

FIFTH ANNUAL EDITION

ELECTRONIC COMMERCE THE SECOND WAVE

Gary P. Schneider





ELECTRONIC COMMERCE

THE SECOND WAVE

Fifth Annual Edition

Gary P. Schneider, Ph.D., CPA University of San Diego



Electronic Commerce: The Second Wave, Fifth Annual Edition

by Gary P. Schneider, Ph.D, CPA

Executive Vice President, Academic and Technology Publishing:

Kristen Duerr

Executive Editor: Mac Mendelsohn

Product Manager:

Development Editor: Amanda Brodkin

COPYRIGHT © 2004 Course Technology, a division of Thomson Learning, Inc. Thomson Learning™ is a trademark used herein under license.

Printed in Canada.

1 2 3 4 5 6 7 8 9 WC 08 07 06 05 04

For more information, contact Course Technology, 25 Thomson Place, Boston, Massachusetts, 02210.

Or find us on the World Wide Web at: www.course.com

ALL RIGHTS RESERVED. No part of this work covered by the copyright hereon may be reproduced or used in any form or by any means—graphic, electronic, or **Production Editor:** Daphne Barbas

Senior Marketing Manager: Jason Sakos

Associate Product Manager: Mirella Misiaszek

Editorial Assistant: Amanda Piantedosi Text Designer:
Anne Small-Wills

Cover Designer: Betsy Young

Cover Art Designer: Rakefet Kenaan

Manufacturing Manager: Laura Burns

mechanical, including photocopying, recording, taping, Web distribution, or information storage and retrieval systems—without the written permission of the publisher.

For permission to use material from this text or product, submit a request online at http://www.thomsonrights.com.

Any additional questions about permissions can be submitted by e-mail to thomsonrights@ thomson.com.

Disclaimer

Course Technology reserves the right to revise this publication and make changes from time to time in its content without notice.

This publication is designed to provide accurate and authoritative information regarding the subject matter covered. It is sold with the understanding that neither the publisher nor the author are engaged in rendering legal, accounting, or other professional services. If legal, accounting, or other expert advice is required, the services of a competent professional person should be sought.

ISBN 0-619-21331-0

DIMINITERACE

Electronic Commerce: The Second Wave, Fifth Annual 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 both an undergraduate business school course and an MBA-level course 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 pedagogic organization and 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. In the subsequent editions, I have worked to improve the book and keep it current with the rapid changes in this dynamic field. The fifth edition includes many updates to the content that reflect the rapid changes that are occurring in electronic commerce today. The fifth edition also introduces an idea—that of the second wave of electronic commerce—that is used to help students understand how electronic commerce is similar to other technological innovations that have changed the world in the past.

Electronic Commerce: The Second Wave, Fifth Annual Edition introduces readers to both the theory and practice of conducting business over the Internet and World Wide Web. In this edition, the two chapters that deal with security issues have been combined to provide a more concise treatment of the subject. The book is organized into four sections: an introduction, business strategies, technologies, and an integration.

New to this Edition

- Introduction of the concept of a second wave of electronic commerce and exploration of the opportunities it offers for business success
- A new focus on the separate operation of revenue models and cost reduction initiatives rather than combined business models
- More in-depth coverage of marketing and promotion strategies, including new material on Web site sponsorships and search engine positioning
- New material on the use of Internet technologies in managing logistics and coordinating the tracking of materials as they move through the supply chain
- Increased coverage of the use of Internet technologies such as e-procurement and reverse auctions in supply chain management
- Expanded coverage of online auction management software and online auction-related services
- Coverage of the latest developments in online privacy legislation for Web sites that interact with children
- Increased coverage of transaction taxes, including sales taxes, use taxes, and value-added taxes
- Inclusion of the latest information about spam filtering technologies
- Updated coverage of wireless and Web services technologies
- Expanded coverage of change management strategies used in electronic commerce implementation projects

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 the second wave of electronic commerce is presented and developed in this chapter. Chapter 1 also describes 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 that recur throughout later chapters: 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, and packet-switched networks. Chapter 2 also describes the markup languages used on the Web (HTML and XML) and discusses Internet connection options and tradeoffs.

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: Revenue Models and Building a Web Presence," 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 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. It includes coverage of market segmentation, technology-enabled customer relationship management, rational branding, 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 Strategies: From Electronic Data Interchange to Electronic Commerce," 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 explores how the Internet now provides an inexpensive EDI communications channel that allows smaller businesses to reap EDI's benefits. Chapter 5 also explains how the Internet and the Web have become an important force driving the adoption of technologies such as e-procurement and reverse auctions in the practice of supply chain management.

Chapter 6, "Online Auctions, Virtual Communities, and Web Portals," outlines how companies now use the Web to do things that they have never done before, such as operating auction sites, creating virtual communities, and serving as Web portals. The chapter describes how firms are using Web auction sites to sell goods to their customers and generate advertising revenue. The chapter explains how businesses are creating virtual communities with their customers and suppliers.

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. Web site hosting options are also discussed in this chapter.

Chapter 9, "Electronic Commerce Software," describes the basic functions that all electronic commerce Web sites must accomplish and explains the various software options available to companies of various sizes. This chapter includes a completely new overview of Web services, a set of technologies that could become an important electronic commerce infrastructure element in the near future.

Chapter 10, "Electronic Commerce Security," discusses security threats and countermeasures that organizations can use to ensure the security of client computers, communications channels, and Web servers. The role of industry organizations in promoting computer, network, and Internet security is also outlined. The chapter emphasizes the importance of a written security policy and explains how encryption and digital certificates work.

Chapter 11, "Payment Systems for Electronic Commerce," presents a discussion of electronic payment systems, including electronic cash, electronic wallets, stored-value cards, credit cards, debit cards, and charge cards. The chapter describes how payment systems operate, including approval of transactions and disbursements to merchants.

Integration

The fourth 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. These elements include the setting of objectives and estimated costs and benefits of the project. The chapter describes outsourcing strategies used in electronic commerce and covers the use of project management as a formal way to plan and control specific tasks and resources used in electronic commerce projects. This chapter concludes with discussions of change management and staffing strategies.

FEATURES

The fifth annual 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.

xxii

- 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.
- Online Companion The Online Companion is a set of Web pages maintained by the publisher for readers of this book. The Online Companion complements the book and contains links to Web sites referred to in the book and to other online resources that further illustrate the concepts presented. The Web is constantly changing and the Online Companion is continually monitored and updated for those changes so that its links continue to lead to useful Web resources for each chapter. You can find the Online Companion for this book at http://www.course.com/downloads/mis/ecommerce5 or by visiting Course Technology's Web site at www.course.com/ and searching on Electronic Commerce.
- Online Companion References in Text Throughout each chapter, there are Online Companion References that indicate the name of a link included in the Online Companion. Text set in bold, sans-serif letters ("Metabot Pro") indicates a like-named link in the Online Companion. The links in the Online Companion are organized under chapter and subchapter headings that correspond to those in the book. The Online Companion also contains many supplemental links to help students explore beyond the book's content.
- Review Questions and Exercises Every 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 a computer output or a written report.
- Cases Each chapter includes a comprehensive case that illustrates key
 learning objectives from that chapter. The cases offer students a rich
 environment in which they can apply what they have learned from
 reading the book and provide a 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 from Course Technology:

- 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 through the Course Technology Faculty Online Companion on the World Wide Web (call your customer service representative for the exact URL and to obtain your username and password).
- ExamView® This textbook is accompanied by ExamView, a powerful testing software package that allows instructors to create and administer printed, computer (LAN-based), and Internet exams. ExamView includes hundreds of questions that correspond to the topics covered in this text, enabling students to generate detailed study guides that include page references for further review. The computer-based and Internet testing components allow students to take exams at their computers, and also save the instructor time by grading each exam automatically.
- 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
 included on the Instructor's CD.
- Distance Learning Course Technology is proud to present online content in WebCT and Blackboard to provide the most complete and dynamic learning experience possible. For more information on how to bring distance learning to your course, contact your local Course Technology sales representative.

ACKNOWLEDGMENTS

I owe a great debt of gratitude to my good friends at Course Technology who made this book possible. Course Technology remains the best publisher with which I have ever worked. Everyone at Course Technology put forth tremendous effort to publish this edition on a very tight schedule. My heartfelt thanks go to Kristen Duerr, Executive Vice President, Publisher; Mac Mendelsohn, Executive Editor; Janet Aras,

Product Manager; Daphne Barbas, Production Editor; and Mirella Misiaszek, Associate Product Manager, for their tireless work and dedication. I am deeply indebted to Amanda Brodkin, Development Editor extraordinaire, for her outstanding contributions to all five editions of this book. Amanda performed the magic of turning my manuscript drafts into a high-quality textbook and was always ready with encouragement and fresh ideas when I was running low on them. Many of the best elements of this book resulted from Amanda's ideas and inspirations. In particular, I want to thank Amanda for contributing the Dutch auction example in Chapter 6 and the ideas for the cases in Chapters 7 and 8.

I want to thank the following reviewers for their insightful comments and suggestions on this and previous editions: Paul Ambrose, University of Wisconsin, Milwaukee; Tina Ashford, Macon State College; Robert Chi, California State University-Long Beach; Roland Eichelberger, Baylor University; Mary Garrett, Michigan Virtual High School; Milena Head, McMaster University; Perry M. Hidalgo, Gwinnett Technical Institute; Brent Hussin, University of Wisconsin, Green Bay; Cheri L. Kase, Legg Mason Corporate Technology; Rick Lindgren, Graceland University; William Lisenby, Alamo Community College; Diane Lockwood, Albers School of Business and Economics, Seattle University; Jane Mackay, Texas Christian University; Michael P. Martel, Culverhouse School of Accountancy, University of Alabama; William E. McTammany, Florida Community College at Jacksonville: Leslie Moore, Jackson State Community College; Martha Myers, Kennesaw State University; Pete Partin, Forethought Financial Services; and Barbara Warner, University of South Florida. Special thanks go to reviewer A. Lee Gilbert of Nanyang Technological University in Singapore, who provided extremely detailed comments and many useful suggestions for improving Chapter 12. My thanks also go to the many professors who have used the previous editions in their classes and who have sent me suggestions for improving the text. In particular, I want to acknowledge the detailed recommendations made by David Bell of Pacific Union College regarding the coverage of IP addresses in Chapter 2.

I appreciate the role that the University of San Diego had in making this book possible. The University provided research funding that allowed me to work on the first edition of this book and gave me fellow faculty members who were always happy to discuss and critically evaluate ideas for the book. Of these faculty members, my thanks go first to Jim Perry for his contributions as co-author on the first two editions of this book. Tom Buckles, now a professor of marketing at Biola University, provided many useful suggestions, pointed out a number of valuable research resources, and was willing to sit and discuss ideas for this book long after everyone else had left the building. Rahul Singh, now teaching at the University of North Carolina-Greensboro, provided suggestions regarding the book's coverage of electronic commerce infrastructure. Carl Rebman made recommendations on a number of networking, telecommunications, and security topics. The University of San Diego School of Business Administration also provided the research assistance of many graduate students. Among those students were Sebastian Ailioaie, a Fulbright Fellow who did substantial work on the Online Companion, Anthony

Coury, who applied his considerable legal knowledge to reviewing Chapter 7 and suggesting many improvements, and Dima Ghawi, who shared her significant background research on reverse auctions and helped me develop many of the ideas presented in Chapters 5 and 6. Other students who provided valuable assistance and suggestions include Maximiliano Altieri, Adrian Boyce, Karl Flaig, Kathy Glaser, Emilie Johnson Hersh, Chad McManamy, Dan Mulligan, Firat Ozkan, Suzanne Phillips, Susan Soelaiman, Carolyn Sturz, and Leila Worthy.

Finally, I want to express my deep appreciation for the support and encouragement of my wife, Cathy Cosby, and our children, Ben, Annie, and Maggie. Without their support and patience, writing this book would not have been possible.

DEDICATION

To Trinity

ABOUT THE AUTHOR

Gary Schneider is the Clarence L. Steber Professor of Accounting and Information Systems at the University of San Diego, where he teaches courses in electronic commerce, database design, supply chain management, and management accounting. He has won several teaching awards and has served as academic director of the school's graduate programs in electronic commerce and information systems. Garv has published more than 40 books and 70 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 Foundation and the U.S. Office of Naval Research, His work has appeared in the Journal of Information Systems, Interfaces, and the Information Systems Audit & Control Journal. He has served as editor of the Accounting Systems and Technology Reporter, as associate editor of the Journal of Global Information Management, and on the editorial boards of the Journal of Information Systems, the Journal of Electronic Commerce in Organizations, the Journal of Database Management, and the Information Systems Audit & Control Journal. Gary has lectured on electronic commerce topics at universities and businesses in the United States, Europe, South America, and Asia. He has provided consulting and training services to a number of major clients, including Gartner. Gateway, Honeywell, the National Science Foundation, Qualcomm, and the U.S. Department of Commerce. In 1999, he was named a Fellow of the Gartner Institute. Gary is a licensed CPA in Ohio, where he practiced public accounting for 14 years. He holds a Ph.D. in accounting information systems from the University of Tennessee, an M.B.A. in accounting from Xavier University, and a B.A. in economics from the University of Cincinnati.

BRIEF CONTENTS

Preface	XVII
Introduction	
Chapter 1 Introduction to Electronic Commerce	2
Chapter 2 Technology Infrastructure: The Internet and the World Wide Web	49
Business Strategies for Electronic Commerce	
Chapter 3 Selling on the Web: Revenue Models and Building a Web Presence	98
Chapter 4 Marketing on the Web	153
Chapter 5 Business-to-Business Strategies: From Electronic Data Interchange to Electronic Commerce	204
Chapter 6 Online Auctions, Virtual Communities, and Web Portals	245
Chapter 7 The Environment of Electronic Commerce: Legal, Ethical, and Tax Issues	283

Technologies for Electronic Commerce

Chapter 8 Web Server Hardware and Software	324
Chapter 9 Electronic Commerce Software	357
Chapter 10 Electronic Commerce Security	395
Chapter 11 Payment Systems for Electronic Commerce	446
Integration	
Chapter 12	497
Planning for Electronic Commerce Glossary	486 516
Index	551

TABLE OF CONTENTS

Preface	xviii
Introduction	
Chapter 1: Introduction to Electronic Commerce	2
Electronic Commerce: The Second Wave	4
Electronic Commerce and Electronic Business	4
Categories of Electronic Commerce	5
The Development and Growth of Electronic Commerce	8
The Second Wave of Electronic Commerce	10
Business Models, Revenue Models, and Business Processes	12
Focus on Specific Business Processes	12
Advantages of Electronic Commerce	15
Disadvantages of Electronic Commerce	16
Economic Forces and Electronic Commerce	18
Transaction Costs	18
Markets and Hierarchies	19
The Role of Electronic Commerce	21
Network Economic Structures	21
Network Effects	23
Value Chains in Electronic Commerce	23
Strategic Business Unit Value Chains	24
Industry Value Chains	25
SWOT Analysis: Evaluating Business Unit Opportunities	27
The Role of Electronic Commerce	29
International Nature of Electronic Commerce	29
Trust Issues on the Web	29
Language Issues	31
Culture Issues	32
Infrastructure Issues	38
Summary	41

41

Key Terms

Review Questions	42
Exercises	42
Case	43
For Further Study and Research	44
Chapter 2: Technology Infrastructure: The Internet and	
the World Wide Web	49
The Internet and the World Wide Web	50
Origins of the Internet	51
New Uses for the Internet	52
Commercial Use of the Internet	52
Growth of the Internet	53
Emergence of the World Wide Web	54
Packet-Switched Networks	57
Routing Packets	58
Internet Protocols	59
TCP/IP	60
IP Addressing	60
Domain Names	62
Web Page Request and Delivery Protocols	63
Electronic Mail Protocols	63
Markup Languages and the Web	65
Standard Generalized Markup Language	66
Hypertext Markup Language (HTML)	66
Extensible Markup Language (XML)	72
HTML and XML Editors	77
Intranets and Extranets	79
Intranets	79
Extranets	79
Public and Private Networks	80
Virtual Private Network (VPN)	80
Internet Connection Options	81
Connectivity Overview	81
Voice-Grade Telephone Connections	82
Broadband Connections	82
Leased-Line Connections	84
Wireless Connections	84
Internet2 and the Semantic Web	88
Summary	89
Key Terms	89
Review Questions	91

For Further Study and Research	94
Business Strategies for Electronic Commerc	<u>e</u>
Chapter 3: Selling on the Web: Revenue Models	
and Building a Web Presence	98
Revenue Models	99
Web Catalog Revenue Models	99
Digital Content Revenue Models	108
Advertising-Supported Revenue Models	110
Advertising-Subscription Mixed Revenue Models	114
Fee-for-Transaction Revenue Models	115
Fee-for-Service Revenue Models	122
Revenue Models in Transition	124
Subscription to Advertising-Supported Model	125
Advertising-Supported to Advertising-Subscription Mixed Model	125
Advertising-Supported to Fee-for-Services Model	125
Advertising-Supported to Subscription Model	125
Multiple Transitions	126
Revenue Strategy Issues	128
Channel Conflict and Cannibalization	128
Strategic Alliances and Channel Distribution Management	129
Mobile Commerce	131
Creating an Effective Web Presence	132
Identifying Web Presence Goals	132
Achieving Web Presence Goals	132
Web Site Usability	137
How the Web Is Different	137
Meeting the Needs of Web Site Visitors	138
Trust and Loyalty	140
Rating Electronic Commerce Web Sites	141
Usability Testing	141
Customer-Centric Web Site Design	142
Connecting with Customers	143
The Nature of Communication on the Web	143
Summary	146
Key Terms	146
Review Questions	147

Exercises

Cases

91

92

Exercises	147
Case	148
For Further Study and Research	149
Chapter 4: Marketing on the Web	153
Web Marketing Strategies	155
Product-Based Marketing Strategies	156
Customer-Based Marketing Strategies	158
Communicating with Different Market Segments	160
Trust and Media Choice	160
Market Segmentation	161
Market Segmentation on the Web	163
Offering Customers a Choice on the Web	165
Beyond Market Segmentation: Customer Behavior and Relationship Intensity	166
Segmentation Using Customer Behavior	166
Customer Relationship Intensity and Life-Cycle Segmentation	169
Acquisition, Conversion, and Retention of Customers	172
Customer Acquisition, Conversion, and Retention: The Funnel Model	173
Advertising on the Web	175
Banner Ads	175
Other Web Ad Formats	179
Site Sponsorships	181
Effectiveness of Online Advertising	181
E-Mail Marketing	182
Permission Marketing	182
Combining Content and Advertising	183
Outsourcing E-Mail Processing	183
Technology-Enabled Customer Relationship Management	183
CRM as a Source of Value in the Marketspace	184
Creating and Maintaining Brands on the Web	185
Elements of Branding	185
Emotional Branding vs. Rational Branding	186
Brand Leveraging Strategies	187
Brand Consolidation Strategies	187
Costs of Branding	188
Affiliate Marketing Strategies	188
Viral Marketing Strategies	191
Search Engine Positioning and Domain Names	191
Search Engines and Web Directories	191
Paid Search Engine Inclusion and Placement	193
Web Site Naming Issues	194