ELEVENTH EDITION

ELECTRONIC COMMERCE

GARY P. SCHNEIDER

ELECTRONIC COMMERCE

Eleventh Edition

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PREFACE

Electronic Commerce, Eleventh Edition provides complete coverage of the key business and technology elements of electronic commerce. The book does not assume that readers have any previous electronic commerce knowledge or experience.

In 1998, having spent several years doing electronic commerce research, consulting, and corporate training, I began developing undergraduate and graduate business school courses in electronic commerce. Although I had used a variety of books and other materials in my corporate training work, I was concerned that those materials would not work well in university courses because they were written at widely varying levels and did not have the organization and pedagogic features, such as review questions, that are so important to students.

After searching for a textbook that offered balanced coverage of both the business and technology elements of electronic commerce, I concluded that no such book existed. The first edition of *Electronic Commerce* was written to fill that void. Since that first edition, I have worked to improve the book and keep it current with the rapid changes in this dynamic field.

New to this Edition

This edition includes the usual updates to keep the content current with the rapidly occurring changes in electronic commerce. The eleventh edition also includes new material on the following topics:

- Social networking tools and how businesses old and new are using them (Chapters 1 and 6)
- Analysis of large data sets (Chapter 1)
- The Internet of Things (Chapter 2)
- Zigbee networking (Chapter 2)
- Revenue models for electronic books and online music sales (Chapter 3)
- Outsourcing, offshoring, and logistics (Chapter 5)
- Social shopping sites and new revenue models for mobile commerce (Chapter 6)
- Location-aware mobile social networks (Chapter 6)
- Privacy, communications with children, and U.S. sales taxes (Chapter 7)
- Viruses, worms, and other security threats to electronic commerce (Chapter 10)
- Digital cash (Chapter 11)

ORGANIZATION AND COVERAGE

Electronic Commerce, Eleventh edition, introduces readers to both the theory and practice of conducting business over the Internet and World Wide Web. The book is organized into four sections: an introduction, business strategies, technologies, and integration.

Introduction

The book's first section includes two chapters. Chapter 1, "Introduction to Electronic Commerce," defines electronic commerce and describes how companies use it to create new products and services, reduce the cost of existing business processes, and improve the efficiency and effectiveness of their operations. The concept of electronic commerce waves is presented and developed in this chapter. Chapter 1 also outlines the history of the Internet and the Web, explains the international environment in which electronic commerce exists, provides an overview of the economic structures in which businesses operate, and describes how electronic commerce fits into those structures. Two themes are introduced in this chapter and recur throughout later chapters: that examining a firm's value chain can suggest opportunities for electronic commerce initiatives, and reductions in transaction costs are important elements of many electronic commerce initiatives.

Chapter 2, "Technology Infrastructure: The Internet and the World Wide Web," introduces the technologies used to conduct business online, including topics such as Internet infrastructure, protocols, packet-switched networks, and the Internet of Things. Chapter 2 also describes the markup languages used on the Web (HTML and XML) and discusses Internet connection options and tradeoffs, including wireless technologies.

Business Strategies for Electronic Commerce

The second section of the book includes five chapters that describe the business strategies that companies and other organizations are using to do business online. Chapter 3, "Selling on the Web," describes revenue models that companies are using on the Web and explains how some companies have changed their revenue models as the Web has matured. The chapter explains important concepts related to revenue models, such as cannibalization and coordinating multiple marketing channels. The chapter also describes how firms that understand the nature of communication on the Web can identify and reach the largest possible number of qualified customers.

Chapter 4, "Marketing on the Web," provides an introduction to Internet marketing and online advertising. It includes coverage of market segmentation, technology-enabled customer relationship management, rational branding, contextual advertising, localized advertising, viral marketing, and permission marketing. The chapter also explains how online businesses can share and transfer brand benefits through affiliate marketing and cooperative efforts among brand owners.

Chapter 5, "Business-to-Business Activities: Improving Efficiency and Reducing Costs" explores the variety of methods that companies are using to improve their purchasing and logistics primary activities with Internet and Web technologies. Chapter 5 also provides an overview of EDI and describes how companies are outsourcing or offshoring some of their business processes to less-developed countries. Chapter 5 describes how businesses are using technologies such as e-procurement, radio-frequency identification, and reverse auctions in the practice of supply chain management online.

Chapter 6, "Social Networking, Mobile Commerce, and Online Auctions," explains how companies now use the Web to do things that they have never done before, such as creating social networks, engaging in mobile commerce, and operating auction sites. The chapter describes how businesses are developing social networks and using existing social

networking Web sites to increase sales and do market research. The emergence of mobile commerce business activities and location-aware online services is discussed. The chapter also explains how companies are using Web auction sites to sell goods to their customers and generate advertising revenue.

Chapter 7, "The Environment of Electronic Commerce: Legal, Ethical, and Tax Issues," discusses the legal and ethical aspects of intellectual property usage and the privacy rights of customers. Online crime, terrorism, and warfare are covered as well. The chapter also explains that the large number of government units that have jurisdiction and power to tax makes it essential that companies doing business on the Web understand the potential liabilities of doing business with customers in those jurisdictions.

Technologies for Electronic Commerce

The third section of the book includes four chapters that describe the technologies of electronic commerce and explains how they work. Chapter 8, "Web Server Hardware and Software," describes the computers, operating systems, e-mail systems, utility programs, and Web server software that organizations use in the operation of their electronic commerce Web sites, including cloud computing technologies. The chapter describes the problem of unsolicited commercial e-mail (UCE, or spam) and outlines both technical and legal solutions to the problem.

Chapter 9, "Electronic Commerce Software," describes the basic functions that all electronic commerce Web sites must accomplish and explains the various software options used to perform those functions by companies of various sizes. This chapter includes an overview of Web services, database management, shopping cart, cloud computing, and other types of software used in electronic commerce. The chapter also includes a discussion of Web hosting options for online businesses of various sizes.

Chapter 10, "Electronic Commerce Security," discusses security threats and countermeasures that organizations can use to ensure the security of client computers (and smartphones and tablet devices), communications channels, and Web servers. The chapter emphasizes the importance of a written security policy and explains how encryption and digital certificates work. The chapter also includes an update on the most recent computer viruses, worms, and other threats.

Chapter 11, "Payment Systems for Electronic Commerce," presents a discussion of electronic payment systems, including mobile banking, digital cash, digital wallets, and the technologies used to make stored-value cards, credit cards, debit cards, and charge cards work. The chapter describes how payment systems operate, including approval of transactions and disbursements to merchants, and describes how banks use Internet technologies to improve check clearing and payment-processing operations. The use of mobile technologies for making payments and doing online banking is outlined. The chapter also includes a discussion of the threats that phishing attacks and identity theft crimes pose for individuals and online businesses.

Integration

The fourth and final section of the book includes one chapter that integrates the business and technology strategies used in electronic commerce. Chapter 12, "Planning for Electronic Commerce," presents an overview of key elements that are typically included

in business plans for electronic commerce implementations, such as the setting of objectives and estimating project costs and benefits. The chapter describes outsourcing strategies used in electronic commerce and covers the use of project management and project portfolio management as formal ways to plan and control tasks and resources used in electronic commerce implementations. This chapter includes a discussion of change management and outlines specific jobs available in organizations that conduct electronic commerce.

FEATURES

The eleventh edition of *Electronic Commerce* includes a number of features and offers additional resources designed to help readers understand electronic commerce. These features and resources include:

- **Business Case Approach** The introduction to each chapter includes a real business case that provides a unifying theme for the chapter. The case provides a backdrop for the material described in the chapter. Each case illustrates an important topic from the chapter and demonstrates its relevance to the current practice of electronic commerce.
- **Learning From Failures** Not all electronic commerce initiatives have been successful. Each chapter in the book includes a short summary of an electronic commerce failure related to the content of that chapter. We all learn from our mistakes—this feature is designed to help readers understand the missteps of electronic commerce pioneers who learned their lessons the hard way.
- **Summaries** Each chapter concludes with a Summary that concisely recaps the most important concepts in the chapter.
- **Web Links** The Web Links are a set of Web pages maintained by the publisher for readers of this book. The Web Links complement the book by linking to Web sites mentioned in the book and to other relevant online resources. The Web Links are continually monitored and updated for changes so they continue to lead to useful Web resources for each chapter. You can find the Web Links for this book by visiting the instructor companion site.
- **Web Links References in Text** Throughout each chapter, there are Web Links references that indicate the name of a link included in the Web Links. Text set in bold, green, sans-serif letters (**Metabot Pro**) indicates a like-named link in the Web Links. The links are organized under chapter and subchapter headings that correspond to those in the book. The Web Links also contains many supplemental links to help students explore beyond the book's content.
- **Review Questions and Exercises** Each chapter concludes with meaningful review materials including both conceptual discussion questions and hands-on exercises. The review questions are ideal for use as the basis for class discussions or as written homework assignments. The exercises give students hands-on experiences that yield computer output or a written report.
- **Cases** Each chapter concludes with two comprehensive cases. One case uses a fictitious setting to illustrate key learning objectives from that chapter. The other case gives students an opportunity to apply what they have learned

from the chapter to an actual situation that a real company or organization has faced. The cases offer students a rich environment in which they can apply what they have learned and provide motivation for doing further research on the topics.

- **For Further Study and Research** Each chapter concludes with a comprehensive list of the resources that were consulted during the writing of the chapter. These references to publications in academic journals, books, and the IT industry and business press provide a sound starting point for readers who want to learn more about the topics contained in the chapter.
- **Key Terms and Glossary** Terms within each chapter that may be new to the student or have specific subject-related meaning are highlighted by boldface type. The end of each chapter includes a list of the chapter's key terms. All of the book's key terms are compiled, along with definitions, in a Glossary at the end of the book.

TEACHING TOOLS

When this book is used in an academic setting, instructors may obtain the following teaching tools:

- **Instructor's Manual** The Instructor's Manual has been carefully prepared and tested to ensure its accuracy and dependability. The Instructor's Manual is available on the instructor companion site.
- **Cengage Learning Testing Powered by Cognero** is a flexible, online system that allows you to:
  - author, edit, and manage test bank content from multiple Cengage Learning solutions
  - create multiple test versions in an instant
  - deliver tests from your LMS, your classroom or wherever you want
- **PowerPoint Presentations** Microsoft PowerPoint slides are included for each chapter as a teaching aid for classroom presentations, to make available to students on a network for chapter review, or to be printed for classroom distribution. Instructors can add their own slides for additional topics they introduce to the class. The presentations are available on the instructor companion site.

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DEDICATION

To the memory of my father, Anthony J. Schneider.

ABOUT THE AUTHOR

Gary Schneider holds the William S. Perlroth Professorship at Quinnipiac University's School of Business and Engineering. His prior teaching appointments include the University of San Diego, the University of Tennessee, and Xavier University. He has won a number of teaching and research awards. He served as academic director of the University of San Diego's graduate programs in electronic commerce and information systems. Gary has published more than 50 books and 100 research papers on a variety of accounting, information systems, and management topics. His books have been translated into Chinese, French, Italian, Korean, and Spanish. Gary's research has been funded by the Irvine

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PART 1

INTRODUCTION

CHAPTER 1

INTRODUCTION TO ELECTRONIC COMMERCE

LEARNING OBJECTIVES

In this chapter, you will learn about:

- What electronic commerce is and how it has evolved
- Why companies concentrate on revenue models and the analysis of business processes instead of business models when they undertake electronic commerce initiatives
- How economic forces have created a business environment that is fostering the continued growth of electronic commerce
- How businesses use value chains and SWOT analysis to identify electronic commerce opportunities
- The international nature of electronic commerce and the challenges that arise in engaging in electronic commerce on a global scale

INTRODUCTION

In the late 1990s, electronic commerce was still emerging as a new way to do business; at that time, most companies were doing very little buying or selling online. They still were selling products in physical stores or taking orders over the telephone and by mail. However, a few companies had established solid footholds online. Amazon.com was a rapidly growing bookseller and eBay had taken the lead as a profitable auction site. The business of providing search tools for finding information online was dominated by a few well-established sites, including AltaVista, HotBot, Lycos, and

Yahoo!. Most industry observers at that time believed that any new search engine Web site would find it very difficult to compete against these established operations.

Search engines of the late 1990s provided results based on the number of times a search term appeared on Web pages. Pages that included the greatest number of occurrences of a user's search term would be more highly ranked and would thus appear near the top of the search results list. By 1998, two Stanford University students, Lawrence Page and Sergey Brin, had been working on a search engine research project for two years. Page and Brin believed that a search ranking based on the relationships between Web sites would give users better and more useful results. They developed search algorithms based on the number of links a particular Web page had to and from other highly relevant pages. In 1998, they started **Google** (*Note*: This typeface indicates a corresponding link to a related Web page in the book's Web Links. Google's URL is http://www.google.com) in a friend's garage with about $1.1 million of seed money invested by a group of Stanford graduates and local businesspersons.

Most industry observers agree that Google's page ranking system, which has been continually improved since its introduction, consistently provides users with more relevant results than other search engines. Internet users flocked to Google, which became one of the most popular sites on the Internet. The site's popularity allowed Google to charge increasingly higher rates for advertising space on its Web pages. Marketing staff at Google noticed that another search engine, Goto.com (now owned by Yahoo! and operated as Yahoo! Search Marketing), was selling ad space on Web sites by allowing advertisers to bid on the price of keywords and then charging based on the number of users who clicked the ads. For example, a car dealer could bid on the price of the keyword "car." If the car dealer were the high bidder at 12 cents, then the car dealer would pay for the ad at a rate of 12 cents times the number of site visitors who clicked the ad. Google adopted this

keyword bidding model in 2000 and has used it since then to sell small text ads that appear on search results pages.

This approach to selling advertising was, and continues to be, extremely successful. Combined with the highly relevant search results provided by the page ranking system, it led to Google's continued growth. When the company went public in 2004 (raising $1.67 billion), its market valuation was nearly $23 billion. Today, Google is one of the most successful online companies in the world. The Web provides a quick path to potential customers for any businessperson with a unique product or service. Google's improved page ranking system was available to anyone in the world the day it was introduced online.

THE EVOLUTION OF ELECTRONIC COMMERCE

The business phenomenon that we now call electronic commerce has had an interesting history. From humble beginnings in the mid-1990s, electronic commerce grew rapidly until 2000, when a major downturn occurred. The popular media published endless news stories describing how the "dot-com boom" had turned into the "dot-com bust." Between 2000 and 2003, many industry observers were writing obituaries for electronic commerce. Just as the unreasonable expectations for immediate success had fueled unwarranted high expectations during the boom years, overly gloomy news reports colored perceptions during this time.

Beginning in 2003, electronic commerce began to show signs of a profound rebirth. Companies that had survived the downturn were not only seeing growth in sales again, but many of them were showing profits for the first time. As the economy grew, electronic commerce grew also, but at a faster pace than the overall economy. Thus, electronic commerce gradually became a larger part of the total economy. In the general economic recession that started in 2008, electronic commerce suffered far less than most of the economy. From 2003 through the present, as the general economy has expanded and contracted, electronic commerce has consistently expanded more in the good times and contracted less in the bad times than other economic sectors. The next section defines electronic commerce and describes its evolution from a novelty to its current place as an important component of global business activity.

Electronic Commerce and Electronic Business

To many people, the term "electronic commerce" means shopping on the part of the Internet called the World Wide Web (the Web). However, **electronic commerce (or e-commerce)** also includes many other activities, such as businesses trading with other

businesses and internal processes that companies use to support their buying, selling, hiring, planning, and other activities. Some people use the term **electronic business (or e-business)** when they are talking about electronic commerce in this broader sense. For example, IBM defines electronic business as "the transformation of key business processes through the use of Internet technologies." Most people use the terms "electronic commerce" and "electronic business" interchangeably. In this book, the term electronic commerce (or e-commerce) is used in its broadest sense and includes all business activities that use Internet technologies. Internet technologies include the Internet, the World Wide Web, and other technologies such as wireless transmissions on mobile telephone networks. Companies that operate only online are sometimes called **dot-com** or **pure dot-com** businesses to distinguish them from companies that operate in physical locations (solely or together with online operations); however, online business activity has become so integrated with everyday life in much of the world that few people worry about these distinctions any longer.

Categories of Electronic Commerce

Categorizing electronic commerce by the types of entities participating in the transactions or business processes is a useful and commonly accepted way to define online business. The five general electronic commerce categories are business-to-consumer, business-to-business, transactions and business processes, consumer-to-consumer, and business-to-government. The three categories that are most commonly used are:

- Consumer shopping on the Web, often called **business-to-consumer (or B2C)**
- Transactions conducted between businesses on the Web, often called **business-to-business (or B2B)**
- Business processes in which companies, governments, and other organizations use Internet technologies to support selling and purchasing activities

A single company might participate in activities that fall under multiple e-commerce categories. Consider a company that manufactures stereo speakers. The company might sell its finished product to consumers on the Web, which would be B2C electronic commerce. It might also purchase the materials it uses to make the speakers from other companies on the Web, which would be B2B electronic commerce. Businesses often have entire departments devoted to negotiating purchase transactions with their suppliers. These departments are usually named **supply management** or **procurement**. Thus, B2B electronic commerce is sometimes called **e-procurement**.

In addition to buying materials and selling speakers, the company must also undertake many other activities to convert the purchased materials into speakers. These activities might include hiring and managing the people who make the speakers, renting or buying the facilities in which the speakers are made and stored, shipping the speakers, maintaining accounting records, obtaining customer feedback, purchasing insurance, developing advertising campaigns, and designing new versions of the speakers. An increasing number of these transactions and business processes can be done on the Web. Manufacturing processes (such as the fabrication of the speakers) can be controlled using

Internet technologies within the business. All of these communication, control, and transaction-related activities have become an important part of electronic commerce. Some people include these activities in the B2B category; others refer to them as underlying or supporting business processes.

Business Processes

For more than 80 years, business researchers have been studying the ways people behave in businesses. This research has helped managers better understand how workers do their jobs and what motivates them to work more effectively. The research results have helped managers, and more recently, the workers themselves, improve job performance and productivity. An important part of doing these job studies is to learn what activities each worker performs. In this setting, a **business activity** is a task performed by a worker in the course of doing his or her job.

For a much longer time—centuries, in fact—business owners have kept records of how well their businesses are performing. The formal practice of accounting, or recording transactions, dates back to the Middle Ages. A **transaction** is an exchange of value, such as a purchase, a sale, or the conversion of raw materials into a finished product. By recording transactions, accountants help business owners keep score and measure how well they are doing. All transactions involve at least one activity, and some transactions involve many activities. Not all activities result in measurable (and therefore recordable) transactions. Thus, a transaction always has one or more activities associated with it, but an activity might not be related to a transaction.

The group of logical, related, and sequential activities and transactions in which businesses engage are often collectively referred to as **business processes**. Transferring funds, placing orders, sending invoices, and shipping goods to customers are all types of activities or transactions. For example, the business process of shipping goods to customers might include a number of activities (or tasks, or transactions), such as inspecting the goods, packing the goods, negotiating with a freight company to deliver the goods, creating and printing the shipping documents, loading the goods onto the truck, and sending payment to the freight company.

One important way that the Web is helping people work more effectively is by enabling employees of many different kinds of companies to work at home or from other locations (such as while traveling). In this arrangement, called **telecommuting** or **telework**, the employee logs in to the company network through the Internet instead of traveling to an office.

Relative Size of Electronic Commerce Elements

Figure 1-1 shows the three main elements of electronic commerce. The figure presents a rough approximation of the relative sizes of these elements. In terms of dollar volume and number of transactions, B2B electronic commerce is much greater than B2C electronic commerce. However, the number of business processes that are conducted using online technologies is far greater than the number of all B2C and B2B transactions combined.

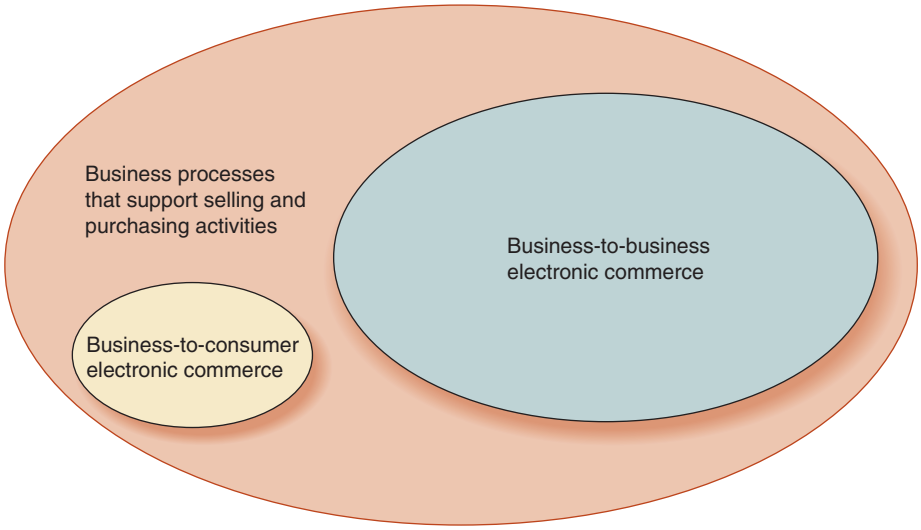

FIGURE 1-1 Elements of electronic commerce

The large oval in Figure 1-1 that represents the business processes that support selling and purchasing activities is the largest element of electronic commerce.

Some researchers define a fourth category of electronic commerce, called **consumer-to-consumer (or C2C)**, which includes individuals who buy and sell items among themselves. For example, C2C electronic commerce occurs when a person sells an item through a Web auction site to another person. In this book, C2C sales are included in the B2C category because the person selling the item acts much as a business would for purposes of the transaction.

Finally, some researchers also define a category of electronic commerce called **business-to-government (or B2G)**; this category includes business transactions with government agencies, such as paying taxes and filing required reports. An increasing number of states have Web sites that help companies do business with state government agencies. In this book, B2G transactions are included in the discussions of B2B electronic commerce. Figure 1-2 summarizes these five categories of electronic commerce.

Category	Description	Example
Business-to-consumer (B2C)	Businesses sell products or services to individual consumers.	Walmart.com sells merchandise to consumers through its Web site.
Business-to-business (B2B)	Businesses sell products or services to other businesses.	Grainger.com sells industrial supplies to large and small businesses through its Web site.
Business processes that support buying and selling activities	Businesses and other organizations maintain and use information to identify and evaluate customers, suppliers, and employees. Increasingly, businesses share this information in carefully managed ways with their customers, suppliers, employees, and business partners.	Dell Computer uses secure Internet connections to share current sales and sales forecast information with suppliers. The suppliers can use this information to plan their own production and deliver component parts to Dell in the right quantities at the right time.
Consumer-to-consumer (C2C)	Participants in an online marketplace can buy and sell goods to each other. Because one party is selling, and thus acting as a business, this book treats C2C transactions as part of B2C electronic commerce.	Consumers and businesses trade with each other in the eBay.com online marketplace.
Business-to-government (B2G)	Businesses sell goods or services to governments and government agencies. This book treats B2G transactions as part of B2C electronic commerce.	CA.gov procurement site allows businesses to sell online to the state of California.

FIGURE 1-2 Electronic commerce categories

THE DEVELOPMENT AND GROWTH OF ELECTRONIC COMMERCE

Over the thousands of years that people have engaged in commerce with one another, they have adopted the tools and technologies that became available. For example, the advent of sailing ships in ancient times opened new avenues of trade to buyers and sellers. Later innovations, such as the printing press, steam engine, and telephone, have changed the way people conduct commerce activities. The Internet has changed the way people buy, sell, hire, and organize business activities in more ways and more rapidly than any other technology in the history of business.

Early Electronic Commerce

Although the Web has made online shopping possible for many businesses and individuals, in a broader sense, electronic commerce has existed for many years. Since the mid-1960s,