

# ELECTRONIC COMMERCE

**Eleventh Edition**

**Gary P. Schneider, Ph.D., CPA**  
*Quinnipiac University*



---

Australia • Brazil • Mexico • Singapore • United Kingdom • United States

# BRIEF CONTENTS

Preface	xv
---------	----

## **Part 1: Introduction**

---

### **Chapter 1**

<i>Introduction to Electronic Commerce</i>	3
--------------------------------------------	---

### **Chapter 2**

<i>Technology Infrastructure: The Internet and the World Wide Web</i>	59
-----------------------------------------------------------------------	----

## **Part 2: Business Strategies for Electronic Commerce**

---

### **Chapter 3**

<i>Selling on the Web</i>	117
---------------------------	-----

### **Chapter 4**

<i>Marketing on the Web</i>	173
-----------------------------	-----

### **Chapter 5**

<i>Business-to-Business Activities: Improving Efficiency and Reducing Costs</i>	227
---------------------------------------------------------------------------------	-----

### **Chapter 6**

<i>Social Networking, Mobile Commerce, and Online Auctions</i>	269
----------------------------------------------------------------	-----

### **Chapter 7**

<i>The Environment of Electronic Commerce: Legal, Ethical, and Tax Issues</i>	313
-------------------------------------------------------------------------------	-----

## **Part 3: Technologies for Electronic Commerce**

---

### **Chapter 8**

*Web Server Hardware and Software* 367

### **Chapter 9**

*Electronic Commerce Software* 403

### **Chapter 10**

*Electronic Commerce Security* 433

### **Chapter 11**

*Payment Systems for Electronic Commerce* 481

## **Part 4: Integration**

---

### **Chapter 12**

*Managing Electronic Commerce Implementations* 515

**Glossary** 547

**Index** 581

# TABLE OF CONTENTS

Preface	xv
---------	----

## Part 1: Introduction

---

<b>Chapter 1</b> <i>Introduction to Electronic Commerce</i>	3
The Evolution of Electronic Commerce	5
Electronic Commerce and Electronic Business	5
Categories of Electronic Commerce	6
Business Processes	7
Relative Size of Electronic Commerce Elements	7
The Development and Growth of Electronic Commerce	9
Early Electronic Commerce	9
The First Wave of Electronic Commerce, 1995–2003	10
The Second Wave of Electronic Commerce, 2004–2009	13
The Third Wave of Electronic Commerce, 2010–Present	15
Business Models, Revenue Models, and Business Processes	18
Focus on Specific Business Processes	19
Role of Merchandising	20
Product/Process Suitability to Electronic Commerce	20
Electronic Commerce: Opportunities, Cautions, and Concerns	21
Opportunities for Electronic Commerce	22
Electronic Commerce: Current Barriers	23
Economic Forces and Electronic Commerce	26
Transaction Costs	27
Markets and Hierarchies	29
Using Electronic Commerce to Reduce Transaction Costs	30
Network Economic Structures	31
Network Effects	32
Identifying Electronic Commerce Opportunities	33
Strategic Business Unit Value Chains	33
Industry Value Chains	35
SWOT Analysis: Evaluating Business Unit Opportunities	37
International Nature of Electronic Commerce	39
Trust Issues on the Web	40
Language Issues	40
Cultural Issues	41
Culture and Government	43
Infrastructure Issues	45
Summary	48
Key Terms	48

## Table of Contents

Review Questions	49
Exercises	50
Cases	51
For Further Study and Research	55
<b>Chapter 2</b> <i>Technology Infrastructure: The Internet and the World Wide Web</i>	59
The Internet and the World Wide Web	61
Origins of the Internet	62
New Uses for the Internet	62
Commercial Use of the Internet	63
Growth of the Internet	64
The Internet of Things	65
Packet-Switched Networks	65
Routing Packets	66
Public and Private Networks	67
Virtual Private Networks (VPNs)	68
Intranets and Extranets	68
Internet Protocols	69
TCP/IP	70
IP Addressing	70
Electronic Mail Protocols	72
Web Page Request and Delivery Protocols	73
Emergence of the World Wide Web	74
The Development of Hypertext	74
Graphical Interfaces for Hypertext	75
The World Wide Web	75
The Deep Web	77
Domain Names	77
Markup Languages and the Web	79
Markup Languages	80
Hypertext Markup Language	81
Extensible Markup Language (XML)	87
HTML and XML Editors	93
Internet Connection Options	93
Connectivity Overview	93
Voice-Grade Telephone Connections	94
Broadband Connections	94
Leased-Line Connections	96
Wireless Connections	97
Internet2 and the Semantic Web	101
Summary	103
Key Terms	104
Review Questions	106
Exercises	107
Cases	108
For Further Study and Research	109

## Part 2: Business Strategies for Electronic Commerce

<b>Chapter 3</b>	<i>Selling on the Web</i>	117
	Revenue Models for Online Business	119
	Web Catalog Revenue Models	119
	Fee-for-Content Revenue Models	124
	Advertising as a Revenue Model Element	128
	Fee-for-Transaction Revenue Models	134
	Fee-for-Service Revenue Models	140
	Free for Many, Fee for a Few	141
	Changing Strategies: Revenue Models in Transition	142
	Subscription to Advertising-Supported Model	143
	Advertising-Supported to Advertising-Subscription Mixed Model	143
	Advertising-Supported to Subscription Model	144
	Multiple Changes to Revenue Models	144
	Revenue Strategy Issues for Online Businesses	146
	Channel Conflict and Cannibalization	146
	Strategic Alliances	147
	Luxury Goods Strategies	148
	Overstock Sales Strategies	148
	Creating an Effective Business Presence Online	149
	Identifying Web Presence Goals	149
	Web Site Usability	153
	How the Web Is Different	153
	Meeting the Needs of Web Site Visitors	154
	Trust and Loyalty	157
	Usability Testing	158
	Customer-Centric Web Site Design	158
	Using the Web to Connect with Customers	160
	The Nature of Communication on the Web	160
	Summary	163
	Key Terms	163
	Review Questions	164
	Exercises	164
	Cases	165
	For Further Study and Research	169
<b>Chapter 4</b>	<i>Marketing on the Web</i>	173
	Web Marketing Strategies	175
	The Four Ps of Marketing	175
	Product-Based Marketing Strategies	176
	Customer-Based Marketing Strategies	177
	Communicating with Different Market Segments	178
	Trust, Complexity, and Media Choice	178
	Market Segmentation	180
	Market Segmentation on the Web	182
	Offering Customers a Choice on the Web	182

## Table of Contents

Beyond Market Segmentation: Customer Behavior and Relationship Intensity	183
Segmentation Using Customer Behavior	183
Customer Relationship Intensity and Life-Cycle Segmentation	185
Customer Acquisition: The Funnel Model	187
Advertising on the Web	190
Banner Ads	191
Text Ads	193
Other Web Ad Formats	194
Mobile Device Advertising	195
Site Sponsorships	195
Online Advertising Cost and Effectiveness	196
Effectiveness of Online Advertising	198
E-Mail Marketing	198
Permission Marketing	199
Combining Content and Advertising	200
Outsourcing E-Mail Processing	200
Technology-Enabled Customer Relationship Management	200
CRM as a Source of Value	202
Creating and Maintaining Brands on the Web	204
Elements of Branding	204
Emotional Branding vs. Rational Branding	205
Affiliate Marketing Strategies	205
Viral Marketing Strategies and Social Media	207
Search Engine Positioning and Domain Names	208
Search Engines and Web Directories	208
Paid Search Engine Inclusion and Placement	209
Web Site Naming Issues	212
Summary	214
Key Terms	214
Review Questions	216
Exercises	217
Cases	218
For Further Study and Research	222

<b>Chapter 5</b> <i>Business-to-Business Activities: Improving Efficiency and Reducing Costs</i>	227
Purchasing, Logistics, and Business Support Processes	229
Outsourcing and Offshoring	229
Purchasing Activities	230
Logistics Activities	233
Business Process Support Activities	234
E-Government	236
Network Model of Economic Organization in Purchasing: Supply Webs	238
Electronic Data Interchange	239
Early Business Information Interchange Efforts	239
Emergence of Broader Standards: The Birth of EDI	240

How EDI Works	241
Value-Added Networks	245
EDI Payments	247
Supply Chain Management Using Internet Technologies	247
Value Creation in the Supply Chain	248
Increasing Supply Chain Efficiencies	250
Materials-Tracking Technologies	251
Creating an Ultimate Consumer Orientation in the Supply Chain	253
Building and Maintaining Trust in the Supply Chain	254
Electronic Marketplaces and Portals	254
Independent Industry Marketplaces	255
Private Stores and Customer Portals	256
Private Company Marketplaces	257
Industry Consortia-Sponsored Marketplaces	258
Summary	259
Key Terms	259
Review Questions	260
Exercises	261
Cases	262
For Further Study and Research	265
<b>Chapter 6</b> <i>Social Networking, Mobile Commerce, and Online Auctions</i>	269
From Virtual Communities to Social Networks	270
Virtual Communities	271
Early Web Communities	271
Social Networking Emerges	272
Business Uses of Social Networking	277
Revenue Models for Social Networking Sites	280
Mobile Commerce	284
Mobile Phones	285
Tablet Devices	285
Mobile Device Operating Systems	287
Mobile Apps	288
Mobile Payment Apps	289
Online Auctions	290
Auction Basics	290
Online Auctions and Related Businesses	294
Auction-Related Services	300
Summary	303
Key Terms	303
Review Questions	304
Exercises	305
Cases	306
For Further Study and Research	308



<b>Chapter 7</b>	<i>The Environment of Electronic Commerce: Legal, Ethical, and Tax Issues</i>	313
	The Legal Environment of Electronic Commerce	315
	Borders and Jurisdiction	315
	Jurisdiction on the Internet	319
	Conflict of Laws	322
	Contracting and Contract Enforcement in Electronic Commerce	323
	Use and Protection of Intellectual Property in Online Business	329
	Copyright Issues	329
	Patent Issues	331
	Trademark Issues	333
	Domain Names and Intellectual Property Issues	333
	Protecting Intellectual Property Online	335
	Defamation	335
	Deceptive Trade Practices	336
	Advertising Regulation	337
	Online Crime, Terrorism, and Warfare	337
	Online Crime: Jurisdiction Issues	338
	New Types of Crime Online	339
	Online Warfare and Terrorism	341
	Ethical Issues	342
	Ethics and Online Business Practices	342
	Privacy Rights and Obligations	343
	Communications with Children	348
	Taxation and Electronic Commerce	350
	Nexus	351
	U.S. Income Taxes	351
	U.S. State Sales Taxes	351
	Import Tariffs	353
	European Union Value Added Taxes	353
	Summary	354
	Key Terms	355
	Review Questions	356
	Exercises	357
	Cases	358
	For Further Study and Research	360

## **Part 3: Technologies for Electronic Commerce**

---

<b>Chapter 8</b>	<i>Web Server Hardware and Software</i>	367
	Web Server Basics	368
	Dynamic Content Generation	369
	Multiple Meanings of “Server”	371
	Web Client/Server Architectures	371
	Software for Web Servers	374
	Operating Systems for Web Servers	374
	Web Server Software	375

Electronic Mail (E-Mail)	377
E-Mail Benefits	377
E-Mail Drawbacks	377
Spam	377
Solutions to the Spam Problem	378
Web Site Utility Programs	385
Tracert and Other Route-Tracing Programs	385
Telnet and FTP Utilities	386
Indexing and Searching Utility Programs	386
Data Analysis Software	387
Link-Checking Utilities	387
Remote Server Administration	387
Web Server Hardware	387
Server Computers	388
Web Servers and Green Computing	389
Web Server Performance Evaluation	389
Web Server Hardware Architectures	390
Summary	394
Key Terms	394
Review Questions	395
Exercises	396
Cases	397
For Further Study and Research	401
<b>Chapter 9</b> <i>Electronic Commerce Software</i>	403
Web Hosting Alternatives	405
Basic Functions of Electronic Commerce Software	405
Catalog Display Software	406
Shopping Cart Software	407
Transaction Processing	409
How Electronic Commerce Software Works with Other Software	410
Databases	411
Middleware	411
Enterprise Application Integration	412
Integration with ERP Systems	413
Web Services	413
Electronic Commerce Software for Small and Midsize Companies	416
Basic CSPs	416
Mall-Style CSPs	416
Estimated Operating Expenses for a Small Web Business	417
Electronic Commerce Software for Midsize Businesses	418
Web Site Development Tools	418
Midrange Electronic Commerce Software	418
Electronic Commerce Software for Large Businesses	419
Enterprise-Class Electronic Commerce Software	419
Content Management Software	421
Knowledge Management Software	422

## Table of Contents

Supply Chain Management Software	422
Customer Relationship Management Software	423
Cloud Computing	424
Summary	425
Key Terms	425
Review Questions	426
Exercises	427
Cases	428
For Further Study and Research	431
<b>Chapter 10</b> <i>Electronic Commerce Security</i>	433
Online Security Issues Overview	435
Origins of Security on Interconnected Computer Systems	435
Computer Security and Risk Management	435
Elements of Computer Security	437
Establishing a Security Policy	437
Security for Client Devices	439
Cookies and Web Bugs	439
Active Content	441
Graphics and Plug-Ins	442
Viruses, Worms, and Antivirus Software	442
Digital Certificates	445
Steganography	448
Physical Security for Client Devices	448
Client Security for Mobile Devices	448
Communication Channel Security	449
Secrecy Threats	450
Integrity Threats	452
Necessity Threats	453
Threats to the Physical Security of Internet Communications Channels	453
Threats to Wireless Networks	454
Encryption Solutions	454
Encryption in Web Browsers	458
Hash Functions, Message Digests, and Digital Signatures	461
Security for Server Computers	462
Password Attack Threats	462
Database Threats	464
Other Software-Based Threats	464
Threats to the Physical Security of Web Servers	465
Access Control and Authentication	465
Firewalls	466
Organizations that Promote Computer Security	468
CERT	468
Other Organizations	469
Computer Forensics and Ethical Hacking	469
Summary	471
Key Terms	471

Review Questions	473
Exercises	474
Cases	475
For Further Study and Research	477
<b>Chapter 11</b> <i>Payment Systems for Electronic Commerce</i>	481
Online Payment Basics	483
Micropayments and Small Payments	483
Online Payment Methods	484
Payment Cards	485
Advantages and Disadvantages of Payment Cards	486
Payment Acceptance and Processing	486
Digital Cash	491
Digital Cash and the Double Spending Issue	492
Advantages and Disadvantages of Digital Cash	493
Digital Wallets	494
Software-Only Digital Wallets	494
Hardware-Based Digital Wallets	495
Stored-Value Cards	495
Magnetic Strip Cards	496
Smart Cards	496
Internet Technologies and the Banking Industry	497
Check Processing	497
Mobile Banking	499
Payment System Threats: Phishing and Identity Theft	499
Phishing Attacks	499
Using Phishing Attacks for Identity Theft	502
Phishing Attack Countermeasures	504
Summary	505
Key Terms	505
Review Questions	506
Exercises	507
Cases	508
For Further Study and Research	511

## Part 4: Integration

---

<b>Chapter 12</b> <i>Managing Electronic Commerce Implementations</i>	515
Identifying Benefits and Estimating Costs of Electronic Commerce Initiatives	516
Identifying Objectives	517
Linking Objectives to Business Strategies	517
Identifying and Measuring Benefits	518
Identifying and Estimating Costs	520
Funding Online Business Startups	523
Comparing Benefits to Costs	524
Return on Investment (ROI)	525

## Table of Contents

xiv

Strategies for Developing Electronic Commerce Web Sites	526
Internal Development vs. Outsourcing	527
Incubators	530
Managing Electronic Commerce Implementations	531
Project Management	531
Project Portfolio Management	532
Staffing for Electronic Commerce	533
Postimplementation Audits	536
Change Management	537
Summary	538
Key Terms	538
Review Questions	539
Exercises	540
Cases	542
For Further Study and Research	544
<b>Glossary</b>	<b>547</b>
<b>Index</b>	<b>581</b>