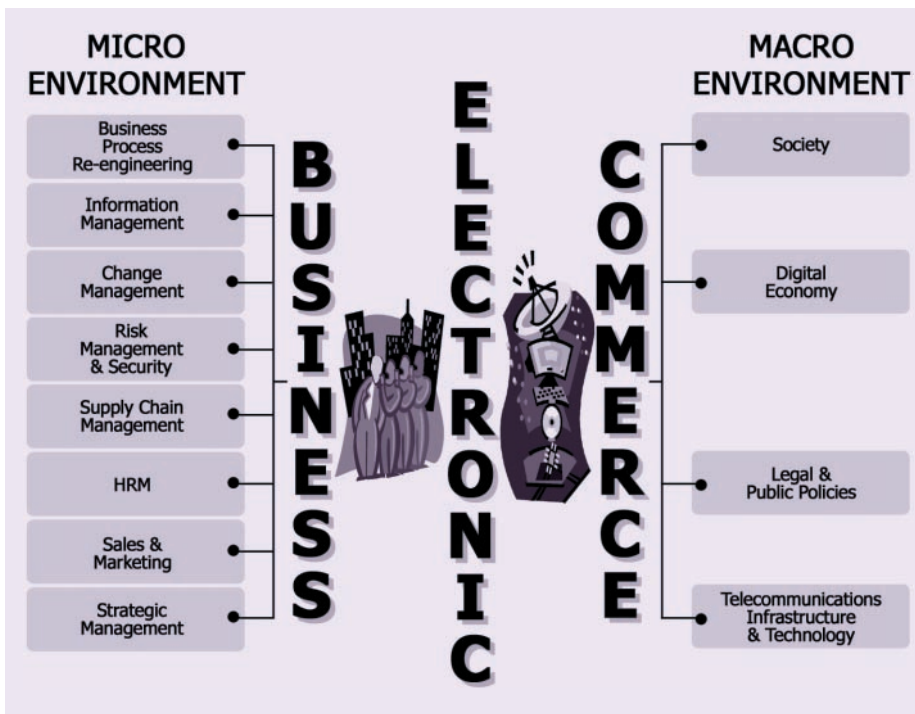
### **AN E-DISTINCTION**

For the purpose of clarity, the distinction between e-commerce and e-business in this book is based on the respective terms commerce and business. Commerce is defined as embracing the concept of trade, 'exchange of merchandise on a large scale between different countries'.<sup>11</sup> By association, e-commerce can be seen to include the electronic medium

for this exchange. Thus electronic commerce can be broadly defined as the exchange of merchandise (whether tangible or intangible) on a large scale between different countries using an electronic medium – namely the Internet. The implications of this are that e-commerce incorporates a whole socio-economic, telecommunications technology and commercial infrastructure at the macro-environmental level. All these elements interact together to provide the fundamentals of e-commerce.

Business, on the other hand, is defined as ‘a commercial enterprise as a going concern’.<sup>12</sup> E-business can broadly be defined as the processes or areas involved in the running and operation of an organisation that are electronic or digital in nature. These include direct business activities such as marketing, sales and human resource management but also indirect activities such as business process re-engineering and change management, which impact on the improvement in efficiency and integration of business processes and activities.

Figure 1.1 illustrates the major differences in e-commerce and e-business, where e-commerce has a broader definition referring more to the macro-environment, e-business relates more to the micro-level of the firm.



**Figure 1.1** Electronic commerce and electronic business

Although different, both e-commerce and e-business are also highly integrated and reliant upon each other.

### WHAT ARE THE KEY DRIVERS?

It is important to identify the key drivers of e-commerce to allow a comparison between different countries. It is often claimed that e-commerce is more advanced in the USA than in Europe. These key drivers can be measured by a number of criteria that can highlight the stages of advancement of e-commerce in each of the respective countries. The criteria that can determine the level of advancement of e-commerce are summarised in Table 1.1 and can be categorised as:

- 1 *Technological factors* – The degree of advancement of the telecommunications infrastructure which provides access to the new technology for business and consumers.
- 2 *Political factors* – including the role of government in creating government legislation, initiatives and funding to support the use and development of e-commerce and information technology.
- 3 *Social factors* – incorporating the level and advancement in IT education and training which will enable both potential buyers and the workforce to understand and use the new technology.
- 4 *Economic factors* – including the general wealth and commercial health of the nation and the elements that contribute to it.

Since a distinction has been made in this book between e-commerce and e-business for consistency, the key drivers of e-business are also identified. These are mainly at the level of the firm and are influenced by the macro-environment and e-commerce, which include:

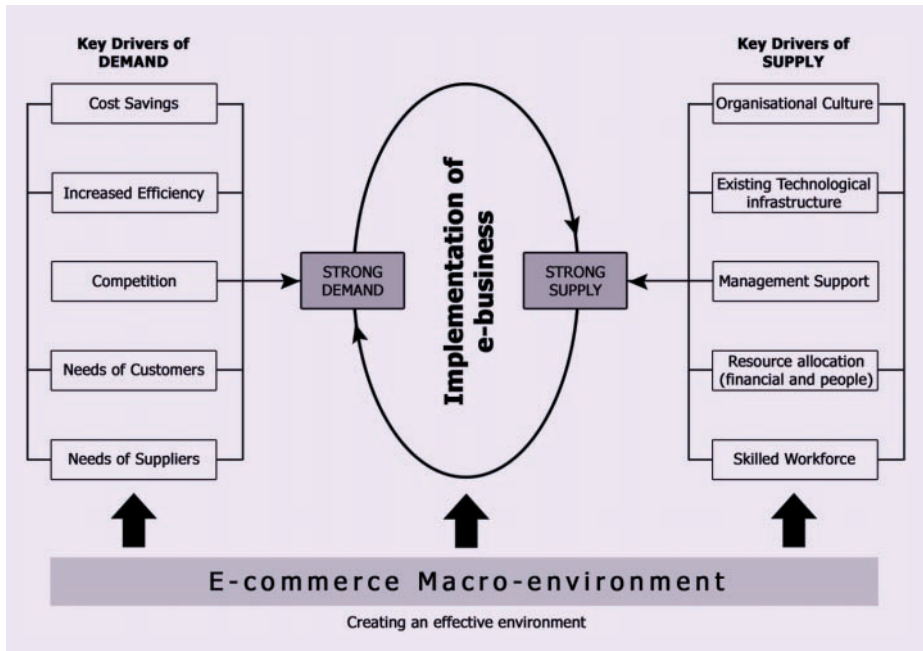
- *Organisational culture* – attitudes to research and development (R&D); its willingness to innovate and use technology to achieve objectives.
- *Commercial benefits* – in terms of cost savings and improved efficiency that impact on the financial performance of the firm.
- *Skilled and committed workforce* – that understands, is willing and able to implement new technologies and processes.
- *Requirements of customers and suppliers* – in terms of product and service demand and supply.
- *Competition* – ensuring the organisation stays ahead of or at least keeps up with competitors and industry leaders.

These key drivers for the implementation of e-business can be put into the context of the classic economic equation of supply and demand illustrated in Figure 1.2.

**TABLE 1.1** Key drivers of E-commerce

<i>Key drivers</i>	<i>Measurement criteria</i>
Technological factors	<ul style="list-style-type: none"> <li>● Telecommunications infrastructure               <ul style="list-style-type: none"> <li>Backbone infrastructure and architecture</li> <li>Industry players and competition</li> <li>Pricing</li> <li>Internet service providers</li> <li>Range of services available (e.g. ADSL, ISDN)</li> <li>Ownership (private or public sector)</li> </ul> </li> <li>● Access to new technology developments</li> <li>● Bandwidth</li> <li>● Speed of development and implementation of new technology by industry sector</li> </ul>
Political factors	<ul style="list-style-type: none"> <li>● Number and type of government incentives and programmes to support the use and development of new technology</li> <li>● Legislation – number and type of supportive or restrictive laws and policies that govern electronic data, contacts and financial transactions. For example, laws that recognise and enforce the validity of electronic documentation, contracts and transactions in a court of law; the validation of digital signatures; the legal usage of electronic security measures such as encryption</li> <li>● Public policies – whether government supports the growth of electronic transactions and processes. For example, filing tax returns to the Inland Revenue electronically, the national education curriculum and training</li> </ul>
Social factors	<ul style="list-style-type: none"> <li>● Skills of workforce</li> <li>● Number of users on-line</li> <li>● Penetration rate of PCs</li> <li>● Level of education; computer literacy and IT skills</li> <li>● Culture of technophilia – a willingness and ability to adopt new technology and the speed at which technology achieves critical mass as in Japan</li> </ul>
Economic factors	<ul style="list-style-type: none"> <li>● Economic growth – GDP</li> <li>● Average income</li> <li>● Cost of technology (hardware and software)</li> <li>● Cost of access to telecommunications infrastructure – pricing structures and rates</li> <li>● Commercial infrastructure – advancement of banking sector; payment systems</li> <li>● Innovative business models</li> </ul>

Thus, e-commerce provides the infrastructure and environment that enables and facilitates e-business. Within this, the implementation of e-business is solely dependent on whether there is a demand by the organisation and whether it can be supplied within the organisation. Demand is created largely by the need to cut costs, improve efficiency, maintain



**Figure 1.2** Key drivers of e-business

competitive advantage and meet stakeholder requirements. These business objectives can be met through the supply of a technological infrastructure to improve organisational processes, a willingness, ability and commitment to integrate new technology and improve working practice within the organisation, and crucial to all this is the allocation of resources.

### WHAT IS THE IMPACT OF ELECTRONIC COMMERCE?

E-commerce and e-business are not solely the Internet, websites or dot com companies. It is about a new business concept that incorporates all previous business management and economic concepts. As such, e-business and e-commerce impact on many areas of business and disciplines of business management studies. For example:

- *Marketing* – issues of on-line advertising, marketing strategies and consumer behaviour and cultures. One of the areas in which it impacts particularly is direct marketing. In the past this was mainly door-to-door, home parties (like the Tupperware parties) and mail order using catalogues or leaflets. This moved to telemarketing and TV selling with



the advances in telephone and television technology and finally developed into e-marketing spawning 'eCRM' (customer relationship management) data mining and the like by creating new channels for direct sales and promotion.

- *Computer sciences* – development of different network and computing technologies and languages to support e-commerce and e-business, for example linking front and back office legacy systems with the 'web-based' technology.
- *Finance and accounting* – on-line banking; issues of transaction costs; accounting and auditing implications where 'intangible' assets and human capital must be tangibly valued in an increasingly knowledge based economy.
- *Economics* – the impact of e-commerce on local and global economies; understanding the concepts of a digital and knowledge-based economy and how this fits into economic theory.
- *Production and operations management* – the impact of on-line processing has led to reduced cycle times. It takes seconds to deliver digitized products and services electronically; similarly the time for processing orders can be reduced by more than 90 per cent from days to minutes. Production systems are integrated with finance marketing and other functional systems as well as with business partners and customers (see Intel mini-case).

Intel launched their on-line business in summer 1998 when their sales shot from zero to \$1 billion per month in the first month of operation. The reason for this is that they totally re-engineered their processes to include small and medium-sized businesses. Previously only Intel's larger customers were connected to them by expensive EDI networks, leaving the small and medium-sized companies sending faxes or phoning in orders or requirements. Intel concentrated on procurement and customer support for a range of their products (including computer chips and microprocessors), developing an extranet (which is the linking of a number of intranets using Internet technology with added security creating virtually private networks). By using the extranet, authorised small and medium-sized business partners could place orders, track the orders and look at product documentation on the site. The savings for Intel and their customers were large – they eliminated 45,000 faxes in a quarter to Taiwan alone – saving on time, telephone charges and fax paper. Eleven of the larger Intel companies were connected to another system which let Intel link to customer plants across the Internet to track part consumption.

**CASE  
STUDY**

- *Production and operations management (manufacturing)* – moving from mass production to demand-driven, mass customisation customer pull rather than the manufacturer push of the past. Web-based Enterprise Resource Planning systems (ERP) can also be used to forward orders directly to designers and/or production floor within seconds, thus

cutting production cycle times by up to 50 per cent, especially when manufacturing plants, engineers and designers are located in different countries. In sub-assembler companies, where a product is assembled from a number of different components sourced from a number of manufacturers, communication, collaboration and coordination are critical – so electronic bidding can yield cheaper components and having flexible and adaptable procurement systems allows fast changes at a minimum cost so inventories can be minimised and money saved.

- *Management information systems* – analysis, design and implementation of e-business systems within an organisation; issues of integration of front-end and back-end systems.
- *Human resource management* – issues of on-line recruiting, home working and ‘intrapreneurs’ working on a project by project basis replacing permanent employees.
- *Business law and ethics* – the different legal and ethical issues that have arisen as a result of a global ‘virtual’ market. Issues such as copyright laws, privacy of customer information, legality of electronic contracts, etc.

These issues will be discussed in more detail throughout the remainder of this book.

## WHAT ARE THE BENEFITS OF E-COMMERCE?

The previous sections have included discussions about what e-commerce is and its impact, but what are the benefits of e-commerce? What does it offer and why do it? The benefits of e-commerce can be seen to affect three major stakeholders: organisations, consumers and society.

### Benefits of e-commerce to organisations

*International marketplace.* What used to be a single physical marketplace located in a geographical area has now become a borderless marketplace including national and international markets. By becoming e-commerce enabled, businesses now have access to people all around the world. In effect all e-commerce businesses have become virtual multinational corporations.

*Operational cost savings.* The cost of creating, processing, distributing, storing and retrieving paper-based information has decreased (see Intel mini-case).

*Mass customisation.* E-commerce has revolutionised the way consumers buy good and services. The pull-type processing allows for products and

services to be customised to the customer's requirements. In the past when Ford first started making motor cars, customers could have any colour so long as it was black. Now customers can configure a car according to their specifications within minutes on-line via the [www.ford.com](http://www.ford.com) website.

*Enables reduced inventories and overheads* by facilitating 'pull'-type supply chain management – this is based on collecting the customer order and then delivering through JIT (just-in-time) manufacturing. This is particularly beneficial for companies in the high technology sector, where stocks of components held could quickly become obsolete within months. For example, companies like Motorola (mobile phones), and Dell (computers) gather customer orders for a product, transmit them electronically to the manufacturing plant where they are manufactured according to the customer's specifications (like colour and features) and then sent to the customer within a few days.

*Lower telecommunications cost.* The Internet is much cheaper than value added networks (VANs) which were based on leasing telephone lines for the sole use of the organisation and its authorised partners. It is also cheaper to send a fax or e-mail via the Internet than direct dialling.

*Digitisation of products and processes.* Particularly in the case of software and music/video products, which can be downloaded or e-mailed directly to customers via the Internet in digital or electronic format.

*No more 24-hour-time constraints.* Businesses can be contacted by or contact customers or suppliers at any time.

### **Benefits of e-commerce to consumers**

*24/7 access.* Enables customers to shop or conduct other transactions 24 hours a day, all year round from almost any location. For example, checking balances, making payments, obtaining travel and other information. In one case a pop star set up web cameras in every room in his house, so that he could check the status of his home by logging onto the Internet when he was away from home on tour.

*More choices.* Customers not only have a whole range of products that they can choose from and customise, but also an international selection of suppliers.

*Price comparisons.* Customers can 'shop' around the world and conduct comparisons either directly by visiting different sites, or by visiting a single site where prices are aggregated from a number of providers and compared (for example [www.moneyextra.co.uk](http://www.moneyextra.co.uk) for financial products and services).

*Improved delivery processes.* This can range from the immediate delivery of digitised or electronic goods such as software or audio-visual files by downloading via the Internet, to the on-line tracking of the progress of packages being delivered by mail or courier.

*An environment of competition* where substantial discounts can be found or value added, as different retailers vie for customers. It also allows many individual customers to aggregate their orders together into a single order presented to wholesalers or manufacturers and obtain a more competitive price (aggregate buying), for example [www.letsbuyit.com](http://www.letsbuyit.com).

### Benefits of e-commerce to society

*Enables more flexible working practices*, which enhances the quality of life for a whole host of people in society, enabling them to work from home. Not only is this more convenient and provides happier and less stressful working environments, it also potentially reduces environmental pollution as fewer people have to travel to work regularly.

*Connects people*. Enables people in developing countries and rural areas to enjoy and access products, services, information and other people which otherwise would not be so easily available to them.

*Facilitates delivery of public services*. For example, health services available over the Internet (on-line consultation with doctors or nurses), filing taxes over the Internet through the Inland Revenue website.

### WHAT ABOUT THE LIMITATIONS OF E-COMMERCE?

There was much hype surrounding the Internet and e-commerce over the last few years of the twentieth century. Much of it promoted the Internet and e-commerce as the panacea for all ills, which raises the question, are there any limitations of e-commerce and the Internet?

Isaac Newton's 3rd Law of Motion, 'For every action there is an equal and opposite reaction' suggests that for all the benefits there are limitations to e-commerce. These again will be dealt with according to the three major stakeholders – organisations, consumers and society.

### Limitations of e-commerce to organisations

*Lack of sufficient system security, reliability, standards and communication protocols*. There are numerous reports of websites and databases being hacked into, and security holes in software. For example, Microsoft has over the years issued many security notices and 'patches' for their software. Several banking and other business websites, including Barclays Bank, Powergen and even the Consumers' Association in the UK, have experienced breaches in security where 'a technical oversight' or 'a fault in its systems' led to confidential client information becoming available to all.

*Rapidly evolving and changing technology*, so there is always a feeling of trying to 'catch up' and not be left behind.

*Under pressure to innovate* and develop business models to exploit the new opportunities which sometimes leads to strategies detrimental to the organisation. The ease with which business models can be copied and emulated over the Internet increase that pressure and curtail longer-term competitive advantage.

*Facing increased competition* from both national and international competitors often leads to price wars and subsequent unsustainable losses for the organisation.

*Problems with compatibility of older and 'newer' technology*. There are problems where older business systems cannot communicate with web-based and Internet infrastructures, leading to some organisations running almost two independent systems where data cannot be shared. This often leads to having to invest in new systems or an infrastructure, which bridges the different systems. In both cases this is both financially costly as well as disruptive to the efficient running of organisations.

### Limitations of e-commerce to consumers

*Computing equipment* is needed for individuals to participate in the new 'digital' economy, which means an initial capital cost to customers.

*A basic technical knowledge* is required of both computing equipment and navigation of the Internet and the World Wide Web.

*Cost of access to the Internet*, whether dial-up or broadband tariffs.

*Cost of computing equipment*. Not just the initial cost of buying equipment but making sure that the technology is updated regularly to be compatible with the changing requirement of the Internet, websites and applications.

*Lack of security and privacy of personal data*. There is no real control of data that is collected over the Web or Internet. Data protection laws are not universal and so websites hosted in different countries may or may not have laws which protect privacy of personal data.

*Physical contact and relationships are replaced by electronic processes*. Customers are unable to touch and feel goods being sold on-line or gauge voices and reactions of human beings.

*A lack of trust because they are interacting with faceless computers*.

### Limitations of e-commerce to society

*Breakdown in human interaction*. As people become more used to interacting electronically there could be an erosion of personal and social skills which

might eventually be detrimental to the world we live in where people are more comfortable interacting with a screen than face to face.

*Social division.* There is a potential danger that there will be an increase in the social divide between technical haves and have-nots – so people who do not have technical skills become unable to secure better-paid jobs and could form an underclass with potentially dangerous implications for social stability.

*Reliance on telecommunications infrastructure, power and IT skills,* which in developing countries nullifies the benefits when power, advanced telecommunications infrastructures and IT skills are unavailable or scarce or underdeveloped.

*Wasted resources.* As new technology dates quickly how do you dispose of all the old computers, keyboards, monitors, speakers and other hardware or software?

*Facilitates Just-In-Time manufacturing.* This could potentially cripple an economy in times of crisis as stocks are kept to a minimum and delivery patterns are based on pre-set levels of stock which last for days rather than weeks (see Case Study).

#### CASE STUDY

In September 2000 in the UK, protestors demonstrating over the high price of petrol blocked petrol depots, preventing the delivery of petrol to petrol stations. Within *days* this led to petrol shortages throughout the UK. The knock-on effects were disruption in public transport, hospital services (with cancellation of non-emergency operations), school closures, shortages in food as supermarkets reported panic buying and some warned supplies could run out 'in days rather than weeks'. Petrol and other essential supplies such as bread and milk were rationed.<sup>13</sup> Even after the blockade was lifted, it took two to three weeks for supplies to get back to normal.

*Difficulty in policing the Internet,* which means that numerous crimes can be perpetrated and often go undetected. There is also an unpleasant rise in the availability and access of obscene material and ease with which paedophiles and others can entrap children by masquerading in chat rooms.

The benefits and limitations discussed here are by no means definitive or exhaustive. This chapter is setting the scene and introducing ideas, which will be explored in more detail in the rest of this book.

#### CLASSIFYING E-COMMERCE

Why classify e-commerce? What does it tell us? Why is there more than one way of classifying e-commerce?

Earlier in the chapter, it was pointed out that there is no one definition of e-commerce or e-business. Different associations of the terms come from people with different perspectives and it is similar with frameworks for classifying e-commerce and e-business. Academics have already drawn up a number of frameworks for classifying e-commerce but each one tends to explain it from a particular perspective. Some of these frameworks are discussed in more detail below.

### A macro-environmental perspective

This framework, first developed by Kalakota and Whinston,<sup>14</sup> Professors of Information Systems and prolific authors on the subject, takes a holistic view and identifies the different components of business and technology that make up e-commerce. Using the analogy of the architecture of a building illustrated in Figure 1.3, they explain how the different components fit and interact together, emphasising the relative importance of each component.

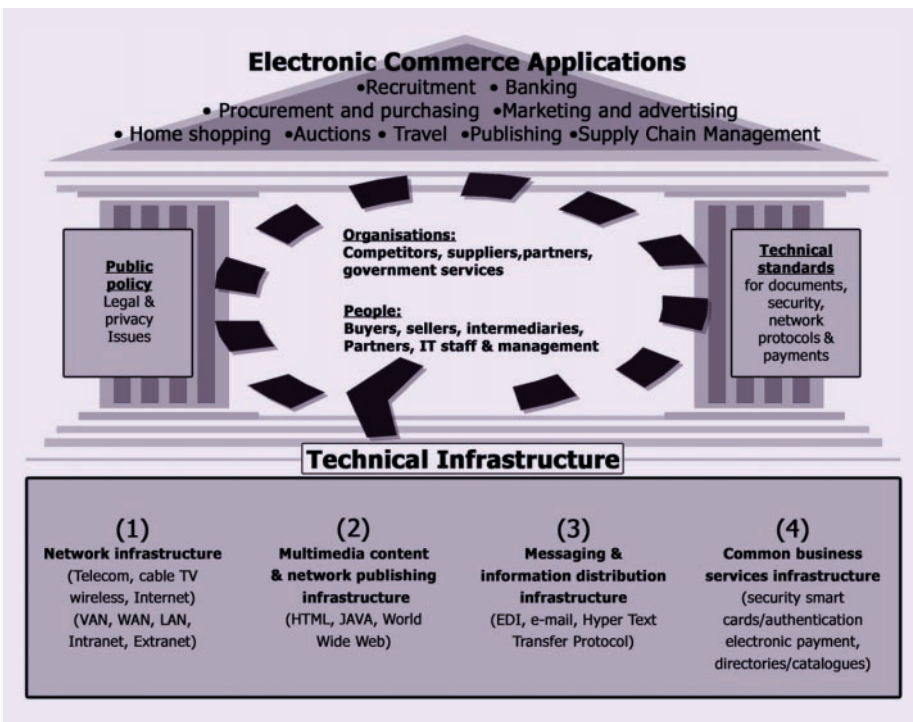


Figure 1.3 A framework for electronic commerce

The technological foundations of e-commerce are largely hidden, but they are the base on which electronic commerce is built. Kalakota and Whinston use the analogy of a traditional transportation company to describe the complexity of the network and how the different components that make up the technology infrastructure are interlinked. (The terms and technology mentioned here are described in full in Chapter 2.)

- The network infrastructure is like the network of roads that are interconnected and are of different widths, lengths and quality – for example, the Internet, local area networks, intranets. Network infrastructures also take different forms such as telephone wires, cables, wireless technology (such as satellite or cellular technology).
- The publishing infrastructure (including the World Wide Web, Web servers) can be seen as the infrastructure of vehicles and warehouses, which store and transport electronic data and multimedia content along the network. Multimedia content is created using myriad tools such as HTML and JAVA. This content can be very different with varying degrees of complexity similar to different vehicles travelling on the roads. For example, text only, or more complex is an application, such as a computer game, containing audio, video, graphics and a programme.
- Messaging and information distribution infrastructure are the engines and fuel, which transport the data around the network. Once the multimedia content is created, there has to be a means of sending and retrieving this information, for example by EDI, e-mail, Hyper Text Transfer Protocol.
- Once content and data can be created, displayed and transmitted, supporting business services are necessary for facilitating the buying, selling and other transactions safely and reliably. For example, smart cards, authentication, electronic payment, directories/catalogues.

The next components which facilitate and enable e-commerce and which are built on the foundations of technology are:

- Public policy, regulations and laws that govern issues such as universal access, privacy, electronic contracts and the terms and conditions that govern e-commerce.
- Universal agreement of technical standards dictate the format in which electronic data is transferred over networks and is received across user interfaces, and the format in which it is stored. This is necessary so that data can travel seamlessly across different networks, where information and data can be accessed by a whole range of hardware and software such as computers, palmtops, and different kinds of browsers and document readers.



- The interaction of people and organisations to manage and coordinate the applications, infrastructures and businesses are all necessary to make e-commerce work.

All these elements interact together to produce the most visible manifestation of e-commerce. These applications include on-line banking and financial trading; recruitment; procurement and purchasing; marketing and advertising; auctions; shopping are just a few examples.

This is a particularly useful framework for managers to understand the importance of technology and business, both within the organisation and external to it, in the planning and development of any e-commerce or e-business solution.

### Identifying transacting partners

Another method for classifying e-commerce is by identifying the partners directly involved in the transaction. An informal version of this framework is being loosely applied in the use of the terms business-to-business (B-to-B), business-to-consumer (B-to-C) and consumer-to-consumer (C-to-C). But what exactly does this mean?

The framework that is summarised in Figure 1.4 identifies a range of relationships based on the party that initiates the transaction and the party that accepts the transaction. The party originating the e-commerce transaction also includes the facilities for initiating and fulfilling it. For example in the case of B-to-C, a business sets up a website that invites and enables consumers to buy their products and then fulfils the purchase. But the

TRANSACTION ORIGINATING FROM AND BEING FULFILLED BY					
TRANSACTION INITIATED & ACCEPTED BY		Business	Consumer	Government	Peer
	Business	<b>B-to-B</b>	<b>B-to-C</b>	<b>B-to-G</b>	<b>B-to-P</b>
	Consumer	<b>C-to-B</b>	<b>C-to-C</b>	<b>C-to-G</b>	<b>C-to-P</b>
	Government	<b>G-to-B</b>	<b>G-to-C</b>	<b>G-to-G</b>	<b>G-to-P</b>
	Peer	<b>P-to-B</b>	<b>P-to-C</b>	<b>P-to-G</b>	<b>P-to-P</b>

Figure 1.4 Classification of e-commerce by transaction partners

consumer actually initiates the transaction by requesting and then accepting the purchase. So there are a number of exchanges that take place between the parties before the transaction is completed and fulfilled.

Each of the categories identified in Figure 1.4 are described as:

**Business-to-Business (B-to-B)** The exchange of products, services or information between business entities. According to market research studies published in early 2000, the money volume of B-to-B exceeds that of B-to-C by 10 to 1. The Gartner Group estimates B-to-B revenue worldwide will be \$7.29 trillion by 2004, a compound annual growth of about 41 per cent. Web-based B-to-B includes:

- *Direct selling and support to business* (as in the case of Cisco where customers can buy and also get technical support, downloads, patches online).
- *E-procurement* (also known as industry portals) where a purchasing agent can shop for supplies from vendors, request proposals, and, in some cases, bid to make a purchase at a desired price. For example the auto-parts wholesaler (reliableautomotive.com); and the chemical B-to-B exchange (chemconnect.com).
- *Information sites* provide information about a particular industry for its companies and their employees. These include specialised search sites and trade and industry standards organisation sites. E.g. newmarketmakers.com is a leading portal for B-to-B news.

Many B-to-B sites may also fall into none or more than one of these groups. Models for B-to-B sites are still evolving and are discussed in more detail in Chapter 5.

**Business-to-consumer (B-to-C)** The exchange of products, information or services between business and consumers in a retailing relationship. Some of the first examples of B-to-C e-commerce were amazon.com and dell.com in the USA and lastminute.com in the UK. In this case, the 'c' represents either consumer or customer.

**Business-to-Government (B-to-G)** The exchange of information, services and products between business organisations and government agencies on-line. This may include,

- *E-procurement services*, in which businesses learn about the purchasing needs of agencies and provide services.
- *A virtual workplace* in which a business and a government agency could coordinate the work on a contracted project by collaborating on-line to coordinate on-line meetings, review plans and manage progress.

- *Rental of on-line applications and databases* designed especially for use by government agencies.

In the UK, the Department of Trade and Industry's target was that by March 2001, 90 per cent of routine procurement of goods would be conducted electronically. In the government's expenditure plans for 2001–02<sup>15</sup> (published in March 2001) the report gave an update of this target:

Keeping closely in touch with the Office of Government Commerce (OGC), DTI is working towards the 90% target through increased usage of the Government Procurement Card. Two studies by ICL Unitas highlighted that the market for electronic purchasing was not fully developed. A scoping study for the delivery of electronic procurement in DTI is underway.<sup>16</sup>

CASE  
STUDY

According to the Gartner Group, B-to-G revenue is expected to grow from \$1.5 billion in 2000 to \$6.2 billion in 2005.

**Business-to-Peer Networks (B-to-P)** This would be the provision of hardware, software or other services to the peer networks. An example here would be Napster who provided the software and facilities to enable peer networking (discussed in more detail in Chapter 5).

**Consumer-to-Business (C-to-B)** This is the exchange of products, information or services from individuals to business. A classic example of this would be individuals selling their services to businesses.

**Consumer-to-Consumer (C-to-C)** In this category consumers interact directly with other consumers. They exchange information such as:

- *Expert knowledge* where one person asks a question about anything and gets an e-mail reply from the community of other individuals, as in the case of the *New York Times*-affiliated abuzz.com website.
- *Opinions* about companies and products, for example epinions.com.

There is also an exchange of goods between people both with consumer auction sites such as e-bay and with more novel bartering sites such as swapitshop.com, where individuals swap goods with each other without the exchange of money.

**Consumer-to-Government (C-to-G)** Examples where consumers provide services to government have yet to be implemented. See Government-to-Business.

**Consumer-to-Peer Networks (C-to-P)** This is exactly part of what peer-to-peer networking is and so is a slightly redundant distinction since consumers offer their computing facilities once they are on the peer network.

**Government-to-Business (G-to-B)** (Also known as e-government, discussed in detail in Chapter 5.) The exchange of information, services and products between government agencies and business organisations. Government sites now enable the exchange between government and business of:

- Information, guidance and advice for business on international trading, sources of funding and support (ukishelp), facilities (e.g. [www.dti.org.uk](http://www.dti.org.uk)).
- A database of laws, regulations and government policy for industry sectors.
- On-line application and submission of official forms (such as company and value added tax).
- On-line payment facilities.

This improves accuracy, increases speed and reduces costs, so businesses are given financial incentives to use electronic-form submission and payment facilities.

**Government-to-Consumer (G-to-B)** (Also known as e-government). Government sites offering information, forms and facilities to conduct transactions for individuals, including paying bills and submitting official forms on-line such as tax returns.

**Government-to-Government (G-to-G)** (Also known as e-government). Government-to-government transactions within countries linking local governments together and also international governments, especially within the European Union, which is in the early stages of developing coordinated strategies to link up different national systems.

**Government-to-Peer Network (G-to-P)** As yet there is no real example of this type of e-commerce.

**Peer-to-Peer Network (P-to-P)** (Peer-to-peer networking is discussed in more detail in Chapter 5). This is the communications model in which each party has the same capabilities and either party can initiate a communication session. In recent usage, peer-to-peer has come to describe applications in which users can use the Internet to exchange files with each other directly or through a mediating server.<sup>17</sup>

**Peer Network-to-Consumer (P-to-C)** This is in effect peer-to-peer networking, offering services to consumers who are an integral part of the peer network.

**Peer Network-to-Government (P-to-G)** This has not yet been used, but if it was, it would be used in a similar capacity to the P-to-B model (see below), only with the government as the party accepting the transaction.

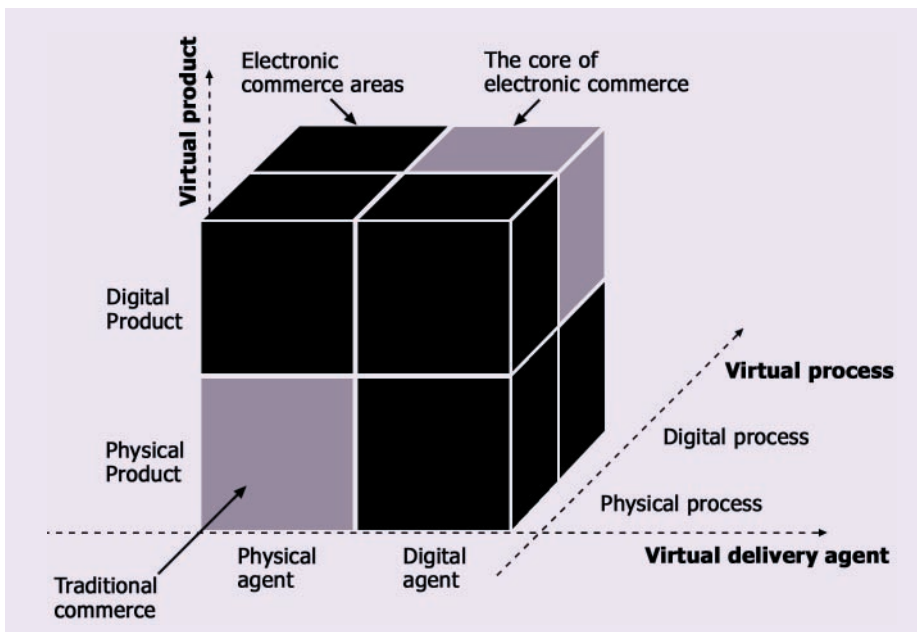
**Peer Network-to-Business (P-to-B)** Peer-to-peer networking provides resources to business. For example, using peer network resources such as the spare processing capacity of individual machines on the network to solve mathematical problems or intensive and repetitive DNA analyses which requires very high capacity processing power.

This framework can be used by organisations to segment their customers and distinguish the different needs, requirements, business processes, products and services that are needed for each.

### Degree of digitisation

Choi et al.<sup>18</sup> created a framework for the categorisation of e-commerce into different configurations based on the degree of digitisation of the product or service sold, the process of the transaction and the delivery agent. From the model in Figure 1.5, three main dimensions can be isolated as:

- *Traditional e-commerce*, where products or services are physical, the process of the transaction is physical and the delivery agent is physical. For



**Figure 1.5** A framework for assessing the degree of digitisation

Source: Choi et al.

example a corner shop stocks newspapers that are bought with cash over the counter and are taken away by the customer out of the shop. However, in reality in today's world, it is very rare that a business is truly traditional because of the use of EPOS systems for payment (electronic point of sale systems).

- *Pure e-commerce*, where products or services are digital, the process of the transaction is digital and the delivery agent is digital. For example, software update services of companies like Microsoft, Cisco, Symantec; downloading of electronic books; peer-to-peer file sharing like Napster would also be considered pure e-commerce.
- *Partial e-commerce*, where either one or two of the dimensions are physical. For example in the case of booksellers Amazon, the products (books) are physical, the process is digital and the delivery agent is physical.

A study by Forrester Research<sup>19</sup> predicted that by 2003, most Web-based retailers will deliver products electronically and that almost a quarter of retailers will obtain 16–50 per cent of their revenue from these digital downloads.

Classifying e-commerce by degree of digitisation is a useful way for managers to analyse the range of products/services they sell, the processes of carrying out and finalising the transaction and the way the product/service is delivered. By identifying the areas that could potentially be digitised, organisations can re-engineer their business processes to improve efficiency, reduce costs, access global markets and benefit from the advantages presented by e-commerce and e-business.

### WHAT ARE THE BARRIERS TO E-COMMERCE?

The drivers of e-commerce were identified and summarised in Table 1.1. Conversely, there are also barriers to the growth and development of e-commerce. Numerous reports and surveys identify the different kinds of barriers, and many of them focus on security as being one of the largest inhibitors to and problems for e-commerce. CommerceNet<sup>20</sup> (a non-profit consortium of business, technology, academic and government leaders who develop and implement e-commerce technology and business practice) conducts an annual time series survey of visitors to the CommerceNet website, to identify the barriers to e-commerce. Different nations are at different stages of development of e-commerce and as such the issues that are relevant to one nation may not be relevant to another. Similarly, the issues that are relevant to the type of organisation also differ. For example, large organisations have different needs and infrastructures to SMEs. The study of 1,000 visitors divides the findings into the perspectives of three

different types of organisation: large B-to-B organisations; SME B-to-B enterprises; and B-to-C retailers. The study also divides the results into US and non-US based. This is particularly useful because the USA is at a more advanced stage in the e-commerce adoption lifecycle than the majority of other nations and so can be used as a predictor of things to come or as a warning to prevent followers experiencing similar pitfalls and problems.

The findings summarised in Figure 1.6 show that barriers to e-commerce can be seen as being relevant both to the macro-environment and the micro-environment level of the firm itself. Overall, all three kinds of organisations have similar barriers but with different emphases.

*Internet infrastructure* deals with issues such as availability and quality of the Internet in terms of speed and reliability. This barrier is of particular concern to SMEs and B-to-C organisations, since their business relies more on general consumers, and so the ease with which the general public can connect to the Internet has a direct impact on their Web-based business.

*Technology infrastructure* deals with issues of standardisation of systems and applications, which is a particular concern for larger organisations who want to implement solutions such as value chain integration and e-supply chain management.

*Security* in its broadest term is one of the most significant barriers to e-commerce both within the organisation and external to it. Identified as *Security and Encryption; Trust and Risk; User Authentication and Lack of Public Key Infrastructure; Fraud and Risk of Loss* it relates to the development of a broader security infrastructure and it also relates to the kinds of measures

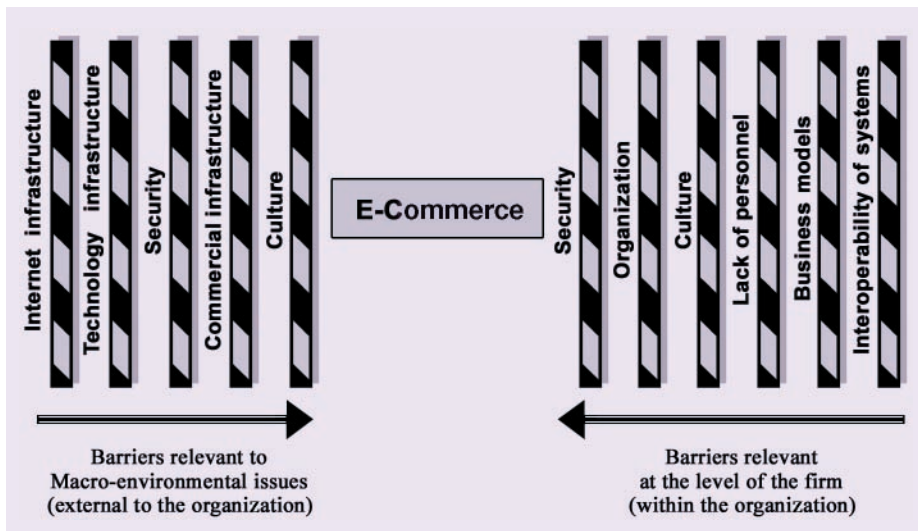


Figure 1.6 Barriers to e-commerce

organisations can take to improve security. Although security is a major concern for all types of organisations, it is a dominant concern for companies in the B-to-C e-commerce retail sector, since it reflects the concerns and perceptions of users and potential customers that are conducting financial transactions on-line.

The *commercial infrastructure* relates to issues such as international trade agreements, taxation laws and other legal agreements that facilitate all kinds of on-line trading and so is a barrier relevant to all types of organisations.

At the level of the organisation itself, there are many barriers to e-commerce that relate to issues of *organisational structure* and *culture*. These are most significant for large organisations that have to deal with change management issues. For example, there is a sense that much work still needs to be done to design the right organisational structure and corporate culture that will promote and be able to maximise the benefits of widespread e-commerce applications. Additionally, there is a perception that business partners face similar organisational and technological problems, which raises the barrier further.

Another significant issue was found to be the *lack of qualified personnel* to implement in-house and third-party e-commerce systems. For SMEs, this is a particularly strong concern because internally they do not have sufficient resources to attract and maintain their own support staff to develop a sophisticated technology infrastructure. With regards to third parties, the qualified personnel tended to work for larger organisations, which were more concerned about serving the more lucrative larger clients than SMEs. One respondent noted that, 'small firms get lots of vague and general exhortations to go "online" but find it very difficult to get reliable, well informed advice and also to get honest, effective support from a Web services provider'.<sup>21</sup>

Another major barrier to the development of e-commerce was a *lack of proven business models*. This is a reflection of the instability of the whole dot com phenomenon, and the poor performance of the dot coms on the world's stock exchanges in late 1999 and early 2000 after the dizzy heights to which dot com companies rose in 1998–9. A financially successful business model has yet to emerge into the business world's limelight as the model to follow.

*Interoperability of systems* is identified as one of the major barriers for large US-based B-to-B corporations. This refers specifically to implementation and compatibility problems of integrating new e-commerce applications with existing legacy systems and resources within organisations. This problem also extends to interacting with systems of business partners and stakeholders. The fact that the USA is ahead in the adoption lifecycle of e-commerce suggests that these issues will become more prevalent in other nations that are further behind in the lifecycle. Thus there is a need for



standards to be introduced to overcome issue of incompatibility and interoperability. For SMEs that have fewer legacy systems, the issues are more a matter of interoperability with partner systems.

Many of the top barriers recognised by respondents in 2000 were also top concerns in 1999, especially security. This illustrates a consistency and reliability of the measures being taken by the survey and also underlines the fact that they are not being addressed adequately. The two major changes were increased concern over lack of business models and lack of qualified personnel. This reflects the downturn in the fortunes of the dot coms and also illustrates the increasing skills shortages problems to deal with the increasing IT implementation and maintenance problems. These issues will be dealt with in the remaining chapters of this book.

## SUMMARY

There is no one commonly agreed definition of e-commerce or e-business. Thus, there is a need to clarify terms being used and explain the context in which they are being applied. E-commerce has an impact on three major stakeholders, namely society, organisations and customers (or consumers). There are a number of advantages, which include cost savings, increased efficiency, customisation and global marketplaces. There are also limitations arising from e-commerce which apply to each of the stakeholders. These include information overload, reliability and security issues, cost of access, social divisions and difficulties in policing the Internet. Successful e-commerce involves understanding the limitations and minimising the negative impact while at the same time maximising the benefits.

In order to aid general understanding of e-commerce a number of frameworks have been introduced to explore it from different perspectives: the macro-environment, which identifies the interaction of technology, people, organisations, policy and technical standards working together to enable e-commerce; the different participants and the kind of e-commerce transactions that occur between them; and the degree of digitisation that analyses product, processes and delivery agents in an organisation. These frameworks help identify the elements of e-commerce and how businesses can better understand e-commerce and its practical applicability.

The issues raised in this chapter will be dealt with in more detail in the remainder of this book.

## DISCUSSION QUESTIONS

- 1 To which definition of e-commerce and e-business do you subscribe and why?
- 2 Identify one country in Europe and one in Asia. Using the measures for the key drivers of e-commerce, compare the degree of advancement of e-commerce in each of the two countries.
- 3 Select a pure e-commerce company and analyse its product/service, process and delivery agent, explaining the implications of having digitised each aspect. Can this company continue to exist in the long term?
- 4 Which industry stands to benefit most from e-commerce?
- 5 Which activities are least likely to be affected by e-commerce?

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Top 10 U.S.	Rank	Top 10 Non-U.S.
Interoperability with complementary companies	1	Security and encryption
Interoperability between eCommerce applications and with legacy systems	2	Trust and risk
Lack of qualified personnel	3	Lack of qualified personnel
International trade barriers	4	Lack of business models
Customers can't find me	5	User authentication and lack of public key infrastructure
Culture	6	Culture
Security and encryption	7	Organisation
Organisation	8	Fraud and risk of loss
User authentication and lack of public key infrastructure	9	Legal issues such as contracts and liabilities
Lack of standards	10	Ability to make and receive payments

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