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电子商务：原理与应用

Electronic Commerce:
Principles and Applications

李晓莉 张华平 谢敬佩 编著

 中国农业出版社

China Agriculture Press

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Preface

Electronic Commerce: Principles and Applications

What is mainly covered in this book

Electronic commerce (or e-commerce) —the purchase of goods and services over the Internet's World Wide Web—is a broad term. It encompasses all electronically conducted business activities, operations, and transaction processing. It also influences government's activities.

E-commerce can take place between companies and customers (business-to-customer), between companies (business-to-business), or between customers/companies and public administration (e-government), all relying on each other for supplies, distribution, services, and technology. E-commerce can't develop without the support of technology, security, payment, marketing, logistics and government.

We have sought, in writing this book, to synthesize current thought and practice into a comprehensive review of electronic commerce. Our choice of topics, in general, reflects the fundamental structure and essential of e-commerce.

This book—designed as a practical “how to” guide—covers all important aspects of e-commerce to help you implement. The techniques it covers can be adopted outright or modified to suit your own needs. Numerous examples illustrate practical applications. Checklists, exhibits, illustrations, and step-by-step instructions enhance the book's practicality. Common questions are answered. Our goal is to give you an up-to-date compendium of current technologies and applications, taking into account new and emerging trends. Because e-commerce requires you to be knowledgeable about both technology and economic management, we have given special consideration to balancing these two needs.

We have tried to make this book easy to understand, comprehensive, and informative. We hope it will be a valuable reference that you can refer to every day.

LI Xiao li contributes Chapter 4, 6, 7. ZHANG Hua ping contributes chapter 1, 2, 5, XIE Jing pei contributes chapter 3, 8.

Why we write this book

The main motivation for writing this book is to support our search on electronic commerce and to supply a textbook for teachers and students in colleges and universities. We are glad to join in the teaching reform activities and try to promote the development of bilingual teaching with others who dedicate to the development of bilingual teaching.

There are many useful works on individual aspects of e-commerce such as security, technology, electronic payment systems or m-commerce. Nevertheless, we want a book we can recommend to readers that would cover (and update) all topics that we consider relevant. It can be said that this book is the result of many years of experiencing teaching (especially bilingual teaching) and studying electronic commerce at the undergraduate and postgraduate level. The book is also intended for all IT professionals and others with some technical background who are interested in e-commerce.

Some disclaimers

This book does not cover all aspects of e-commerce, nor does it discuss specific e-commerce models and their particular application requirements. As its name says, the book deals with the fundamental e-commerce issues that one must consider when learning an e-commerce application. It does not always provide a detailed discussion of the e-commerce topics, but gives references instead. Whenever possible, we also provide URLs and supplements, but unfortunately we cannot guarantee that they will still be valid at the time of reading. In addition, draft documents representing work in progress (e.g., by IETF, W3C, and other standardization bodies) may also be expired or no longer available. Throughout the book we have mentioned certain company or product names; their sole purpose is to provide examples, not to give preference over other companies or products.

How to read this book

The book has eight chapters. Each chapter can be read individually. It is necessary to study all of the content in chapter 1 in order to understand other parts of the book well. Chapter 1 gives an overview of e-commerce.

From chapter 2 to chapter 8, you will learn important knowledge of electronic commerce below:

1. E-commerce technology including fundamental technologies and advanced technologies (chapter 2);
2. E-commerce security (chapter 3);
3. E-commerce payment (chapter 4);
4. M-commerce (chapter 5);
5. E-marketing (chapter 6);
6. E-commerce logistics (chapter 7);
7. Electronic government (chapter 8) .

We have also been neutral regarding gender, using she and he more or less alternately throughout the text.

Acknowledgements

The book would not have been possible without contributions and support from many people and institutions. We are deeply grateful to all those who support us, directly and indirectly, in writing this book.

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We wish to thank our editor, Huang Yu, for her outstanding editing work on this book. We very much appreciate her exceptional efforts.

We hope that you will enjoy reading the book, and that you will learn something from it. We are grateful for any feedback. You can reach us at zhanghuaping@ncwu.edu.cn.

Any mistakes in the book are ours.

Editors

February 2009, in ZhengZhou

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Chapter 1

Electronic Commerce: Principles and Applications

Overview of Electronic Commerce

1.1 Introduction

Commerce is a basic economic activity involving trading or the buying and selling of goods (according to standard dictionaries). For example, a customer enters a bookshop, examines the books, selects a book, and pays for it. To fulfill the customer requirement, the bookshop needs to carry out other commercial transactions and business functions such as managing the supply chain, providing logistic support, handling payments, etc. As we enter the electronic age, an obvious question is whether these commercial transactions and business functions can be carried out electronically. In general, this means that no paperwork is involved, nor is any physical contact necessary. This is often referred to as electronic commerce (e-commerce). The earliest example of e-commerce is EFT (electronic funds transfer). This allows financial institutions to transfer funds between one another in a secure and efficient manner. Later, electronic data interchange (EDI) was introduced to facilitate interbusiness transactions. However, early EDI systems were typically operated over special networks that are complex to set up and costly to administer. For these reasons, EDI has not been as widely deployed as expected. With the advent of internet technologies and advanced cryptographic techniques, it is now feasible to implement e-commerce over a public network—the Internet. The development of the World Wide web (WWW) greatly accelerates the development of e-commerce and expands its scope to cover different types of applications. In this chapter, we will give an introduction to e-commerce by discussing some primary concepts, advantages, and frameworks.

1.2 Definition of electronic commerce

There does not exist a simple definition of e-commerce that adequately describes the coverage of its operations, functions and underlying technologies. One common view is: e-commerce is the process of buying and selling or exchanging of products, services; and information via computer networks including the Internet.

- From a communications perspective, EC is the delivery of information, products/services, or payments over telephone lines, computer networks, or any other electronic means.
- From a business process perspective, EC is the application of technology toward the automation of business transactions and work flow.
- From a service perspective, EC is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the

speed of service delivery.

- From an online perspective, EC provides the capability of buying and selling products, services and information on the Internet and other online services.

Although this is correct, buying and selling of products, services and information is only one of many types of e-commerce activities. In broader terms:

E-commerce is any commercial activity conducted electronically, particularly via private or open networks, such as the Internet.

The key point of this definition is that e-commerce is a confluence of business operations with electronic and network technologies. Telephony and non-networked technologies such as CD-ROM media may integrate into operations, but the core of e-commerce is network technologies and especially open networks such as the Internet. The Internet made possible the rapid global adoption of e-commerce because of the lower costs involved and its being based on open standards. Experts share an optimistic prediction on the increased use of the Internet for electronic commerce.

E-commerce is not an entirely new type of commerce. It first emerged in the 1960's on private networks, as typically large organizations developed electronic data interchange (EDI) installations and banks implemented electronic funds transfer (EFT). Today, however, e-commerce is no longer the exclusive domain of large organizations or private networks. The open network Internet and particularly the World Wide Web not only present new commercial potential for large organizations, but also provide a viable entry point for small and medium-sized enterprises (SMEs) into e-commerce opportunities.

Is e-commerce the same as e-business?

In recent years, another term called e-business has emerged. Some use e-commerce and e-business interchangeably. In general, e-business has a wider perspective than e-commerce. It involves using information technologies in all aspects of the business. Hence, e-commerce can be viewed as a subset of e-business. However, like many other e-commerce books, we will use the following terms e-commerce, Internet commerce, web-based electronic business and e-business in an interchangeable manner.

Through e-business, the following business areas/applications are enhanced and improved:

Workgroup communications E-business applications in this area provide the means of communication between managers and employees, through electronic mail, videoconferencing, and bulletin boards for the purpose of increasing information dissemination, to the end of having better informed employees.

Electronic publishing Such applications allow companies to organize, publish, and disseminate critical work information, such as human resources manuals, product specifications, and minutes of meetings through tools such as the World Wide Web. The benefits of online publishing include: reduction of costs for the printing and distribution of documentation, speedier information delivery, and minimization of outdated information.

Sales force productivity Electronic applications enhance information flow between the production and sales forces, and between the firm and its customers. Through the integration of sales forces with other parts of the organization, firms will have increased and

quicker access to market intelligence and competitor information to aid in better strategy formulation.

1.3 Electronic commerce and traditional commerce

Generally speaking, e-commerce is about the sale and purchase of goods or services by electronic means, particularly over the Internet. E-commerce is not going to the web and doing the same traditional commerce thing in just a slightly different setting. Successful e-commerce firms do new things and add unique, new improvements to old things in cyberspace. Dell Computer's emergence as the US's largest computer company is not due simply to the fact that it sells plain vanilla computers over the Internet. Dell's success is due primarily to its ability to use the Internet to produce and sell customized computers. The key point here is that the Internet and information technology (IT) are simply an enabler. Business is created when technology is used to enhance value or create new products.

Figure 1.1 shows that in broad terms one can distinguish two types of commerce: traditional commerce and e-commerce. In a traditional or physical commerce system, transactions take place via contact between humans usually in a physical outlet such as a store. For example, if you want to buy a book, you will go to a physical bookstore and buy the physical book from a salesman.

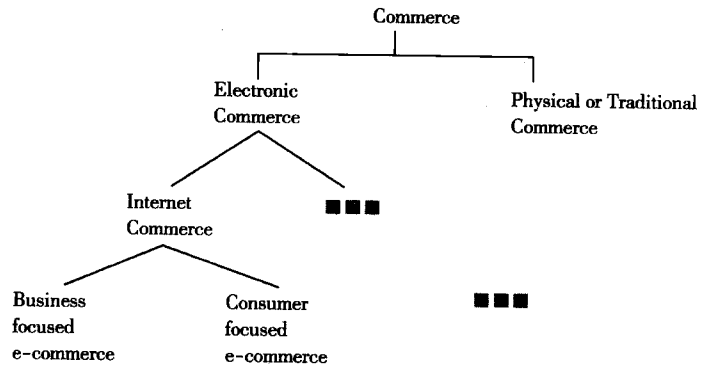


Figure 1.1 Types of commerce

In a pure e-commerce system, transactions take place via electronic means. In this case, you will access a cyber bookstore such as www.netlibrary.com and download a digital book from a server computer. These two cases represent the extremes: the traditional commerce system on one side and the pure e-commerce system on the other. There are many variants and in many cases, e-commerce and traditional commerce can complement each other. For example, a physical book is ordered by electronic means and it is sent to you via physical means. E-commerce is more suitable for standard goods, low-value goods, digital goods, and simple services (i.e. intangible goods), whereas traditional commerce is more suitable for nonstandard goods, perishable goods, expensive goods, and extremely low-value goods. Complex products such as cars and nonstandard services are better served by integrating e-commerce and physical commerce.

Most people have an understanding of commerce based on their experience as shoppers and buyers, and they bring this experience with them when they start shopping online. So, it's necessary to understand the characteristics of traditional commerce.

Identity. Customers can easily authenticate the identity of a merchant simply by walking into a bricks-and-mortar store. There is a concreteness about a physical store that no amount of HTML will ever match.

Immediacy. Customers can touch and feel and hold the merchandise. Tactile cues can drive the decision to buy. A transaction that is face-to-face is usually unmediated; your communication with the merchant is not in the hands of a third party or technology (as with ordering by phone).

Value. The item at the center of the commerce transaction—the product or service that is to be sold/bought—has some kind of value. Its price is determined and validated through the performance of the transaction. The seller agrees to a selling price, and the buyer agrees to a buying price. The value of an item, especially the relative value an item has for the buyer, is much easier to appraise if that item is close at hand.

Discourse. Customers can converse with the merchant face-to-face; unmediated conversation is basic to human communication. People want the feedback available from non-verbal behavior, which forms a large part of our judgment process.

Community. Customers can interact with other customers and gain feedback about the merchant from other customers, as well as by observing the merchant interacting with other customers.

Privacy. Customers can make purchases anonymously with cash; they usually don't have to give their name or address. They don't usually have to worry about what a store will do with their personal information, although this is becoming more of an issue with various recent attempts by lawyers to access private sales and rental records. Privacy is often a measure of how much of his or her identity a buyer wants to invest in a transaction; sometimes, we just want to quietly make our purchase and leave with it.

An online commerce customer faces mediation in every element and at every stage of the commerce transaction. Customers can't see the merchant, only the merchant's website; they can't touch the merchandise, they can only see a representation; they can't wander a store and speak with employees, they can only browse HTML pages, read FAQs, and fire off email to nameless customer service mailboxes; they can't explore the store's shelves and product space, they can only search a digital catalog. A customer at an online commerce site lacks the concrete cues to comfortably assess the trustworthiness of the site, and so must rely on new kinds of cues. The problem for the online customer is that the web is new and online commerce seems like a step into an unknown experience.

So, it's not difficult to find out that e-commerce differs from traditional commerce primarily in the way that information is exchanged and processed. Traditionally, information has been exchanged through direct personal contact or through the use of phone or postal systems. In EC, information is conveyed primarily via digital communications networks and computer systems. Often these networks are accessible to everybody and have an open nature.

1.4 Drivers of e-commerce

Various statistics and forecasts have all indicated that e-commerce has an extremely promising future. A few years ago, Forrester Research forecasted that e-commerce sales would account for 1% of the global economy by 2002. However, recent forecasts have all suggested that this may be too conservative. It is predicted that the number of e-commerce customers worldwide will reach 900 million by 2005, and the associated revenue will increase

to \$550 billion as compared with \$120 billion in 1999. According to the Gartner Group, business-to-consumer e-commerce will account for 5%~7% of the retail sales in the United States by 2004. This represents at least a 500% growth from the year 2000. Based on research by Jupiter Communications, the revenue for business-to-business e-commerce in the United States will reach \$6.3 trillion by 2005, representing a 2000% increase as compared with the same Figure in 2000.

These figures indicate that there must be some “drivers” behind e-commerce. As e-commerce is about going “DIGITAL,” we call this the DIGITAL phenomenon. Here we attempt to examine the

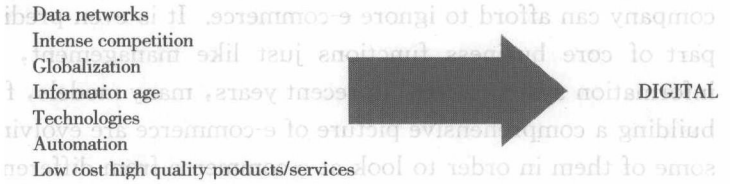


Figure 1.2 The “DIGITAL” phenomenon

possible drivers behind e-commerce (or the DIGITAL phenomenon) by the following “DIGITAL” acronym (see Figure 1.2). Hopefully, this can provide the basis for further discussion.

Let us explain the key words given in the figure in more detail in the following table (Table 1.1).

Table 1.1 Summary of key drivers of e-commerce

Key drivers	Explanations
Data networks	With the advent of data networks such as the local area networks and the Internet, dispersed computing systems can now be connected together. This not only allows seamless flow of information but also opens many new opportunities including e-commerce.
Intense competition	In nearly all businesses, competition is becoming increasingly intense. In order to survive, companies are constantly looking for more effective ways to provide better customer services. E-commerce is one of the effective ways.
Globalization	To maintain growth of profit, many companies are moving to the international market. However, one of the major obstacles is the geographical barrier. E-commerce provides an effective (vehicle) for companies to move to the international market because there is almost no geographical barrier in cyberspace. In other words, it is easier for a foreign company to compete with a local company under the cyber environment. Globalization is a complex issue and the reader is referred to the references for a more detailed discussion.
Information age	As we enter the information age, information becomes a valuable asset. Therefore, companies are looking for more effective ways to collect, update, and manipulate various types of information particularly for marketing purposes. E-commerce facilitates this.
Technologies	With the advent of technologies, many business ideas can now be realized. Technologies are the enabler for e-commerce.
Automation	As the cost of labor increases, there is a strong need for companies to look for alternative ways to do routine work. This is particularly true in handling the myriad paper transactions once an order is taken. With electronic messages one can reduce this considerably. E-commerce thus provides an attractive solution.
Low cost high quality products/ services	“Low cost high quality products/services” has become one of the major business philosophies in the 21st century because of competitions and high customer expectations. Companies are looking for ways to satisfy these requirements.

While each of the topics in this table can be explored in greater depth, they are introduced here to give one a feeling for the drivers behind e-commerce. For those who wish to follow up any of these in greater detail we include many references at the end of this book.

1.5 Looking at e-commerce from different perspectives

E-commerce is changing our economy and affecting all aspects of business. Today, no company can afford to ignore e-commerce. It is even predicted that e-commerce will become part of core business functions just like management, accounting, marketing, finance, information systems, etc. In recent years, many models, frameworks, and thoughts towards building a comprehensive picture of e-commerce are evolving. In this section, we go through some of them in order to look at e-commerce from different perspectives.

A three-layer model is commonly used to describe e-commerce. This model consists of an infrastructure layer, a services layer, and a products/structures layer. The three layers can be further divided into seven functional layers for carrying out different functions. The major functions are to provide the:

- technical infrastructure (e. g. the Internet and WWW)
- secure messaging services (e. g. EDI)
- supporting services (e. g. electronic payment)
- commercial products, services, and systems (e. g. e-retailing)
- electronic marketplace (e. g. on-line auctions)

E-commerce experts, Greenstein and Feinman, discuss another three-layer model consisting of the existing market space, the three pillars of e-commerce (electronic information, electronic relationships, and electronic transactions), and the open market processes. Schneider and Perry view e-commerce as an effective means to improve a value chain, which is used to link various functional activities (i. e. production, marketing, finance, etc.) of a company. This value chain concept can also be extended to link different companies to form an industry value chain. In general, e-commerce helps to facilitate information flow across the value chains and to reduce the associated transaction costs. It is also of interest to look at e-commerce from the point of view of relationship. At its root, every business needs to maintain three types of relationship: the relationship with its customer, the relationship with its business partners (e. g. suppliers), and the relationship with its employees. E-commerce provides an effective tool for building, managing, and enhancing these relationships. In the context of e-commerce, the first type of relationship is not just selling through the web but managing customer relationships in general. Special electronic customer relationship management software is available for this purpose. The second type of relationship is about procurement and supply chain management by electronic means. Virtual Private Networks and XML are the main facilitators in these areas. They will be described later in this book. While the first two types of relationship are external, the last one is internal. It involves building an effective Intranet for integrating different information systems and sharing information through which communication and productivity can be enhanced.

Furthermore, in both the popular press and in the general community, a number of

ideas and commentaries are also gaining credence. It is worth looking at some of the more interesting of these in order to gain an appreciation of some aspects of e-commerce (see Table 1.2).

Table 1.2 Some interesting comments on e-commerce: what do you think?

E-commerce is the smartest way of doing business. You ask your customers to do the work for you such as filling in the order forms, checking the order status and downloading the product themselves so that you can save huge costs and manpower. Furthermore, they do not make any complaints and even think that you have done excellent work for them. Can you think of anything smarter than this?
E-commerce is changing the traditional way of measuring business performance. People no longer look at the profit and loss account any more. Instead, the future value of a company becomes the major concern. As long as an e-commerce business "makes sense" (it does not need to "make cents"), it may still be backed by numerous investors.
Many e-commerce companies are "burning money". There has even been the invention of a new term called "burn rate" to measure how "well" a company manages its e-commerce business. In order to survive, the business focus is not "how to make money quickly" but "how to burn money slowly".
In both traditional commerce and e-commerce, companies and investors care about earning per share (EPS), but in a totally different way. In traditional commerce, investors care whether the EPS of a company is positive. In e-commerce, they care whether the EPS is negative. If the EPS is too positive, it may indicate that the company is too conservative (i. e. not aggressive enough).
E-commerce is about focus. Many dotcoms (e-commerce companies are usually called dotcoms) sell only one product and in fact the company name may also be the product name.
E-commerce relies heavily on IP; Innovation and People or Investment and Partnership.

1.6 Different types of e-commerce

The matrix in Table 1.3 shows the different types of e-commerce from the perspective of the buyer and seller relationship. This is often used to categorize e-commerce applications. According to this relationship, e-commerce applications can be divided into the following four categories:

Table 1.3 Different types of e-commerce

	Business (organization)	Consumer (individual)
Business (organization)	B2B (e. g. TPN)	B2C (e. g. Amazon)
Consumer (individual)	C2B (e. g. Priceline)	C2C (e. g. eBay)

a. Business-to-consumer (B2C) In this case, the seller is a business organization whereas the buyer is a consumer. This emulates the situation of physical retailing and so it is commonly called electronic retailing. Typically, electronic stores are set up on the Internet to sell goods to the consumers. For example, virtual bookstores (VBS) sells books to the consumers through the Internet. Note here that the business drives the specification of the product and the customer chooses whether or not to buy a prefabricated product. A good example of a B2C website is www.amazon.com. Amazon sells books and various other items. Many students turn to Amazon when they cannot find a textbook for a class at the local bookstores. Amazon provides a convenience for these students; e-commerce succeeds when it makes things convenient for the consumer. B2C transactions can occur

instantaneously and globally, saving money for both the business and the consumer.

Business-to-consumer e-commerce involves customers gathering information, purchasing, and (for specific information goods) receiving products over an electronic network.

The consumer uses electronic commerce in the following economic transactions:

Purchasing products and information Electronic applications make it possible for consumers to look up online information about existing and new products/services.

Personal finance management In this field, electronic applications aid the consumers in managing investments and personal finances through the use of online banking tools. Bookschina.com is a good example of B2C electronic commerce application, particularly of purchasing products online.

b. Business-to-business (B2B) In this case, both the buyer and the seller are business organizations. In many situations, it is related to supply chain management. For example, the Virtual Bookstore (VBS) needs to order books from various publishers. The ordering process can be accomplished by using electronic data interchange.

Business-to-business e-commerce plays an important role in enhancing and transforming relationships between and among business. Some B2B applications are:

Supplier management Electronic applications in this area aid in expediting business partnerships through the reduction of purchase order (PO) processing costs and cycle times, and by maximizing the number of POs processed with fewer people.

Inventory management Electronic applications make the order-ship bill cycle shorter. For instance, if most of a business's partners are linked electronically, any information sent by mail can be transmitted instantly. Businesses can easily keep track of their documents to make sure that they were received. Such a system improves auditing capabilities, and helps reduce inventory levels, improve inventory turns, and eliminate out-of-stock occurrences.

Distribution management Electronic-based applications make the transmission of shipping documents a lot easier and faster. Shipping documents include bills of lading, purchase orders, advance ship notices, and manifest claims. E-commerce also enables more efficient resource management by certifying that documents contain more accurate data.

Channel management E-commerce allows for speedier dissemination of information regarding changes in operational conditions to trading partners. Technical, product and pricing information can be posted with much ease on electronic bulletin boards.

Payment management An electronic payment system allows for a more efficient payment management system by minimizing clerical errors, increasing the speed of computing invoices, and reducing transaction fees and costs.

c. Consumer-to-consumer (C2C) This refers to situations where both the seller and the buyer are consumers. There are many sites offering free auctions, and forums where individuals can buy and sell thanks to online payment systems like PayPal where people can send and receive money online with ease. eBay's auction service is a great example of where person-to-person transactions take place everyday since 1995. On eBay a consumer can not only purchase items, but also put items up for sell. EBay is one of the most successful C2C