

The background of the cover is a dark blue field. On the left, a large, semi-transparent globe shows the continents of North and South America. Overlaid on this and the rest of the cover is a faint grid pattern. Several thick, semi-transparent arrows in shades of orange, red, and blue point in various directions across the image. A smaller, wireframe sphere is positioned in the lower right quadrant.

COLIN COMBE

INTRODUCTION TO E-BUSINESS

MANAGEMENT AND STRATEGY

Introduction to E-business

To Debbie and Richard

Introduction to E-business Management and strategy

Colin Combe

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Preface

The twentieth century will be remembered for the rapid changes in technology every bit as much as the social and political upheavals that changed the lives of so many people. In fact, such has been the speed of development of new products, devices and gadgets that it is often easy to become ambivalent about technological advance. However, some inventions are of such life-changing significance that they make everyone sit up and take notice. Few technologies can be considered revolutionary in the impact they have had on society. Certainly, the telephone, television, air travel and some medical advances can be considered revolutionary in this context.

To this list can be added the internet as a means of communication. Although there are some sections of society for whom the internet remains an alien device, the majority of people in countries with internet access have made use of this technology for a myriad of reasons, including education, entertainment, information, business and communication. The internet has been a catalyst for change in the way people communicate and has drawn the attention of diverse bodies including government, police and security agencies, the legal profession, public sector organisations, educational establishments and many, many more.

The business community has been fundamentally changed by the advent of the internet as a means of communication and trading. The development of the World Wide Web in the mid 1990s opened up the commercial viability of the internet as, for the first time, ordinary citizens were able to access the resources that it held. Soon, the number of websites increased from tens of thousands to millions. The internet has become an integral part of many organisations' means of undertaking business. It can be used as an additional channel through which businesses communicate with and trade with

customers (business-to-consumer, B2C) and suppliers and partners (business-to-business, B2B).

The internet and related technologies, such as intranets and extranets, also help organisations to increase efficiency in their internal processes. From a business perspective, the internet has had a profound effect on the way firms operate, how they communicate with others, what products they produce, how they deliver products and services, and how they seek competitive advantage. The internet has changed the 'rules' of trading by presenting new challenges and opportunities and altering the way firms engage and build relationships with customers.

This book is designed to highlight the key issues that affect businesses who have adopted the internet as a means of trading or improving internal processes. Electronic business (e-business) is the use of the internet for these purposes. Consequently, e-business has implications for a range of issues affecting an organisation, including the adoption of technology, choice of business models, economics, marketing, legal and security issues, management and the strategies for gaining a competitive advantage. This book highlights and explains the nature and characteristics of e-business in the context of each of these key issues. Examples of e-business applications are a feature of the book and these help the process of comprehending how the internet has been used to different effects in different business settings.

Following on from the discussions of the key issues, the book then focuses on the management of e-business and the formulation, implementation and evaluation of e-business strategies. These chapters bring together elements of the key issues to articulate how organisations manage their resources and create strategies for gaining competitive advantage through undertaking e-business. Gaining and sustaining competitive advantage is a theme that runs throughout the book, but its importance to the viability of internet-based firms (or firms that use the internet for some aspects of their business) is such that it is afforded its own chapter. The book chapters close with analysis of the stages of evolution that e-business has traversed since the commercialisation of the internet in the mid 1990s as well as some informed speculation as to the future prospects of e-business. The book also contains five case studies of well-known organisations that have successfully (or not in the case of boo.com) harnessed the attributes of the internet to create such compelling value propositions that they have been able to build global businesses through their online activities.

The structure and content of this book has been compiled to help undergraduate and postgraduate students new to the subject of e-business understand the key issues from both theoretical and practical perspectives. The book is also a valuable source of guidance and information for practitioners seeking an insight into the key issues affecting an e-business venture. There are many books covering different aspects of the internet, some focus on the technology, others on marketing or economics. There has, in recent years, been a proliferation of books on the security and legal aspects of the internet. Many business and management books incorporate elements of online trading into the narrative or as featured case studies.

This book uses rigorous academic theories and practical examples to bring together the business, management and strategic issues relating to e-business in a coherent and lucid manner to help the process of learning for students and practitioners seeking an introduction to e-business. In particular, the book offers readers an insight into how organisations can build an effective e-business venture using a mix of resources and capabilities. There are practical issues relating to security, law, economics and human resources that provide the basis for creating an effective e-business. This is complemented by an outline of the main business models that can be adopted as a means of competing in the e-business environment. The chapters on formulating and implementing a strategy for e-business provide a guide to the stages involved in developing a coherent strategy that is geared towards leveraging a competitive advantage by engaging in e-business activities.

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Introduction

Key issues:

- Defining e-business;
- The development of the new economy;
- Types of e-business and related industries;
- The growth of e-business;
- Use of the internet;
- Key people;
- Scope of the book;
- Structure of the book.

Defining e-business

Electronic business (e-business) can be defined as the use of the internet to network and empower business processes, electronic commerce, organizational communication and collaboration within a company and with its customers, suppliers, and other stakeholders. E-businesses utilise the internet, intranets, extranets and other networks to support their commercial processes. Electronic commerce (e-commerce) is the buying and selling, marketing and servicing of products and services via computer networks. Since e-business includes the process of transacting with suppliers and customers there is an overlap in activities with e-commerce.

Although the terms 'e-business' and 'e-commerce' are often used synonymously, the distinction between them lies in the broader range of processes in e-business that incorporates internal transactions within an organisation. These include transactions relating to procurement, logistics, supply chain management, payments, stock control and order tracking. As Chaffey (2004) notes, e-commerce can best be conceived as a subset of e-business. Where the two concepts overlap is in the buying and selling of products and services.



Figure 1.1
The relationship
between e-business
and e-commerce

Buy-side e-commerce refers to electronic transactions between a purchasing organisation and its suppliers and sell-side e-commerce refers to electronic transactions between a supplier organisation and its customers. [Figure 1.1](#) illustrates the relationship between e-business and e-commerce.

The development of the new economy

Throughout the book references will be made to ‘the internet economy’, ‘the information economy’ or ‘the digital economy’. These terms are used to define the distinct contributions to the economy through use of the internet, digital technology, or information and communications technology (ICT). Together these types of technologies have created the so-called ‘new economy’, one that is based on entrepreneurship in knowledge creation and sharing, innovation and creativity, and utilising information technology for developing and selling new products and services. The new economy defined the industrial landscape of the late twentieth century and will be the dominant driver of economies well into the new millennium.

The new economy has been boosted by the development of the infrastructure that supports the internet, ICT and digital technology. The rollout of high-speed broadband internet access means more people can connect to the internet at higher speed and with greater flexibility and scope of activities. Digital exchanges and fibre-optic networks mean that the convergence of technologies further boosts the new economy. Where once the internet, television broadcasting and telecommunications were separate and distinct industries, convergence means that these sectors have increasingly merged,

thereby offering consumers greater scope for accessing services via one technology. For example, the new economy is boosted by the development of internet access on mobile phones because it means knowledge workers can access information and communicate with others from almost any location. The convergence of the internet and television means that interactive television provides an additional media for facilitating online sales of products and services.

At the business level, organisations are no longer viewed as individual entities but as part of an integrated network of organisations where information and communications technologies play a key role in smoothing transactions and collaborative ventures between partners. The internet has opened up the possibility of exchanging information, products and services around the globe without any restraints of time or distance. This has given rise to the concept of the 'boundaryless' organisation. Indeed, the new economy is characterised by changes to the boundaries of whole economies as well as industries and firms. In the last few decades these changes have led to a marked acceleration in globalisation.

The diffusion of information technologies has played a key role in knowledge sharing, encouraging innovation and creativity, integrating global supply chains, facilitating global trade and creating wealth. There is also a local characteristic to the new economy as organisations utilise information technologies to serve local or regional demand. The scope of the new economy encompasses the spectrum from localisation through to globalisation and lends meaning to the concept of the 'boundaryless' organisation, industry or economy.

Information technology has also enabled new forms of management and control, both within organisations and between organisations. Information technology makes it possible to simultaneously co-ordinate economic activity in many different locations and beyond traditional organisational boundaries. This has enabled organisations to create new structures, such as the network organisation or the virtual organisation, that are more flexible and efficient, harness the best skills and experience of workers and eliminate many of the costs associated with running traditional hierarchical and rigid organisations.

The new economy is also characterised by changes in the competitive structure of industries. The traditional model, based on mass production where competitive advantage was gained through decreasing production costs or increasing productivity, has given way to a need for organisations to adapt to changes in market conditions, seek new opportunities, enhance learning, embrace change and innovation, and create and share knowledge. Managers in organisations

Issues	Old economy	New economy
Economy factors		
Markets	Stable	Dynamic and complex
Competition	National	International and global
Structure	Manufacturing	Service
Value driver	Physical capital	Human capital
Business factors		
Organisation	Hierarchy	Network or virtual
Production	Mass	Flexible, customised
Growth driver	Capital and labour	Innovation and knowledge
Technology driver	Machines	Digital and electronic
Competitive advantage	Low cost/high production	Innovation, speed, quality
Relationships	Independent	Collaborative
Consumer factors		
Tastes	Stable	Dynamic, segmented
Skills	Specialised	Multiple and flexible
Educational needs	Trade orientated	Lifelong learning
Workplace relations	Confrontational	Collaborative
Nature of employment	Stable	Insecure, opportunistic

Figure 1.2
Key differences
between the old
and new economy

have to co-ordinate and control the use of information technologies such as the internet, intranet, extranet and applications software to help meet these challenges and take advantage of the opportunities associated with operating within the new economy. [Figure 1.2](#) summarises the key differences between the old and new economy from the perspectives of the overall economy, businesses and consumers.

Types of e-business and related industries

E-business varies in scope and type of activities undertaken. The entire supply chain of many industries has been radically transformed by the development of the internet and related technologies. Some organisations specialise in business-to-business (B2B) activities by providing e-business services across the supply chain or in parts of the supply chain such as e-procurement, logistics, stock

control, ordering, payments and distribution. E-business also includes the organisation of collaboration platforms that allows different organisations to share information and knowledge for mutual benefit, i.e. the organisation of e-marketplaces that bring organisations together for buying and selling products and services or providing an online business support service.

The most high profile types of e-business involve those that sell products or services to customers. The business-to-consumer (B2C) sector has attracted the highest number of entrants as well as some of the most successful e-business ventures such as Amazon.com, e-Bay and FriendsReunited. The latter two also incorporate a consumer-to-consumer (C2C) element to their service by bringing consumers together for specific purposes. Most organisations now have a website that is used for promoting the activities of the business or marketing their products and services. More and more traditional firms are creating their own e-business and e-commerce websites to offer an additional sales channel for their customers (Tesco.com, marksandspencer.com).

There is a large industry sector that supports e-business, including Internet Service Providers (ISPs) such as Yahoo!, Google and AOL. These organisations run a number of services including internet access and search engines and have built up enormous databases of websites that form the basis of their search engine. Organisations who want to have their websites on the search engine pay an amount relative to the prominence on the list. Other organisations specialise in providing applications software for facilitating e-business or sell hardware such as computers and modems (Dell, Compaq, IBM). There are many thousands of businesses that specialise in maintaining and supporting e-businesses, including computer analysts, IT specialists, software consultants, applications consultants, computer trainers, security consultants and so on. The development and maintenance of the network infrastructure is a vital industry for ensuring high quality access to internet services and includes some of the world's biggest and most complex organisations such as BT and Cisco.

The growth of e-business

The most significant factor that transformed the internet into a global communications phenomenon was the development of the World Wide Web (WWW) in the early 1990s. This extended the functionality of the internet by introducing hypertext that linked documents held

on the internet servers. This facilitated access to particular parts of documents or even to other relevant documents held on other servers. This was called the hypertext transfer protocol (HTTP) and derived from a mark-up language called hypertext markup language (HTML). Within the servers, each document, or pages within documents, are given a unique address. The addresses are termed universal resource locators (URL's). The ability to access pages, documents and servers from many different websites created a network of interconnectivity and gave rise to the term the World Wide Web.

The Web was the catalyst for huge changes in the business environment as more and more firms sought to integrate their traditional business models with those online. By the mid 1990s firms 'born on the net' emerged, whose function was to exploit the opportunities in the marketplace by using the internet. However, the key driver of the phenomenal rise of the internet was the rapid increase in the use of computers with access to the internet and the Web by the public. From 1993 to 1996 the number of computer users with access to the internet and the Web rose from zero to 10 million. In 2004 the figure stood at around half a billion. Also, the number of websites appearing on the Web has increased exponentially from 1993 onwards. In the months following the release of HTTP and HTML there were less than 50 websites in existence. By the end of the decade there were countless millions available.

Since the commercialisation of the internet in the mid 1990s demand for its use has increased hugely each year. In fact, the growth of the internet has been such that there are fears that the existing infrastructure may be unable to sustain demand into the future. The internet has had a profound effect at so many different levels including individuals, society, business, governments, education, health, security services, entertainment, news services, financial markets and many others. To comprehend the staggering growth of the internet many analysts turn to the prediction of the founder of Intel and inventor of the chip, Gordon Moore. In the mid 1960s Moore predicted that the number of components that could be located on a single chip would double every twenty-four months. In the twenty years between 1974 and 1994 the Intel 8080 chip increased the number of transistors from 5000 to over 5 million. This exponential growth phenomenon became known as Moore's law and can easily be related to the growth witnessed in demand for access to information technology in general, and the internet in particular.

The internet has created a new communications channel and provides an ideal medium for bringing people together cheaply,

efficiently and for a wide range of different reasons. It has also presented opportunities and challenges for the business community. As consumers become more knowledgeable about using the internet to service their needs and wants so the business community has been boosted by the potential the internet presents for extending markets, developing new products and services and achieving a competitive advantage and profitability. New markets quickly emerged based on applications of the internet, most prominently the business-to-consumer (B2C) and business-to-business (B2B) sectors.

One of the key characteristics of e-commerce is the ease of entry for firms. The cost of entry and exit is low relative to traditional industries, as firms do not require large sales teams, costly investment in infrastructure or high sunk costs in order to compete effectively. Rising connectivity rates among potential customers ensures increasing competition among e-commerce firms as more are attracted to the source of potential revenue. Importantly, the internet does away with geographical boundaries thereby increasing yet further the extent of competitive rivalry. Intense competition is a characteristic of the internet economy and has spread across all e-business and e-commerce sectors. [Figure 1.3](#) outlines the main benefits that firms and consumers gain from using the internet.

Advantages of using the internet

Firms	Consumers
Ease of access	Ease of access
Ease of use	Ease of use
Access to wider market	Access to market information
Potential economies of scale	Convenience
Marketing economies	Lower prices
Improved logistics	Personalisation
Automated processes	Customisation
Network externalities	Network externalities
Improved customer knowledge	One-to-one customer service
Lower costs	Access to internet community
Increased efficiency	Empowerment

Figure 1.3
Advantages of
using the internet
for firms and
consumers

Use of the internet

Demand for internet services has been growing year on year since it became generally available to the public in the mid 1990s. The internet has had an impact on the economic and social fabric of many societies and has been the catalyst for changes in the way people interact, do business, gain information and seek entertainment. The internet has provided a whole new economy with its own rules and terms of engagement. Businesses and customers have been through a period of learning about how they can best leverage advantage from using the internet and many users are now adept at utilising the technology in a versatile and effective way to enhance their lifestyle.

In the UK around 60% of adults actively use the internet (Oxis). Of those, seven out of ten regard the internet as important or very important to their lives. The average time spent on computers by the 2200 people surveyed by the Oxford Internet Institute (OII) in 2005 was one and a half hours. The time spent using the internet has been at the expense of other activities such as reading, watching television and family life. There are many types of activities available on the internet but searching for information or communicating via e-mail are the two most popular. [Figure 1.4](#) lists the percentage of internet users undertaking a sample of activities.

Not everyone enjoys the benefits of the internet. There is, in each country, a section of society that remains marginalised or excluded from the digital revolution. The digital divide has implications for government, social services and society as a whole. In particular, children from poorer homes are more likely to find themselves excluded from the benefits of internet use because their parents lack the skills to help them use the internet as effectively as their middle-class counterparts (LSE, 2005). A study of 1500 young people conducted by the London School of Economics found that children from middle-class backgrounds had greater access to the internet at home (88%) compared to working-class children (61%). Children from middle-class backgrounds are more likely to gain benefits from exploiting the resources available on the internet to enhance their education and, eventually, their job prospects.

There are, of course, some people who deliberately exclude themselves from the digital revolution and shun the internet. In the UK, internet diffusion stands at 60% compared to 75% in the USA. After taking into account the 8% of internet users who have lapsed, that leaves around 32% of the UK population as non-users of the

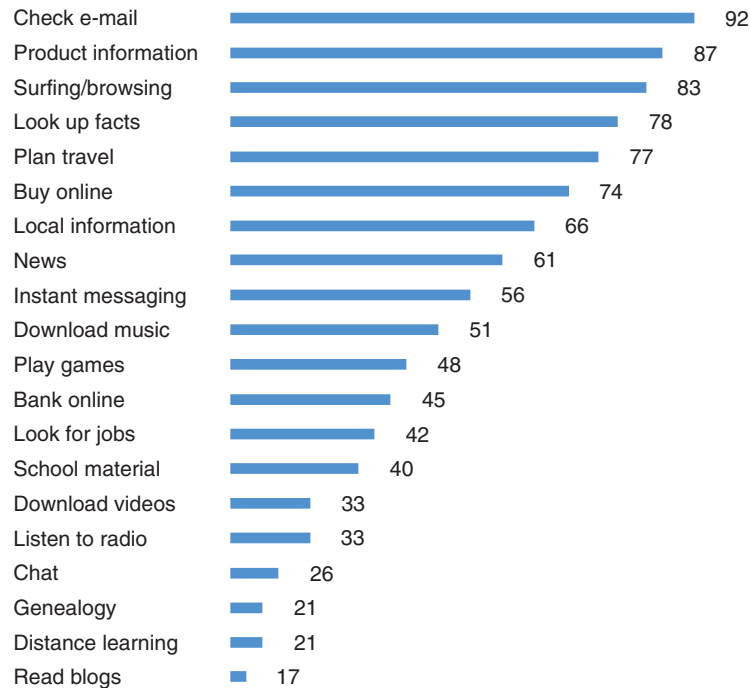


Figure 1.4
UK internet users'
online activities (%).
Source: Oxis
(Sample of 2200)

internet (Oxis). There is also around 15% of the UK population who do not possess a mobile phone.

A number of reasons have been put forward to explain the rationale of people who wish to exclude themselves from engaging with advances in information technology. Some have interests they see as incompatible with the internet, such as hillwalking or other outdoor activities (although mobile internet access could be useful for determining geographical positioning or a mobile phone could be useful should one require rescue services). Some people do not wish to be continuously accessible to communicating with others and view use of information technology as an invasion of privacy. The risk of being victims of fraud or other security breaches are other reasons put forward by those who do not participate in the digital revolution.

However, perhaps the most important reason is that many people feel daunted by the prospect of learning how to use new technology to their benefit. The challenge is for manufacturers to make computers more user-friendly so that more people can access the resources of the internet. The internet is a technology that has to be used and experienced before the benefits become apparent. Persuading non-users to engage with the internet requires better learning facilities, tailored marketing for all segments of society,

availability of free advice, easier navigation of computers, increased security and cheaper access.

Key people

The development and use of the internet has been made possible by the foresight, ingenuity and innovative prowess of a number of key people. The development of the internet stems from the work of a long line of inventors, technologists and engineers. Although the driving force behind its development stemmed from military needs, the commercialisation of the internet required a concerted effort to create the necessary communications infrastructure that supports internet-based activities.

The creation of the World Wide Web enabled many millions to access the resources held within the internet. The navigation of the internet became easier thanks largely to the development of web browsers and search engines. The commercialisation of the internet presented opportunities for entrepreneurs and computer buffs to create business models that attracted many millions of customers. The development of the internet and its use for business purposes is the result of the combined effort of a large number of people. This section of the book gives a brief profile of just some of the key people involved in bringing e-business and e-commerce to online consumers.

Tim Berners Lee

In 1984 physicist and computer buff Tim Berners Lee was working at CERN, the European particle physics laboratory in Switzerland, when he developed the idea of linking all the information stored on computers to other computers on a global scale. Berners Lee's ambition was to create a single, global information space that would be freely available to anyone with access to a computer. By 1990 enough progress had been made to name the project the World Wide Web (WWW).

The WWW was located on the internet and consisted of a computer language for formatting hypertext files (Hypertext Markup Language – HTML); a method for moving between files (Hypertext Transfer Protocol – HTTP) and a web address for each file (Universal Resource Locator – URL). The WWW was one of the most significant developments leading to the globalisation and commercialisation of the internet because it allowed free access to huge amounts

of information, facilitated communications between people and provided a mechanism for different activities to take place, including e-business.

Marc Andreeson

In the early 1990s Marc Andreeson was a young programmer at the National Center for Supercomputing Applications in the USA. In 1993 he released the first Web browser called Mosaic. The browser was easy to install, easy to use and could be operated on numerous systems including Microsoft Windows and Apple Mackintosh. The popularity of Mosaic grew quickly with around half a million users in the first year of its rollout. The most important contribution that Mosaic made was to transform Web browsing on the World Wide Web from being a slow, laborious and inefficient process to one that made navigation of websites quick and easy. It also allowed users to design their own websites.

Andreeson later teamed up with Jim Clark, an associate professor at Stanford University and founder of personal computer company Silicon Graphics. Between them they commercialised Mosaic and later called the browser Mosaic Netscape. After a legal wrangle with the University of Illinois over licensing fees Andreeson and Clark changed the name to Netscape. The Netscape Navigator browser was launched in December 1994 and by the end of the first quarter in 1995 had amassed three million users. Netscape was to become the world's most popular Web browser.

Bill Gates

In 1975 Bill Gates and business partner Paul Allen began writing software for computers and created a company called Microsoft. The company is now one of the world's most recognised brands and is a multi-billion dollar enterprise with interests in many hundreds of multimedia products. The basis for the success of Microsoft was the vision that Gates and Allen had in recognising the huge potential that personal computers would have as technology developed and demand grew. Today Microsoft enjoys a huge market share in computer software and related products and is fully established in the firmament of global corporations. The influence of Microsoft on the internet, and computers generally, cannot be underestimated, with

the vision and leadership skills of Bill Gates still very much a driving force behind the company's success.

Michael Dell

Michael Dell started his computer business when still an undergraduate at the University of Texas. Dell is now the world's leading direct-sale personal computer company. Dell built the success of the company around the concept of direct ordering through mail order, telephone and online by using the internet. The competitive advantage gained by the company lay in the ability to take large volume orders, transform those orders into products configured around customer specifications and, finally, assemble, package and deliver the product to the customer quickly, efficiently and in good condition. Dell takes orders amounting to around £20 million per day and is valued at around £20 billion.

Jerry Yang

Jerry Yang and business partner David Filo created internet search engine Yahoo!. The concept began when the two Stanford University PhD students started compiling lists of their favourite websites. This so-called 'hotlist' formed a database that web users could access to quickly find web pages. Yang and Filo recruited specialist managers Tim Koogle and Jeff Mallet to grow the business. By the late 1990s Yahoo! had grown into one of the world's leading search engines. However, it has not all been plain sailing for Yahoo!. Although Yahoo! had a market capitalisation of over \$100 million the company suffered the same fate as so many other dot-com firms in 2000. As the valuation of the company plummeted the attention of managers turned to survival. The rollercoaster story of Yahoo! is one of the case studies featured in this book.

Pierre Omidyar

Pierre Omidyar is the son of French-Iranian immigrants to America and is famous for creating the world's biggest and most well-known internet firm, e-Bay. Omidyar was a computer fanatic and spent a great deal of his student years programming on Apple. His move to

Silicon Valley was a natural progression for the self-confessed computer nerd. Omidyar had a vision for the internet that centred on providing the perfect market for trading. He decided that an online auction website would be the nearest thing to perfect competition as it would bring buyers and sellers together to negotiate transactions in the quickest and most efficient way possible. The phenomenal success of e-Bay is worthy of greater scrutiny and forms part of the case study series for this book.

Jeff Bezos

Jeff Bezos left his job on Wall Street to start a new business from his garage in Seattle. His idea was to use the internet to take orders for books and deliver them to customers quickly. His company, which he called Amazon.com, quickly built up a reputation and customer base that ensured growth. The Amazon strategy has remained consistent since its inception, to grow the business as quickly as possible and diversify the online retailing concept. The Amazon.com website now caters for a wide range of different products and services including toys, garden implements, healthcare products, media products, business services and so on.

In the first decade of its existence Amazon.com failed to make a profit but was able to survive through the goodwill of investors and lenders based around the huge market share the company had built up. Eventually, in 2003, Bezos was able to announce that Amazon was profitable and that the company would be extending its products and services further. The Amazon.com story features in the case studies series in this book.

Scope of the book

The main foci of this book are e-business from two perspectives:

- The use of the internet by organisations to improve internal communications and efficiency, speed administration and transactions, market products and services, communicate with supply chain partners, add value to customers and create a competitive advantage;
- The application of the internet as a basis for creating business models for selling products and services and

providing secure payment systems for transactions. It is concerned with using the internet as a mechanism for facilitating the exchange of value. This is commonly known as e-commerce, which is a function of e-business.

The book is designed to give a valuable insight into the key factors that organisations have to understand when undertaking e-business. The internet changes the way businesses operate and alters the marketing and economics of providing and selling products and services. There are distinct legal implications associated with selling products and services online and managers have to understand the complexities of incorporating new technologies into their organisations to improve internal efficiency and/or serve customers better. The scope of the book also includes ways in which competitive advantage can be gained through the effective management of e-business and the formulation, implementation and evaluation of strategies for e-business. The book concludes by giving an overview of the three distinct phases of e-business development and the performance of the e-business industry up to 2005. The final section offers some judgements based on current knowledge regarding the future for e-business and the key changes that are likely to impact the future prospects of the internet economy.

Structure of the book

Following the introduction the book proceeds to focus on technology as one of the most important drivers of e-business. [Chapter 2](#) (*E-business technology*) charts the development of the internet and the World Wide Web. It also gives an overview of the information infrastructure that is necessary to allow e-business and other internet-based activities to take place. The chapter then goes on to explain the key issues relating to the technical aspects of electronic communications such as Electronic Data Interchange (EDI), the development and use of program languages, the pros and cons of creating industry standards and the development of wireless technology and interactive television. The characteristics of new and emerging technologies are also highlighted. The chapter concludes with an overview of the types of technologies that are used to effect secure payments for e-business and e-commerce.

The key markets that exist for e-business and types of internet-based business models form the basis of the discussion in [Chapter 3](#)

(*E-business markets and models*). The chapter begins by identifying the types of businesses that use the internet as a means of communications and transactions. There then follows an overview of the e-business competitive environment before going on to highlight the advantages associated with e-marketplaces and the characteristics of the key e-business markets that have emerged. The main part of the chapter includes definitions and examples of the main e-business models used by internet-based organisations. The chapter concludes with a framework for analysing the effectiveness of e-business models.

Another important driver of e-business concerns the economics of undertaking trade online and the cost savings and efficiencies that organisations can gain by using the internet and related information technologies. [Chapter 4](#) (*E-business economics*) starts with a discussion on how the internet pushes markets towards perfect competition. This is followed by a wider discussion of how the internet affects the competitive environment. There are a number of key economic factors that contribute to the formation of a distinct e-business competitive environment. The main ones form the basis for the rest of this chapter and include cost factors; disintermediation and reintermediation of organisations along the supply chain; the economics of information-based products and services, levels of connectivity and interactivity; economies of scale and scope; the effects of low transaction costs; the role of switching costs in creating a competitive advantage and building a critical mass of customers. The chapter concludes with an examination of the effects of online trading on prices.

The internet provides an additional communications channel for organisations and provides a mechanism through which marketing and promotional activities can be undertaken. [Chapter 5](#) (*E-marketing*) focuses on the key aspects of marketing using the internet, including the creation of a marketing plan; the marketing mix; the way the internet can be used to underpin the strength of branding; the targeting of online customers; the effect of the internet on advertising; the emergence of interactive television and its impact on e-marketing; and the development of customer relationship management (CRM) systems as a means of building knowledge of customers' online browsing and buying habits and as an aid to marketing products and services to key customer segments.

The development of the internet has raised a number of new and pressing problems relating to issues of law and security.

One of the strengths of the internet is the freedom of individuals to access and use it largely as they see fit. However, this strength can also be a weakness since it offers the opportunity for individuals, groups or organisations to abuse the freedom it offers. The internet has raised a number of issues that require the intervention of legislators, public policy makers and law enforcement agencies. There are ethical (pornography), legal (contracts for electronic transactions), trust (sharing sensitive information), privacy (securing information) and security (cyber-terrorism, fraud, spam) issues to be addressed. [Chapter 6](#) (*The internet: law, privacy, trust and security*) highlights and discusses these key issues and analyses the impact that they have on the development and growth of e-business.

Creating a competitive advantage begins with effective management of e-business. [Chapter 7](#) (*The management of e-business*) begins with a discussion of managing knowledge. For many modern organisations competitive advantage stems from the ability of managers to communicate a vision and build a positive organisational culture based around knowledge and learning. The discussion of knowledge management links into the section on managing applications for e-business where the advantages of implementing some of the main types of applications are highlighted. Technology itself cannot create a competitive advantage and this is recognised in the section dealing with management skills for e-business. The development of the internet and other information technologies has placed extra demands on managers who are charged with the task of deciding what technology is appropriate for their organisation, linking it to the skills of workers, and bringing it all together to help achieve stated aims. There are a number of risks associated with undertaking e-business and the final section of this chapter focuses on identifying the key risks and their related problems as well as suggesting some solutions.

To gain a competitive advantage organisations have to formulate and implement a strategy. A strategy is a formal set of activities that have been identified as the means through which stated aims and objectives are to be achieved. There are three parts to the strategic process – formulation, implementation and evaluation. [Chapter 8](#) (*E-business strategy: formulation*) sets out the key elements that comprise objective setting for organisations. An explanation of the strategic process is the precursor to identifying and explaining some key elements of an internal and external analysis. This section uses theoretical models such as the value chain and the five forces model

as frameworks for analysis and discussion. The chapter concludes by highlighting competitive strategies for gaining a competitive advantage by using Porter's (1985) generic strategy model.

Chapter 9 (*E-business strategy: implementation*) features the second element of the strategic process. The chapter starts by identifying and explaining the key elements that comprise strategic control. Control functions are necessary in order to link the chosen strategy with outcomes so that performance can be evaluated. This is followed by discussion and evaluation of three main ways of implementing strategy: organisational learning, organisational culture and organisational structure. These three elements are linked and come together to help organisations achieve their stated aims and objectives. The chapter concludes with a discussion on change management as part of an implementation strategy. In particular, this section focuses on the practicalities and tactics for implementing change and highlights some of the problems and solutions to resistance to change.

Chapter 10 (*E-business strategy: evaluation*) forms the third part of the strategic process. All organisations have to undertake some form of evaluation of strategy in order to determine whether or not progress has been made towards achieving stated aims and objectives. The chapter begins with an overview of the evaluation process before outlining the role that evaluation plays in the control function within organisations. This is followed by discussions centred around the key elements of the organisation that have to be evaluated, including finance, technology, human resources, the website and the business model adopted for achieving competitive advantage.

The main reason why organisations undertake a strategic process is to ensure that their resources are being utilised in a way that maximises returns and helps achieve a competitive advantage. Once competitive advantage has been achieved managers need to turn their attention to ways in which the competitive advantage can be sustained into the future. The issues relating to the ultimate aim of developing a strategy are discussed in **Chapter 11** (*Gaining and sustaining a competitive advantage*). The key issues addressed in this chapter include the importance of first-mover advantages; the factors that determine the choice of generic strategy; the integration of generic strategies; expanding product lines; the lock-in and switching costs of customers; the mix of traditional and online business (bricks and clicks); and the winner-takes-all characteristic of many e-business models. The chapter concludes by highlighting some of the problems of sustaining competitive advantage.

The final part of the book is [Chapter 12](#) (*E-business: the future*). This chapter starts by giving an overview of the three distinct phases that the evolution of e-business has passed through since the commercialisation of the internet in the mid 1990s. This is followed by analysis and discussion of the performance of e-business in the UK and the USA in the decade since e-business and e-commerce started to emerge on to the industrial landscape. The knowledge gained through analysing past performance and experiences alongside understanding of emerging technologies and business models forms the basis for making value judgements about the future prospects for e-business. This final section of the book looks to the future of e-business from the perspective of key parts of the internet economy.

Case studies

The book includes five case studies. These are:

- Amazon.com: one of the first-movers in e-business and e-commerce.
- e-Bay: the world's most successful online auction site.
- Tesco.com: the online service of the UK's leading supermarket.
- Yahoo! the rise, fall and rise again of the Internet Service Provider (ISP).
- boo.com: the failed online fashion e-tailer.

The cases have been chosen based on four main criteria:

- They are widely recognised brands with distinct business models based wholly, or in part, on the use of the internet or associated technologies;
- They clearly illustrate some of the key issues featured in chapters in the book;
- They cover the most prominent internet-based business models (e-tailing, auction, ISP and as an additional service provided by an established bricks and mortar organisation). The cases also cover the main e-business markets of business-to-consumer (B2C), business-to-business (B2B) and consumer-to-consumer (C2C);
- They provide an insight into the success and failure, risks and benefits, and opportunities and threats that trading online or providing internet-based services can bring to organisations.

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E-business technology

Key issues:

- The development of the internet;
- The World Wide Web (WWW);
- Information infrastructure;
- Electronic Data Interchange (EDI);
- Program languages;
- Industry standards;
- Wireless technology;
- Interactive television;
- Payment systems.

Introduction

Chapter 2 focuses on the key technological factors relevant to e-business. The chapter starts with an historical overview of the development of the internet and the World Wide Web. An outline of the information infrastructure that supports electronic communication is featured, using issues of connectivity and interactivity as a basis for highlighting the growth of electronic communications on a global scale. The rollout of broadband internet services is also discussed in this section. The history of electronic communications in business is further explored by discussing the role of Electronic Data Interchange (EDI) in the development of e-business.

There then follows a discussion of the key program languages that underpin e-business communications via the internet. The chapter then features analysis of the issue of standardisation of technology in e-business. Examples of attempts at standardisation and the advantages and disadvantages of each are discussed. The analysis offers an understanding of how the evolving e-business environment may benefit from universal standards whilst articulating the reasons for the continuing lack of an accepted universal standard. The chapter also highlights emerging technologies and discusses the key developments in mobile wireless technology, interactive television and payment systems.

The development of the internet

The development of the internet stems from innovations in computer technology. The first attempts at constructing a computer date back to the early twentieth century. In 1913 Vannevar Bush invented the Prolific Tracer, a device comprising a bicycle wheel, a rotating drum, gears and a pen. The device could measure distances over uneven ground. By 1919, Bush had created the first computer that could solve mathematical equations, called the 'differential analyser'. The onset of two World Wars meant that greater investment was poured into developing technology for military purposes. Computers became bigger and more sophisticated.

In the UK, the invention of the Enigma code-breaking computer by Alan Turing played a crucial role in turning the tide in favour of the Allies against Nazi Germany. In the USA, the momentum for developing the computer was enhanced by the setting up of the National Science Foundation (NSF) in 1944 to support scientific research. Microphotography was invented in 1945. This was the first system that could store large amounts of information in small storage units – the same principle as digital technology in the modern era. The immediate post-war period also saw the development of the cathode ray tube that could display text on a screen. The proposed system that combined data storage and visual text that could be linked by files was called the 'memex'. Although it was never built the idea was the forerunner of the World Wide Web.

The application of business activities via the internet has been a feature of the business environment since the late 1980s, but the roots of its development stems from scientific research dating back to the Cold War era of the 1950s. In an effort to co-ordinate the

activities of the US military, President Eisenhower set up the Advanced Research Project Agency (ARPA) in 1958. A decade later ARPA had successfully introduced a system called ARPANET that facilitated the sharing of information electronically between its headquarters and selected universities across the USA.

By the mid 1970s the National Science Foundation (NSF) of the USA was commissioned to further the activities of ARPANET across the university sector. The development of electronic mail (e-mail) was one feature of the burgeoning interest in electronic communications. In 1980 the NSF formally introduced an academic network system called CSNET that connected US university computer science departments. With the NSF supplying the support network called 'NSFNET', the number of computers supplying information through the network more than doubled each year throughout the 1980s. Simultaneously, other networks connecting communities emerged across the USA and Europe. The use of NSFNET became diluted by the emergence of independent network companies who set up international links for the electronic transfer of information. However, all networks used the same protocol (TCP/IP) and the same open operating system (Unix). This network of networks formed the birth of the internet as we know it today.

By the early 1990s the use of the internet had expanded beyond university departments and government bodies to incorporate the business world. However, the use of the internet for business purposes got off to a slow start because no infrastructure existed that could connect users to the network from any location around the globe. Only those with a good knowledge of the technology could find their way around the large number of databases. Even then the whole process was time-consuming and frustrating. For the internet to be adopted by the business community, and the general public, there was a need for a system that made navigation of the network simple and narrowed down the number of documents that users had to search through before accessing the information they needed. Early search facilities included Gopher, a system that used menus as a means of searching for documents.

The World Wide Web (WWW)

Perhaps the most significant development in bringing forward the application of business via the internet was the emergence of the World Wide Web (WWW). The usability of the internet was greatly

enhanced after researcher Tim Berners Lee developed the hypertext transfer protocol (HTTP) at the CERN atomic research centre in Switzerland in 1993. Through HTTP it is possible to use a hypertext markup language (HTML) to design web pages with text, graphics and a range of other formatting techniques to create a visually appealing layout, as well as linking documents electronically to other documents. The links in each document are connected to links in other documents thereby creating a network of information sources on a worldwide scale. The technology underpinning the WWW is relatively simple. A computer acting as an internet server is turned into a site on the WWW by activating software on the server that enables it to talk the language of HTTP. The language facilitates access to documents marked up with HTML codes and allows users to link from other servers to the documents or to use the documents as jumping off points to other sites on the WWW.

Crucially, the WWW brought together information on a common topic to ease the process and speed of searching. However, there was still work to be done before the internet could become the global phenomenon that it is today. In the months following the release of Berners Lee's HTTP there were only 50 websites in existence compared to the millions there are today. Hyperlinks alone could not attract a global level of usage because the internet still ran on the open operating system Unix. The problem of usability remained. To overcome this, researchers had to find a way of moving the internet beyond the confines of the academic world to one that would be readily available to anyone with access to a computer.

Thus, very soon after the development of the WWW in 1993 a team of researchers at the National Center for Supercomputing Applications (NCSA) at the University of Illinois developed a windows-based graphical user interface for the internet. The window is a specialised form of software which is run on client computers to provide an instant interface for the Web. The generic name for the software is a Web browser.

The web browser developed by Marc Andreessen and his team of researchers at the NCSA was called 'Mosaic' and represented the first truly worldwide web. In 1994 the same group of researchers developed Netscape, a browser with a 'search engine' that enables searches using keywords. Netscape briefly enjoyed a near monopoly of the market for web browsers. However, the market domination of Netscape has subsequently been eroded by competition, most notably from Microsoft's Internet Explorer. The market for web browsers is also competitive, with Google, Lycos, Yahoo! and AltaVista being

among the more prominent websites specialising in facilitating keyword searches. By 1995 the NCSA team had been tempted into the commercial arena by Jim Clark, Chief Executive Officer of computer hardware company Silicon Graphics. Between them they created one of the world's best-known browsers – Netscape Navigator.

Prior to the development of the WWW and Netscape, businesses had mostly used the internet for publishing information online relating to products, prices and other marketing material. However, by the mid 1990s businesses across the globe began using the internet for conducting online transactions (e-commerce) and a host of other business activities such as communicating with suppliers, distributors, partners, manufacturers and government bodies (e-business). The need for quick and efficient access to information became the key to gaining a competitive advantage in the web browser industry. A keyword search results in a long list of sites offering a large amount of information on a common topic. What firms wanted was for web users to be channelled towards their particular website. This could be arranged by advertising on a portal. A portal is a website that acts as a gateway to the information on the internet by providing search engines, directories and other services such as personalized news or free e-mail.

Information infrastructure

The information infrastructure is the support system that allows the internet to work. The main infrastructure support facilities exist in developed nations where access to the internet has moved beyond fixed location computers to incorporate mobile wireless computers and mobile phones. Even in developing nations such as India and China the connectivity rates for internet access are rising exponentially year on year. Most developed nations have been constructing their own national information infrastructure (NII) to facilitate connectivity in homes, educational institutions, businesses and public organisations.

The investment required for building the information infrastructure has been considerable and the connectivity rates differ markedly between countries and continents. For example, political, economic and geographical factors have combined to slow the development of the information infrastructure across the African continent relative to other regions. In many geographically remote areas the rollout of satellite-enabled wireless infrastructure may circumvent the problems

associated with land-based telephony systems that cross borders and hazardous terrain. An effective infrastructure needs to be able to support high rates of interactivity and is reliant on robust hardware and software, continuous power supplies, state-of-the-art telecommunications systems and the availability of efficient maintenance and support systems. An important infrastructure initiative that addresses the issue of high demand and the need for quick and efficient access to internet services is the development of broadband.

Broadband

Broadband has been part of communications terminology for a number of years but few consumers of media are aware of what it is or what it does. Since interactive television arrived in the 1990s consumers have been absorbing the products and services that new technology has brought to the home. Similarly, governmental bodies and the communications industries have been on a steep learning curve, as the pace of change has posed difficult questions regarding regulation of industry structure, issues of content, wider access and increasing competition.

Broadband is a term used to describe the bandwidth of a transmitted communications signal. The bandwidth describes a range of frequencies that the signal occupies (Rao and De Backer, 2000). The bandwidth for digital and analogue corresponds to the amount of information received or sent over a particular time unit. Higher bandwidth increases transmission speeds and facilitates the communication of much greater volumes of information (Brennan, 1999). For consumers, broadband has numerous delivery platforms for accessing the internet including personal computers, television and mobile telephones.

With cables, high-capacity optical fibre networks provide greater speed and volume of information. Existing telephone networks also provide a similar platform through the technique of multiplexing. This allows more information to be channelled through old copper wires. ADSL (Asymmetric Digital Subscriber Line) is the specific technology for making broadband transmissions on existing telephone networks. Essentially, broadband hugely increases the range of services that can be offered via the internet and digital television.

An important issue relating to broadband rollout is the method of dealing with local-loop unbundling. This is the process that

permits smaller firms into the competitive market for ADSL services. Unbundling allows firms to access and install the necessary technology in British Telecom (BT) exchanges to compete in the 'last mile' of the telecommunications link between provider and user. However, demand for access to local exchanges has been lower than predicted because of a combination of poor sites offered and a lack of robust business models. BT has now opened up more of its infrastructure to make investment in broadband more attractive to smaller firms.

The UK government set out its plans for broadband rollout in the document *Broadband Britain* (1997). ADSL technology was the preferred option for introducing broadband services in the UK starting in 2001, with countrywide availability set for 2002. However, for technical and economic reasons ADSL fell short of expectations and the government had to rethink their broadband strategy. Other forms of delivery have been tested for economic and technical efficacy including DSL (Digital Subscriber Line), cable and the existing copper wire in telephone lines. Fibre-optic cable is the most efficient, but also the most expensive option. The business plans of many e-businesses have been built around new business applications facilitated by broadband infrastructure.

Access to broadband has become a vital component for e-businesses. This is especially the case for firms located in geographically remote areas. Most of these firms tend to be small and medium sized enterprises (SMEs) that rely on high-speed internet access to circumvent their geographical isolation. However, in the UK there is evidence that a significant number of businesses are being denied access to the broadband infrastructure on economic grounds. In 2005, BT estimated that there were 565 small-scale exchanges in the UK that were uneconomic for broadband installation. Combined, these exchanges serve around 100 000 customers (the number of people affected rises considerably when employees are added to the list).

Although BT has removed geographical limits for 512 k/bits per second broadband, the majority of businesses need access to 2M/bits per second and this can only be guaranteed within four miles of an exchange. At the Labour Party conference in 2004 Prime Minister Tony Blair underlined the Government's commitment to deliver broadband technology to every home by 2008. This may prove an overly ambitious target unless the economic investment in broadband infrastructure is bolstered by subsidies.

Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) describes the exchange of documents between organisations in standardised electronic form directly between computer applications. Many routine and procedural processes between organisations are automated and completed electronically using EDI. Purchase orders, invoices and material releases are just some examples of these processes where EDI can result in cost savings and increased efficiency. Another advantage of EDI is the standard format of communication between organisations that it offers. This circumvents the need for each organisation to deal with the internal data formats of other organisations, thereby allowing integration among dispersed organisations.

The origins of EDI stretch back to the early 1960s but the development of the internet gave the use of EDI an added boost. Transmitting EDI via the internet has seen its application extending across many industries such as engineering, electronics, metals, petroleum, chemical and the pharmaceutical sector. The early use of EDI in industry was characterised by closed systems whereby agreements were put in place restricting the number and type of users to a particular industry. Since the development of the internet, systems deployed use international standards that enable organisations to deal with any interested party via that standard. However, there are numerous standards in operation and this constitutes an impediment to the universal online access to all organisations. A detailed analysis of the issue of standardisation is featured later in this chapter.

Minoli and Minoli (1998) summarise the key features of EDI as:

- The use of an electronic transmission medium;
- The use of structured, formatted messages based upon agreed standards;
- The fast delivery of electronic documents from sender to receiver; and
- The direct communication between applications and systems.

The key benefits associated with EDI include:

- Lower costs in administration and processing;
- Lower costs in posting and preparation of transactions;
- Increased efficiency in transaction processing;
- Eliminating paper-handling tasks;

- Reducing errors;
- Quick exchange of documents which reduces the business cycle;
- Lower inventory costs;
- Increased customer service.

Use of EDI has been a feature of business strategies of many firms as they seek competitive advantage. However, the cost of implementing EDI and its architectural limitations has resulted in its failure to achieve universal acceptance across industry. For example, there are many EDI standards that are significantly divergent from each other. The United Nations sponsor the EDIFACT (Electronic Data Interchange for Administration, Commerce and Trade) standard, whereas in the United States the ANSI X12 standard is the most commonly used. Each standard requires users to map the data items of the standard with their own system.

EDI systems run on a network infrastructure called 'Value Added Networks' (VANs). These VANs were built for commercial return but have been undermined by the internet, where costs are lower because the development work was paid for through public funds. EDI cannot compete with the internet either on scope of applications, reach or economic criteria. For EDI to be a viable proposition there has to be agreement on standards between participants and even then there has to be sufficiently large volumes of applications taking place to justify the investment costs.

Program languages

Technology development lies at the heart of e-business. In order to communicate with others via a computer it is necessary to access a program language. A program language facilitates the development of a set of instructions from the programmer that constitutes a computer program. The instructions must be translated by a language translator into the computer's own machine language before they can be processed. Types of language translators include 'assemblers' that translate symbolic instruction codes, and 'compilers' that translate high-level language codes. These two types of language translators produce a complete machine language program, unlike an 'interpreter' that translates and executes each statement in a program individually. There are many program languages, and each has their own form of language translator, vocabulary and user