PART 1

Introduction to E-commerce

CHAPTER 1

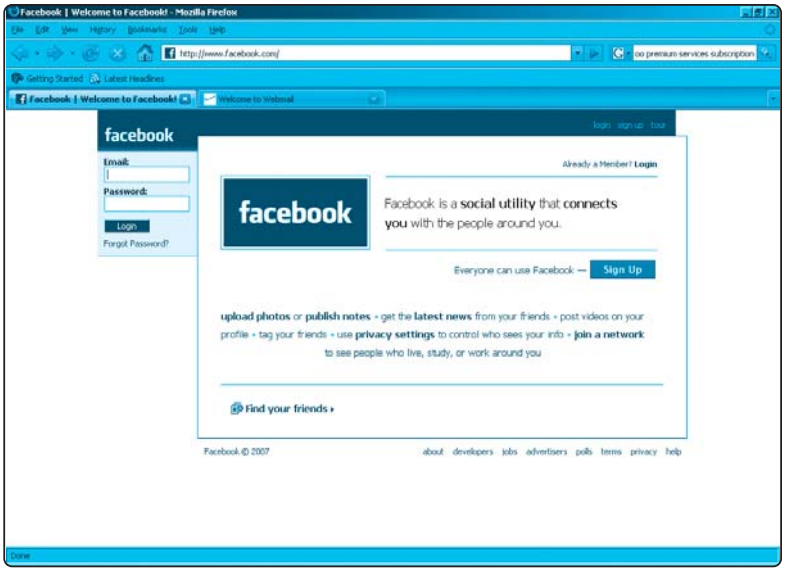
The Revolution Is Just Beginning

LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- Define e-commerce and describe how it differs from e-business.
- Identify and describe the unique features of e-commerce technology and discuss their business significance.
- Recognize and describe Web 2.0 applications.
- Describe the major types of e-commerce.
- Discuss the origins and growth of e-commerce.
- Understand the evolution of e-commerce from its early years to today.
- Identify the factors that will define the future of e-commerce.
- Describe the major themes underlying the study of e-commerce.
- Identify the major academic disciplines contributing to e-commerce.

MySpace and Facebook:
It's All About You



How many people watched the final episode of the most popular American television show in history, the Sopranos? Answer: about 12 million (out of a total television audience size of 111 million). Only once in American history has a television show drawn more simultaneous viewers—13 million for NBC's "America's Got Talent" premiere in 2006. How many people visit MySpace each month? About 70 million. There are now more than 100 million personal profiles on MySpace. Almost 40 million visit MySpace's closest social network rival, Facebook, each month. Facebook has 27 million active members and more than 35 million profiles online. At MySpace, users spend an average of 30 minutes, and at Facebook, 24 minutes, about as long as a half-hour television show.

MySpace and Facebook, along with other "social" sites such as YouTube, Photobucket, and Second Life, exemplify the new face of e-commerce in the 21st century. When we think of e-commerce we tend to think of selling things online, a retail model based on selling physical products. While this iconic vision of e-commerce is still very powerful, and online retail is the fastest growing form of retail in the United States, growing up alongside is a whole new value stream based on selling services—not just goods. It's the service model of e-commerce.

What are these services and how much are they worth? How can you make money selling online services and how much can you make? Here, a little background will help.

The idea behind MySpace was to create a Web site that would make it possible for people to talk about the things they loved, and do it in a personal way—a sort of bulletin board combined with the capability of building your own Web pages with ease. The vision was that people would like to talk about themselves, even promote themselves, and find others online to talk with. Founders Tom Anderson and Chris DeWolfe started the business in January 2004, experienced an immediate unparalleled growth spurt, and today MySpace is among the top five most visited

sites on the Internet, and on some days, in the top spot, rivaling and surpassing Google, Amazon, and eBay! Only Yahoo consistently draws more visitors.

MySpace is supported by advertising. That's where audience size is critical: a very large number of firms are willing to pay premium prices to contact 100 million people. For instance, Procter & Gamble used MySpace to launch new products by linking their product pages to the MySpace pages of musicians whose visitors have the right demographics. Toyota used MySpace to set up a profile of its Yaris car, and users can become "friends" of Yaris.

In July 2005, Rupert Murdoch's News Corporation bought MySpace for what then was thought to be an outrageous price of $580 million. Even more unusual was the buyer. Here was a traditional newspaper and television company buying an Internet venture that at the time was not profitable. In retrospect, many believe the real value of MySpace was in the billions of dollars. In August 2006, MySpace struck a deal with Google for $900 million, allowing Google to display short text ads next to search results generated by MySpace. In one year, Murdoch had made back his investment and then some. Analysts believe that MySpace will have $300 million in revenue for 2007, and $450 million in 2008. News Corporation does not report the financial results of MySpace. No one knows if MySpace is profitable, and Murdoch isn't saying.

MySpace was not a new vision—other sites such as Friendster preceded it. But MySpace learned from Friendster's limitations. MySpace allowed bands and artists to promote themselves on the site, while Friendster banned self-promoting bands and artists. At MySpace, users could find the bands they liked and share that with their friends, starting a word-of-mouth buzz that promoted the bands, but also promoted MySpace as the place to find great music. Because it allows users to post just about anything they want, the site has copious amounts of vulgarity, pornography, and just poor use of language, and it has been banned from many business firms, as well as schools. Nevertheless, more than half of the MySpace audience is older than 34 years.

MySpace has rivals. In fact, it has spawned hundreds of more focused, niche social networks. There are investor, teen, business, career, family, fishing, music and travel networks, just to name a few. But its largest rival is Facebook. Founded as thefacebook.com at Harvard by student Mark Zuckerberg as a hobby, the idea behind Facebook was to create an online digital version of the traditional student class picture or "facebook." It quickly became popular at Harvard, expanded to Yale and Stanford, and then to the nation's 3,000 plus college campuses, creating a "social networking phenomenon" on campus. About 90% of college students in the United States have a Facebook profile, along with lists of favorites, activities, and accomplishments. Like MySpace, Facebook quickly developed into a general-purpose platform for conducting social life.

Originally restricted to college students, and relying on fixed templates rather than user-designed Web pages, Facebook was easily eclipsed by MySpace in terms of sheer numbers of subscribers. In 2006, in an effort to expand its subscriber base, Facebook made itself available to anyone, not just college students, and opened up its

Web pages to thousands of widgets—small software programs that users can find on the Web that make posting of photos, music, and video easy. Facebook even allows users to post ads and make money from their own advertising campaigns. MySpace does not allow posting of user advertising, and does not allow outside vendors to develop software applications to run on its site. Facebook, in contrast, supplies other firms with its source code and is encouraging outside firms to build applications that run on the Facebook site. As a result, Facebook is attracting MySpace users looking for a more structured, defined, and refined environment. Facebook is growing at twice the rate of MySpace in 2007. As with MySpace, no one knows if Facebook is profitable, and the owners of this private company are not saying.

For Zuckerberg, still the CEO of Facebook, the goal is to become "the social operating system of the Internet," at the center of users' online lives. This is right up there with the ambitions of Google ("to organize the world's information") and Amazon (becoming the "Earth's Biggest Selection").

SOURCES: "MySpace Outperforms All Other Social Networking Sites," News Corporation, July 12, 2007; "MySpace, Chasing YouTube, Upgrades Its Offerings," by Brad Stone, *New York Times*, June 27, 2007; "The Guys Behind MySpace.com," by Matt Krantz, *USA Today*, June 27, 2007; "Facebook Gets Help From Its Friends," *Wall Street Journal*, June 22, 2007; "'Sopranos' Whacks Most Rivals," by *Associated Press*, June 13, 2007; "Social Networking's Next Phase," by Brad Stone, *New York Times*, March 3, 2007; "Turning an Online Community Into a Business," by David Enrich, *Wall Street Journal*, February 27, 2007; "Marketing to Kids Where They Live," by Rachael King, *BusinessWeek Online*, September 11, 2006; "Social Networks: More Bubble Than Profit?," by Alex Halperin, *BusinessWeek Online*, February 28, 2006.

MySpace and Facebook, and hundreds of other niche-oriented social networking sites, are emblematic of the new e-commerce. These sites and others, such as YouTube, Photobucket, and Second Life, are defining a new and vibrant model of e-commerce growing up alongside the more traditional e-commerce retail sales model exemplified by Amazon and eBay. In this new model, services—not retail goods—are provided both to subscribers as well as to business firms advertising to entirely new audiences. Second, the movement of eyeballs towards social networking and user-generated content sites means fewer viewers of television and Hollywood movies, and fewer readers of newspapers and magazines. Never before in the history of media have such large audiences been aggregated and made accessible. Social networks are a technology that is highly disruptive of traditional media firms. Social networks are becoming the place where new products can be introduced and where new sales can be achieved to highly targeted and segmented audiences with a precision heretofore impossible. Welcome to the new service-based e-commerce!

This is not the first time e-commerce has reinvented itself. In the past 10 years, e-commerce has gone through two transitions. The early years of e-commerce, during the late 1990s, were a period of business vision, inspiration, and experimentation, followed by the realization that establishing a successful business model based on those visions would not be easy, which then ushered in a period of retrenchment and reevaluation. The retrenchment led to the stock market crash of March 2000 to April 2001, when the stock market value of e-commerce, telecommunications, and other technology stocks plummeted in the space of a year by more than 90%. After the bubble burst, many people were quick to write off e-commerce and predicted that e-commerce growth would stagnate, and the Internet audience itself would plateau. But they were wrong. In this first transition, the surviving firms refined and honed their business models, ultimately leading to models that actually produced profits, resulting in e-commerce retail growth rates of over 25% per year.

The second transition is toward services such as creating and publishing photos, blogs and videos, and developing new communities and professional ties through network sites, even as the e-commerce retail goods trade continues to expand at 25% a year. And it probably safe to predict that this will not be the last transition for e-commerce.

1.1 E-COMMERCE: THE REVOLUTION IS JUST BEGINNING

In fact, the e-commerce revolution is just beginning. For instance, in 2007:

- Online consumer sales expanded by more than 25% to an estimated $225 billion (eMarketer, Inc., 2007a, b, c; Internet Retailer, 2007; Forrester Research, 2007a).
- The major source of online retail growth is now increased spending by existing online buyers rather than new buyers as trust and consumer confidence build. Shoppers are buying expensive, "high-touch" goods online such as consumer electronics, home furnishings, and apparel.

- The number of individuals online in the United States increased to 175–200 million, up from 150 million in 2005 (The total population of the United States is about 300 million.) (eMarketer, Inc., 2007a).
- Of the total 120 million households in the United States, the number online increased to 78 million or about 65% of all households (eMarketer, Inc., 2007d).
- On an average day, 92 million people go online. Around 76 million send e-mail, 4 million share music on peer-to-peer networks, and 17 million research a product. About 50 million have used Wikipedia, 26 million have created a social network profile, 11 million have created a blog, and 3 million have used the Internet to rate a person, product, or service (Pew Research Center, 2007).
- The number of people who have purchased something online expanded to about 116 million, with an additional 22 million just shopping (gathering information but not purchasing) (eMarketer, Inc., 2007a).
- The demographic profile of new online adult shoppers broadened to become more like ordinary American shoppers while at the same time significant generational differences in purchase patterns have emerged (eMarketer, Inc., 2006c, 2006d).
- B2B e-commerce—use of the Internet for business-to-business commerce—expanded about 17% to more than $3.6 trillion (U.S. Census Bureau, 2007; authors' estimates).
- The Internet technology base gained greater depth and power, as more than 65 million households have broadband cable or DSL access to the Internet—about 54% of all U.S. households (eMarketer, Inc., 2007d).
- Initial public offerings (IPOs) returned, with over 200 IPOs raising over $43 billion, 37% more than the previous year (Renaissance Capital, 2007). Broadly based Internet stock funds such as Baron's iOpportunity Fund grew by more than 15% in 2006 and 2007 (Lesova, 2007). Google, Apple, Amazon, E*Trade, and many other smaller online firms led the rebound in Internet stocks. Google's stock alone hit an all-time high in 2007 of $697 a share (as of November 2007), far above its public offering price in 2005 of $85.

These developments signal many of the themes in the new edition of this book (see **Table 1.1**). More and more people and businesses will be using the Internet to conduct commerce; smaller, local firms are learning how to take advantage of the Web; the e-commerce channel will deepen as more products and services come online; more industries will be transformed by e-commerce, including all forms of traditional media (from movies, television, music, and news), software, education, and finance; Internet technology will continue to drive these changes as broadband telecommunications comes to more households; pure e-commerce business models will be refined further to achieve higher levels of profitability; and traditional retail brands such as Sears, JCPenney, and Wal-Mart will further extend their multi-channel, bricks-and-clicks strategies and retain their dominant retail positions by strengthening their Internet operations. At the societal level, other

trends are apparent. The Internet has created a platform for millions of people to create and share content, establish new social bonds and strengthen existing ones through social networking sites, blogging, and video posting sites such as YouTube. The major digital copyright owners have increased their pursuit of online file-swapping services with mixed success. States have successfully moved toward taxation of Internet sales, while Internet gaming sites have been severely curtailed through criminal prosecutions in the United States. Sovereign nations have expanded their surveillance of, and control over, Internet communications and content as a part of their anti-terrorist activities and their traditional interest in snooping on citizens. Privacy seems to have lost much of its meaning in an age when millions create public online personal profiles.

In 1994, e-commerce as we now know it did not exist. In 2008, just 14 years later, around 120 million American consumers are expected to spend about $265 billion purchasing online retail products and services on the Internet's World Wide Web (eMarketer, Inc., 2007a). Although the terms Internet and World Wide Web are often used interchangeably, they are actually two very different things. The *Internet* is a worldwide network of computer networks, and the *World Wide Web* is one of the Internet's most popular services, providing access to over 50 billion Web pages. We describe both more fully later in this chapter and in Chapter 3. In 2008, businesses are expected to spend over $4.2 trillion purchasing goods and services from other businesses on the Web (U.S. Census Bureau, 2007). From a standing start in 1995, this type of commerce, called *electronic commerce* or *e-commerce*, has experienced growth rates of well over 100% a year, although the rate has slowed and is now growing at about 25% a year. These developments have created the first widespread digital electronic marketplaces. Even more impressive than its spectacular initial growth is its future predicted growth. By 2010, analysts estimate that consumers will be spending over $400 billion and businesses about $6 trillion in online transactions (eMarketer, Inc., 2007a; U.S. Census Bureau, 2007).

TABLE 1.1 MAJOR TRENDS IN E-COMMERCE 2007–2008

BUSINESS
• New business models emerge based on social technologies and consumer-generated content from videos and photos, to blogs and reviews.
• Search engine marketing challenges traditional marketing and advertising media as consumers switch their eyes to the Web.
• Retail consumer e-commerce continues to grow at double-digit rates.
• The online demographics of shoppers continues to broaden with the fastest growth among teens and tweens, and older adults.
• Online sites continue to strengthen profitability by refining their business models and leveraging the capabilities of the Internet.

TABLE 1.1 MAJOR TRENDS IN E-COMMERCE 2007–2008 (CONTINUED)

- The first wave of e-commerce transformed the business world of books, music, brokerage, and air travel. Today industries facing a similar transformation include marketing/advertising, telecommunications, entertainment, print media, real estate, hotels, bill payments, and software.
- The breadth of e-commerce offerings grows, especially in travel, entertainment, retail apparel, appliances, and home furnishings.
- Small businesses and entrepreneurs continue to flood into the e-commerce marketplace, often riding on the infrastructures created by industry giants such as Amazon, eBay, and Google.
- Brand extension through the Internet grows as large firms such as Sears, JCPenney, L.L.Bean, and Wal-Mart pursue integrated, multi-channel bricks-and-clicks strategies.
- B2B supply chain transactions and collaborative commerce continue to strengthen and grow beyond the $3.6 trillion mark.

TECHNOLOGY

- Wireless Internet connections (Wi-Fi, WiMax, and 3G telephone) grow rapidly.
- New digital gadgets, such as the iPhone, that support Internet and telephone service along with digital music, video, and television, appear.
- Podcasting takes off as a new media format for distribution of video, radio, and user-generated content. iTunes becomes an operating system within Windows for the play of music and video.
- The Internet broadband foundation becomes stronger in households and businesses. Bandwidth prices fall as telecommunications companies re-capitalize their debts.
- Computing and networking component prices continue to fall dramatically.
- New Internet-based models of computing such as .NET and Web services expand B2B opportunities.

SOCIETY

- Consumer and user-generated content, and syndication in the form of blogs, wikis, virtual lives, and social networks, grow to form an entirely new self-publishing forum that engages millions of consumers.
- Virtual life sites such as Second Life emerge as a new form of Internet-based entertainment that causes millions to reduce television viewing.
- Traditional media such as newspapers, television broadcasters, and magazine publishers continue to lose subscribers, and adopt online, interactive models.
- Conflicts over copyright management and control grow in significance.
- Over 105 million adults join a social network on the Internet, with the majority over 35 years of age.
- Taxation of Internet sales becomes more widespread and accepted by large online merchants.
- Controversy over content regulation and controls increases.
- Surveillance of Internet communications grows as a part of the "war on terror."
- Concerns over commercial and governmental privacy invasion grow as firms provide access to government agencies of private personal information.
- Internet fraud, abuse, and identity theft occurrences increase.
- Spam grows despite new laws and promised technology fixes.
- Invasion of personal privacy on the Web expands as marketers expand their capabilities to track users.

THE FIRST THIRTY SECONDS

It is important to realize that the rapid growth and change that has occurred in the first 12 years of e-commerce represents just the beginning—what could be called the first 30 seconds of the e-commerce revolution. The same technologies that drove the first decade of e-commerce (described in Chapter 3) continue to evolve at exponential rates. This underlying ferment in the technological groundwork of the Internet and Web presents entrepreneurs with new opportunities to both create new businesses and new business models in traditional industries, and also to destroy old businesses. Business change becomes disruptive, rapid, and even destructive, while offering entrepreneurs new opportunities and resources for investment.

Changes in underlying information technologies and continuing entrepreneurial innovation in business and marketing promise as much change in the next decade as seen in the last decade. The twenty-first century will be the age of a digitally enabled social and commercial life, the outlines of which we can barely perceive at this time. It appears likely that e-commerce will eventually impact nearly all commerce, and that most commerce will be e-commerce by the year 2050.

Is there a terminal velocity, or a terminal point, towards which e-commerce is hurtling? Can e-commerce continue to grow at its current rate indefinitely? It's possible that at some point, e-commerce growth may slow just because people have no more time to watch yet another Internet television show, or open more and more e-mail. However, currently, there is no foreseeable limit to the continued exponential development of the technology, or limits on the inventiveness of entrepreneurs to develop new uses for the technology. Therefore, for now at least, the disruptive process will continue.

Business fortunes are made—and lost—in periods of extraordinary change such as this. The next five years hold out extraordinary opportunities—as well as risks—for new and traditional businesses to exploit digital technology for market advantage. For society as a whole, the next few decades offer the possibility of extraordinary gains in social wealth as the digital revolution works its way through larger and larger segments of the world's economy, offering the possibility of high rates of productivity and income growth in an inflation-free environment.

As a business or technology student, this book will help you perceive and understand the opportunities and risks that lie ahead. By the time you finish, you will be able to identify the technological, business, and social forces that have shaped the growth of e-commerce and extend that understanding into the years ahead.

WHAT IS E-COMMERCE?

e-commerce
the use of the Internet and the Web to transact business. More formally, digitally enabled commercial transactions between and among organizations and individuals

Our focus in this book is **e-commerce**—the use of the Internet and the Web to transact business. More formally, we focus on digitally enabled commercial transactions between and among organizations and individuals. Each of these components of our working definition of e-commerce is important. *Digitally enabled transactions* include all transactions mediated by digital technology. For the most part, this means transactions that occur over the Internet and the Web. *Commercial transactions* involve the exchange of value (e.g., money) across organizational or individual boundaries in return for products and services. Exchange of value is important for understanding the limits of e-commerce. Without an exchange of value, no commerce occurs.

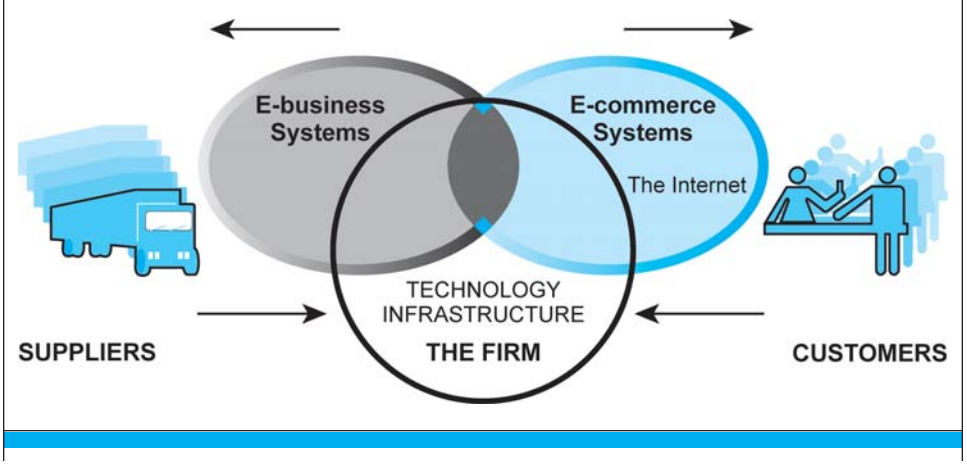
THE DIFFERENCE BETWEEN E-COMMERCE AND E-BUSINESS

There is a debate among consultants and academics about the meaning and limitations of both e-commerce and e-business. Some argue that e-commerce encompasses the entire world of electronically based organizational activities that support a firm's market exchanges—including a firm's entire information system's infrastructure (Rayport and Jaworski, 2003). Others argue, on the other hand, that e-business encompasses the entire world of internal and external electronically based activities, including e-commerce (Kalakota and Robinson, 2003).

We think that it is important to make a working distinction between e-commerce and e-business because we believe they refer to different phenomena. E-commerce is not "anything digital" that a firm does. For purposes of this text, we will use the term **e-business** to refer primarily to the digital enabling of transactions and processes *within* a firm, involving information systems under the control of the firm. For the most part, in our view, e-business does not include commercial transactions involving an exchange of value across organizational boundaries. For example, a company's online inventory control mechanisms are a component of e-business, but such internal processes do not directly generate revenue for the firm from outside businesses or consumers, as e-commerce, by definition, does. It is true, however, that a firm's e-business infrastructure provides support for online e-commerce exchanges; the same infrastructure and skill sets are involved in both e-business and e-commerce. E-commerce and e-business systems blur together at the business firm boundary, at the point where internal business systems link up with suppliers or customers, for instance (see **Figure 1.1**). E-business applications turn into e-commerce precisely when an exchange of value occurs (see Mesenbourg, U.S. Department of Commerce, 2001, for a similar view). We will examine this intersection further in Chapter 12.

e-business
the digital enabling of transactions and processes within a firm, involving information systems under the control of the firm

FIGURE 1.1 THE DIFFERENCE BETWEEN E-COMMERCE AND E-BUSINESS



E-commerce primarily involves transactions that cross firm boundaries. E-business primarily involves the application of digital technologies to business processes within the firm.

WHY STUDY E-COMMERCE?

Why are there college courses and textbooks on e-commerce when there are no courses or textbooks on "TV Commerce," "Radio Commerce," "Direct Mail Commerce," "Railroad Commerce," or "Highway Commerce," even though these technologies had profound impacts on commerce in the twentieth century and account for far more commerce than e-commerce? Many colleges, including Massachusetts Institute of Technology (MIT), University of Michigan, Cornell University, University of California at Berkeley, and NSEAD Business School (France), are also developing courses on social interaction technologies and techniques, online social networks, online community development, and consumer-generated media. Is "YouTube 401" next?

The reason for the interest specifically in e-commerce is that e-commerce technology (discussed in detail in Chapters 3 and 4) is different and more powerful than any of the other technologies we have seen in the past century. E-commerce technologies—and the digital markets that result—promise to bring about some fundamental, unprecedented shifts in commerce. While these other technologies transformed economic life in the twentieth century, the evolving Internet and other information technologies will shape the twenty-first century.

Prior to the development of e-commerce, the marketing and sale of goods was a mass-marketing and sales force-driven process. Marketers viewed consumers as passive targets of advertising "campaigns" and branding blitzes intended to influence their long-term product perceptions and immediate purchasing behavior. Companies sold their products via well-insulated "channels." Consumers were trapped by geographical and social boundaries, unable to search widely for the best price and quality. Information about prices, costs, and fees could be hidden from the consumer, creating profitable "information asymmetries" for the selling firm. **Information asymmetry** refers to any disparity in relevant market information among parties in a transaction. It was so expensive to change national or regional prices in traditional retailing (what are called *menu costs*) that "one national price" was the norm, and dynamic pricing to the marketplace—changing prices in real time—was unheard of. In this environment, manufacturers prospered by relying on huge production runs of products that could not be customized or personalized. One of the shifts that e-commerce appears to be bringing about is a large reduction in information asymmetry among all market participants (consumers and merchants). Preventing consumers from learning about costs, price discrimination strategies, and profits from sales becomes more difficult with e-commerce, and the entire marketplace potentially becomes highly price competitive.

information asymmetry
any disparity in relevant market information among parties in a transaction

EIGHT UNIQUE FEATURES OF E-COMMERCE TECHNOLOGY

Table 1.2 lists eight unique features of e-commerce technology that both challenge traditional business thinking and explain why we have so much interest in e-commerce. These unique dimensions of e-commerce technologies suggest many new possibilities for marketing and selling—a powerful set of interactive, personalized, and rich messages are available for delivery to segmented, targeted audiences. E-commerce technologies make it possible for merchants to know much more about

TABLE 1.2 EIGHT UNIQUE FEATURES OF E-COMMERCE TECHNOLOGY

E-COMMERCE TECHNOLOGY DIMENSION	BUSINESS SIGNIFICANCE
Ubiquity—Internet/Web technology is available everywhere: at work, at home, and elsewhere via mobile devices, anytime.	The marketplace is extended beyond traditional boundaries and is removed from a temporal and geographic location. "Marketspace" is created; shopping can take place anywhere. Customer convenience is enhanced, and shopping costs are reduced.
Global reach—The technology reaches across national boundaries, around the Earth.	Commerce is enabled across cultural and national boundaries seamlessly and without modification. "Marketspace" includes potentially billions of consumers and millions of businesses worldwide.
Universal standards—There is one set of technology standards, namely Internet standards.	There is one set of technical media standards across the globe.
Richness—Video, audio, and text messages are possible.	Video, audio, and text marketing messages are integrated into a single marketing message and consuming experience.
Interactivity—The technology works through interaction with the user.	Consumers are engaged in a dialog that dynamically adjusts the experience to the individual, and makes the consumer a co-participant in the process of delivering goods to the market.
Information density—The technology reduces information costs and raises quality.	Information processing, storage, and communication costs drop dramatically, while currency, accuracy, and timeliness improve greatly. Information becomes plentiful, cheap, and accurate.
Personalization/Customization—The technology allows personalized messages to be delivered to individuals as well as groups.	Personalization of marketing messages and customization of products and services are based on individual characteristics.
Social technology—User content generation and social networking.	New Internet social and business models enable user content creation .and distribution, and support social networks.

consumers and to be able to use this information more effectively than was ever true in the past. Potentially, online merchants can use this new information to develop new information asymmetries, enhance their ability to brand products, charge premium prices for high-quality service, and segment the market into an endless number of subgroups, each receiving a different price. To complicate matters further, these same technologies make it possible for merchants to know more about other

merchants than was ever true in the past. This presents the possibility that merchants might collude on prices rather than compete and drive overall average prices up. This strategy works especially well when there are just a few suppliers (Varian, 2000b). We examine these different visions of e-commerce further in Section 1.2 and throughout the book.

Each of the dimensions of e-commerce technology and their business significance listed in Table 1.2 deserves a brief exploration, as well as a comparison to both traditional commerce and other forms of technology-enabled commerce.

Ubiquity

marketplace
physical space you visit in order to transact

ubiquity
available just about everywhere, at all times

marketspace
marketplace extended beyond traditional boundaries and removed from a temporal and geographic location

In traditional commerce, a **marketplace** is a physical place you visit in order to transact. For example, television and radio typically motivate the consumer to go some place to make a purchase. E-commerce, in contrast, is characterized by its **ubiquity**: it is available just about everywhere, at all times. It liberates the market from being restricted to a physical space and makes it possible to shop from your desktop, at home, at work, or even from your car, using mobile commerce. The result is called a **marketspace**—a marketplace extended beyond traditional boundaries and removed from a temporal and geographic location. From a consumer point of view, ubiquity reduces *transaction costs*—the costs of participating in a market. To transact, it is no longer necessary that you spend time and money traveling to a market. At a broader level, the ubiquity of e-commerce lowers the cognitive energy required to transact in a marketspace. *Cognitive energy* refers to the mental effort required to complete a task. Humans generally seek to reduce cognitive energy outlays. When given a choice, humans will choose the path requiring the least effort—the most convenient path (Shapiro and Varian, 1999; Tversky and Kahneman, 1981).

Global Reach

reach
the total number of users or customers an e-commerce business can obtain

E-commerce technology permits commercial transactions to cross cultural and national boundaries far more conveniently and cost-effectively than is true in traditional commerce. As a result, the potential market size for e-commerce merchants is roughly equal to the size of the world's online population (over 1.2 billion in 2007, and growing rapidly, according to industry sources) (Internet Worldstats, 2007). The total number of users or customers an e-commerce business can obtain is a measure of its **reach** (Evans and Wurster, 1997).

In contrast, most traditional commerce is local or regional—it involves local merchants or national merchants with local outlets. Television and radio stations, and newspapers, for instance, are primarily local and regional institutions with limited but powerful national networks that can attract a national audience. In contrast to e-commerce technology, these older commerce technologies do not easily cross national boundaries to a global audience.

Universal Standards

universal standards
standards that are shared by all nations around the world

One strikingly unusual feature of e-commerce technologies is that the technical standards of the Internet, and therefore the technical standards for conducting e-commerce, are **universal standards**—they are shared by all nations around the

world. In contrast, most traditional commerce technologies differ from one nation to the next. For instance, television and radio standards differ around the world, as does cell telephone technology. The universal technical standards of the Internet and e-commerce greatly lower *market entry costs*—the cost merchants must pay just to bring their goods to market. At the same time, for consumers, universal standards reduce *search costs*—the effort required to find suitable products. And by creating a single, one-world marketspace, where prices and product descriptions can be inexpensively displayed for all to see, *price discovery* becomes simpler, faster, and more accurate (Bakos, 1997; Kambil, 1997). And users of the Internet, both businesses and individuals, experience *network externalities*—benefits that arise because everyone uses the same technology. With e-commerce technologies, it is possible for the first time in history to easily find many of the suppliers, prices, and delivery terms of a specific product anywhere in the world, and to view them in a coherent, comparative environment. Although this is not necessarily realistic today for all or many products, it is a potential that will be exploited in the future.

Richness

Information **richness** refers to the complexity and content of a message (Evans and Wurster, 1999). Traditional markets, national sales forces, and small retail stores have great richness: they are able to provide personal, face-to-face service using aural and visual cues when making a sale. The richness of traditional markets makes them a powerful selling or commercial environment. Prior to the development of the Web, there was a trade-off between richness and reach: the larger the audience reached, the less rich the message (see **Figure 1.2**). The Internet has the potential for offering considerably more information richness than traditional media such as printing presses, radio, and television because it is interactive and can adjust the message to individual users. Chatting with an online sales person, for instance, comes very close to the customer experience in a small retail shop. The richness of the Web allows retail and service merchants to market and sell "complex" goods and services that heretofore really did require a face-to-face presentation by a sales force. Complex goods have multiple attributes, are typically expensive, and cannot be compared easily, such as used cars, non-standard financial instruments, and even diamond rings (Fink, et. al., 2004).

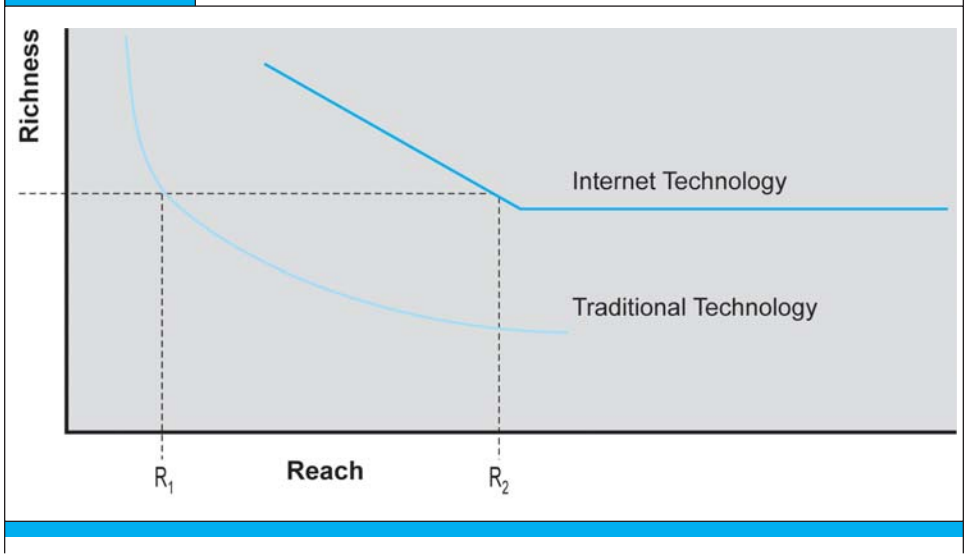
richness
the complexity and content of a message

Interactivity

Unlike any of the commercial technologies of the twentieth century, with the possible exception of the telephone, e-commerce technologies allow for interactivity, meaning they enable two-way communication between merchant and consumer. Traditional television, for instance, cannot ask viewers any questions or enter into conversations with them, and it cannot request that customer information be entered into a form. In contrast, all of these activities are possible on an e-commerce Web site. **Interactivity** allows an online merchant to

interactivity
technology that allows for two-way communication between merchant and consumer

FIGURE 1.2 THE CHANGING TRADE-OFF BETWEEN RICHNESS AND REACH



E-commerce technologies have changed the traditional trade-off between richness and reach. The Internet and Web can deliver, to an audience of millions, "rich" marketing messages with text, video, and audio, in a way not possible with traditional commerce technologies such as radio, television, or magazines.

SOURCE: Evans and Wurster, 2000.

engage a consumer in ways similar to a face-to-face experience, but on a much more massive, global scale.

Information Density

information density the total amount and quantity of information available to all market participants

The Internet and the Web vastly increase **information density**—the total amount and quality of information available to all market participants, consumers, and merchants alike. E-commerce technologies reduce information collection, storage, processing, and communication costs. At the same time, these technologies increase greatly the currency, accuracy, and timeliness of information—making information more useful and important than ever. As a result, information becomes more plentiful, less expensive and of higher quality.

A number of business consequences result from the growth in information density. In e-commerce markets, prices and costs become more transparent. *Price transparency* refers to the ease with which consumers can find out the variety of prices in a market; *cost transparency* refers to the ability of consumers to discover the actual costs merchants pay for products (Sinha, 2000). But there are advantages for merchants as well. Online merchants can discover much more about consumers; this allows merchants to segment the market into groups willing to pay different prices and permits them to engage in *price discrimination*—selling the

same goods, or nearly the same goods, to different targeted groups at different prices. For instance, an online merchant can discover a consumer's avid interest in expensive exotic vacations, and then pitch expensive exotic vacation plans to that consumer at a premium price, knowing this person is willing to pay extra for such a vacation. At the same time, the online merchant can pitch the same vacation plan at a lower price to more price-sensitive consumers. Merchants also have enhanced abilities to differentiate their products in terms of cost, brand, and quality.

Personalization/Customization

E-commerce technologies permit **personalization**: merchants can target their marketing messages to specific individuals by adjusting the message to a person's name, interests, and past purchases. The technology also permits **customization**—changing the delivered product or service based on a user's preferences or prior behavior. Given the interactive nature of e-commerce technology, much information about the consumer can be gathered in the marketplace at the moment of purchase. With the increase in information density, a great deal of information about the consumer's past purchases and behavior can be stored and used by online merchants. The result is a level of personalization and customization unthinkable with existing commerce technologies. For instance, you may be able to shape what you see on television by selecting a channel, but you cannot change the contents of the channel you have chosen. In contrast, the online version of *The Wall Street Journal* allows you to select the type of news stories you want to see first, and gives you the opportunity to be alerted when certain events happen. Personalization and customization allow firms to precisely identify market segments and adjust their messages accordingly.

personalization
the targeting of marketing messages to specific individuals by adjusting the message to a person's name, interests, and past purchases

customization
changing the delivered product or service based on a user's preferences or prior behavior

Social Technology: User Content Generation and Social Networking

In a way quite different from all previous technologies, the Internet and e-commerce technologies have evolved to be much more social by allowing users to create and share content in the form of text, videos, music, or photos with a worldwide community. Using these forms of communication, users are able to create new social networks and strengthen existing ones. All previous mass media in modern history, including the printing press, use a broadcast model (one-to-many) where content is created in a central location by experts (professional writers, editors, directors, actors, and producers) and audiences are concentrated in huge aggregates to consume a standardized product. The telephone would appear to be an exception but it is not a "mass communication" technology. Instead the telephone is a one-to-one technology. The new Internet and e-commerce technologies have the potential to invert this standard media model by giving users the power to create and distribute content on a large scale, and permit users to program their own content consumption. The Internet provides a many-to-many model of mass communications that is unique.

WEB 2.0: PLAY MY VERSION

Many of the unique features of e-commerce and the Internet come together in a set of applications and social technologies referred to as Web 2.0. The Internet started out as a simple network to support e-mail and file transfers among remote computers. Communication among experts was the purpose. The World Wide Web (the Web) started out as a way to use the Internet to display simple pages and allow the user to navigate among the pages by linking them together electronically. You can think of this as Web 1.0—the first Web. By 2007 something else was happening. The Internet and the Web have evolved to the point where users can now create, edit, and distribute content to millions of others; share with one another their preferences, bookmarks, and online personas; participate in virtual lives; and build online communities. This "new" Web is called by many "**Web 2.0**," and while it draws heavily on the "old" Web 1.0, it is nevertheless a clear evolution from the past.

Web 2.0
a set of applications and technologies that allows users to create, edit, and distribute content; share preferences, bookmarks, and online personas; participate in virtual lives; and build online communities

Let's look at some examples of Web 2.0 applications and sites:

- Photobucket zooms from 4 million to 50 million users and 3 billion consumer-generated photos to become the most popular Web photo posting site, offering users an easy way to post and send photos and video, and provides a convenient link to YouTube, MySpace, and blog pages (Photobucket.com, 2007).
- YouTube, owned by Google after a $1.65 billion purchase, grows to the largest online consumer-generated video posting site and still searches for a profitable business model. Over 65,000 videos are uploaded and 100 million videos are watched each day. This one site accounts for over 60% of all videos watched online (Reuters, 2006).
- MySpace ("A place for friends") rockets to the lead of online networking sites for 100 million Web socialites, and receives 49,000 consumer-generated videos each day to be shared with others, half of them from adults over 35 (News Corporation, 2007). Adult professional sites such as LinkedIn, Friendster, and Facebook attract additional millions of adults looking for online connections.
- Joost.com becomes the first Internet Television channel with financing of $50 million and agreements with networks to deliver TV programs to any Internet-connected device such as an iPod, MP3 player, cell phone, TV set top box, or any wirelessly connected PC or device. Suddenly TV is unleashed from cables, wires and national television networks or even local stations. Programming becomes user programming (Joost.com, 2007).
- Google attracts the largest Internet audience with 85 million daily U.S. users, and over 160 million international users, with a continual stream of innovations such as Google Maps, GoogleView (a photo database of U.S. neighborhoods from the street level), video and photo posting and sharing (more than 500 million photos), Gmail, and Google Scholar. Over 25% of Google search results on the world's top 20 brands provide links to consumer-generated content such as reviews, blogs, and photos (iProspect, 2007).

- Second Life is a 3-D virtual world built and owned by its residents who have established lives by building over 8.5 million avatars in "The World," spending Linden dollars, owning real estate, and building and sharing "creations," which include clothing, interior designs, or writing, among other items. Residents spend over $2 million real dollars each day to buy things on the site for their virtual lives, and convert the real dollars to Lindens (Secondlife.com, 2007).
- Wikipedia allows 35 million contributors in the United States alone to share their knowledge and in the process has become the most successful online encyclopedia, far surpassing early "professional" encyclopedias such as Encarta or even Britannica. Wikipedia is one of the largest collaboratively edited reference projects in the world. Garnering over 20% of the online reference market, Wikipedia relies on volunteers, makes no money, and accepts no advertising. The Wikimedia Foundation, Inc., a not-for-profit organization that relies on fund-raising and donations to survive, owns Wikipedia. Wikipedia is one of the top 10 most visited sites on the Web (Wikipedia.org, 2007).

What do all these applications and new sites have in common? First, they rely on user- and consumer-generated content. These are all "applications" created by people, especially people in the 18–34 year-old demographic, and heavily in the 7–17 age group as well. "Regular" people (not just experts or professionals) are creating, sharing, modifying, and broadcasting content to huge audiences. Second, easy search capability is a key to their success. Third, they are inherently highly interactive, creating new opportunities for people to socially connect to others. They are "social" sites because they support interactions among users. Fourth, they rely on broadband connectivity to the Web. Fifth, with the exception of Google, they are currently marginally profitable, and their business models unproven despite considerable investment. Sixth, they attract extremely large audiences when compared to traditional Web 1.0 applications, exceeding in many cases the audience size of national broadcast and cable television programs. These audience relationships are intensive and long-lasting interactions with millions of people. In short, they attract eyeballs in very large numbers. Hence, they present marketers with extraordinary opportunities for targeted marketing and advertising. They also present consumers with the opportunity to rate and review products, and entrepreneurs with ideas for future business ventures. Briefly, it's a whole new world from what has gone before. You'll learn more about Web 2.0 in later chapters.

TYPES OF E-COMMERCE

There are a variety of different types of e-commerce and many different ways to characterize these types. **Table 1.3** lists the five major types of e-commerce discussed in this book.[1]

[1]Business-to-Government (B2G) e-commerce can be considered yet another type of e-commerce. For the purposes of this text, we subsume B2G e-commerce within B2B e-commerce, viewing the government as simply a form of business when it acts as a procurer of goods and/or services.

TABLE 1.3 MAJOR TYPES OF E-COMMERCE

TYPE OF E-COMMERCE	EXAMPLE
B2C—Business-to-Consumer	Amazon is a general merchandiser that sells consumer products to retail consumers.
B2B—Business-to-Business	Foodtrader is an independent third-party commodity exchange, auctions provider, and market information source that serves the food and agricultural industry.
C2C—Consumer-to-Consumer	On a large number of Web auction sites such as eBay, and listing sites such as Craigslist, consumers can auction or sell goods directly to other consumers.
P2P—Peer-to-Peer	BitTorrent is a software application that permits consumers to share videos and other high-bandwidth content with one another directly, without the intervention of a market maker as in C2C e-commerce.
M-commerce—Mobile commerce	Wireless mobile devices such as PDAs (personal digital assistants) and cell phones can be used to conduct commercial transactions.

For the most part, we distinguish different types of e-commerce by the nature of the market relationship—who is selling to whom. The exceptions are P2P and m-commerce, which are technology-based distinctions.

Business-to-Consumer (B2C) E-commerce

Business-to-Consumer (B2C) e-commerce
online businesses selling to individual consumers

The most commonly discussed type of e-commerce is **Business-to-Consumer (B2C) e-commerce**, in which online businesses attempt to reach individual consumers. Even though B2C is comparatively small (about $225 billion in 2007), it has grown exponentially since 1995, and is the type of e-commerce that most consumers are likely to encounter. Within the B2C category, there are many different types of business models. Chapter 2 has a detailed discussion of seven different B2C business models: portals, online retailers, content providers, transaction brokers, service providers, and community providers.

Business-to-Business (B2B) E-commerce

Business-to-Business (B2B) e-commerce
online businesses selling to other businesses

Business-to-Business (B2B) e-commerce, in which businesses focus on selling to other businesses, is the largest form of e-commerce, with about $3.6 trillion in transactions in the United States in 2007. There was an estimated $16 trillion in business-to-business exchanges of all kinds, online and offline, suggesting that B2B e-commerce has significant growth potential. The ultimate size of B2B e-commerce could be huge. There are two primary business models used within the B2B arena:

Net marketplaces, which include e-distributors, e-procurement companies, exchanges and industry consortia, and private industrial networks, which include single firm networks and industry-wide networks.

Consumer-to-Consumer (C2C) E-commerce

Consumer-to-Consumer (C2C) e-commerce provides a way for consumers to sell to each other, with the help of an online market maker such as the auction site eBay. Given that in 2006, eBay generated more than $52 billion in gross merchandise volume around the world, it is probably safe to estimate that the size of the global C2C market in 2007 is over $60 billion (eBay, 2007). In C2C e-commerce, the consumer prepares the product for market, places the product for auction or sale, and relies on the market maker to provide catalog, search engine, and transaction-clearing capabilities so that products can be easily displayed, discovered, and paid for.

Consumer-to-Consumer (C2C) e-commerce
consumers selling to other consumers

Peer-to-Peer (P2P) E-commerce

Peer-to-peer technology enables Internet users to share files and computer resources directly without having to go through a central Web server. In peer-to-peer's purest form, no intermediary is required, although in fact, most P2P networks make use of intermediary "super servers" to speed operations. Since 1999, entrepreneurs and venture capitalists have attempted to adapt various aspects of peer-to-peer technology into **Peer-to-Peer (P2P) e-commerce**. To date, the most widely used P2P networks are BitTorrent (which is used for downloading large video files, and accounts for nearly 25% of all Internet traffic) and eDonkey (used mostly for music files). Together these two P2P network programs account for 50%–70% of all Internet traffic worldwide—a startling figure. Some of this downloading and sharing is legal, but most is not. Legal commercial applications of P2P networking are beginning to emerge as Hollywood film studios move towards a digital distribution platform. The business models that support P2P commerce are unusual, in many cases illegal, and under constant attack by authorities.

Peer-to-Peer (P2P) e-commerce
use of peer-to-peer technology, which enables Internet users to share files and computer resources directly without having to go through a central Web server, in e-commerce

Napster, which was established to aid Internet users in finding and sharing online music files, was the most well-known example of P2P e-commerce until it was put out of business in 2001 by a series of negative court decisions. However, other file-sharing networks, such as Kazaa and Grokster, quickly emerged to take Napster's place. These networks were also put out of business by a variety of court opinions. The Supreme Court issued a decision in the case against the file-sharing networks in June 2005. Read the case study at the end of the chapter for a further look at how the music industry has been transformed both by file-sharing networks and legal sites such as Apple's iTunes and Real Networks' Rhapsody.

Mobile Commerce (M-commerce)

Mobile commerce, or **m-commerce**, refers to the use of wireless digital devices to enable transactions on the Web. Described more fully in Chapter 3, m-commerce involves the use of wireless networks to connect cell phones, handheld devices such BlackBerries, and personal computers to the Web. Once connected, mobile

mobile commerce (m-commerce)
use of wireless digital devices to enable transactions on the Web

consumers can conduct transactions, including stock trades, in-store price comparisons, banking, travel reservations, and more. Thus far, m-commerce is used most widely in Japan and Europe (especially in Scandinavia), where cell phones are more prevalent than in the United States. However, as discussed in the next section, m-commerce is expected to grow rapidly in the United States over the next five years.

GROWTH OF THE INTERNET AND THE WEB

The technology juggernauts behind e-commerce are the Internet and the World Wide Web. Without both of these technologies, e-commerce as we know it would be impossible. We describe the Internet and the Web in some detail in Chapter 3. The **Internet** is a worldwide network of computer networks built on common standards. Created in the late 1960s to connect a small number of mainframe computers and their users, the Internet has since grown into the world's largest network, connecting over 1.2 billion computers worldwide. The Internet links businesses, educational institutions, government agencies, and individuals together, and provides users with services such as e-mail, document transfer, newsgroups, shopping, research, instant messaging, music, videos, and news.

Internet
worldwide network of computer networks built on common standards

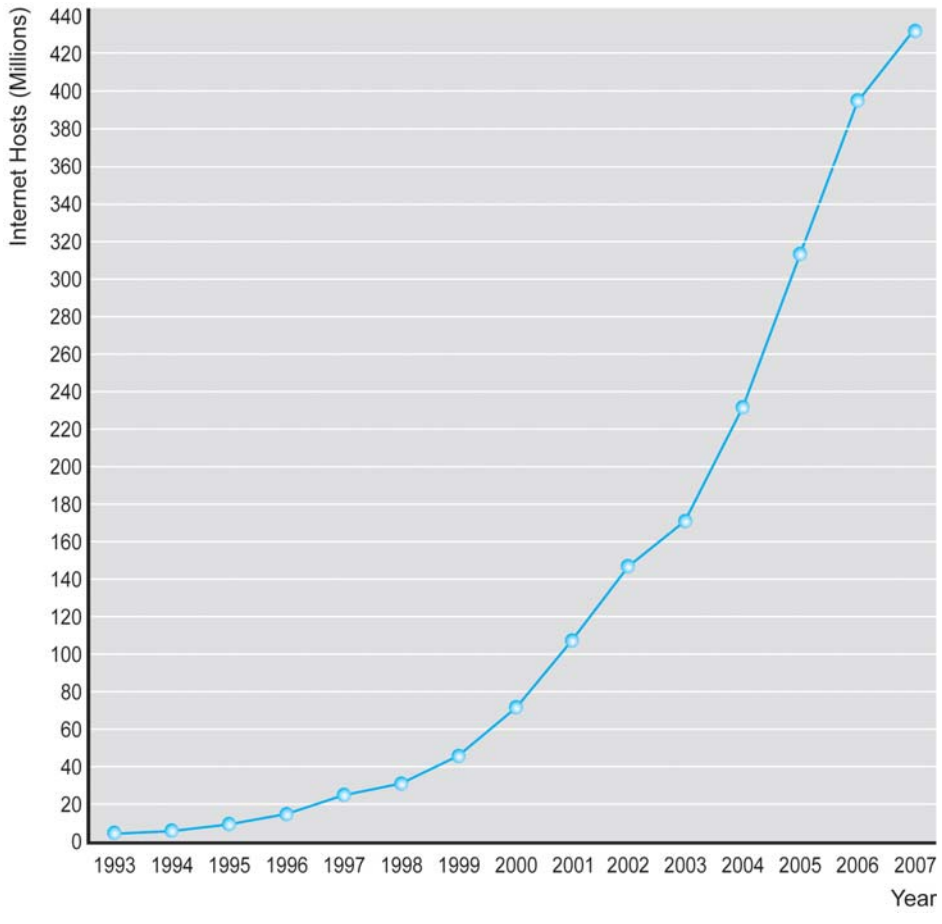
Figure 1.3 illustrates one way to measure the growth of the Internet, by looking at the number of Internet hosts with domain names. (An *Internet host* is defined by the Internet Software Consortium, which conducts this survey, as any IP address that returns a domain name in the in-addr.arpa domain, which is a special part of the DNS namespace that resolves IP addresses into domain names.) In January 2007, there were over 433 million Internet hosts in over 245 countries, up from a mere 70 million in 2000. The number of Internet hosts has been growing at a rate of around 35% a year since 2000 (Internet Systems Consortium, Inc., 2007).

The Internet has shown extraordinary growth patterns when compared to other electronic technologies of the past. It took radio 38 years to achieve a 30% share of U.S. households. It took television 17 years to achieve a 30% share. Since the invention of a graphical user interface for the World Wide Web in 1993, it took only 10 years for the Internet/Web to achieve a 53% share of U.S. households.

World Wide Web (the Web)
the most popular service that runs on the Internet; provides easy access to Web pages

The **World Wide Web (the Web)** is the most popular service that runs on the Internet infrastructure. The Web is the "killer application" that made the Internet commercially interesting and extraordinarily popular. The Web was developed in the early 1990s and hence is of much more recent vintage than the Internet. We describe the Web in some detail in Chapter 3. The Web provides easy access to over 50 billion Web pages indexed by Google and other search engines. These pages are created in a language called *HTML (HyperText Markup Language)*. HTML pages contain information—including text, graphics, animations, and other objects—made available for public use. You can find an exceptionally wide range of information on Web pages, ranging from the entire catalog of Sears Roebuck, to the entire collection of public records from the Securities and Exchange Commission, to the card catalog of your local library, to millions of music tracks (some of them legal) and videos. The Internet prior to the Web was primarily used for text communications, file

FIGURE 1.3 **THE GROWTH OF THE INTERNET, MEASURED BY THE NUMBER OF INTERNET HOSTS WITH DOMAIN NAMES**

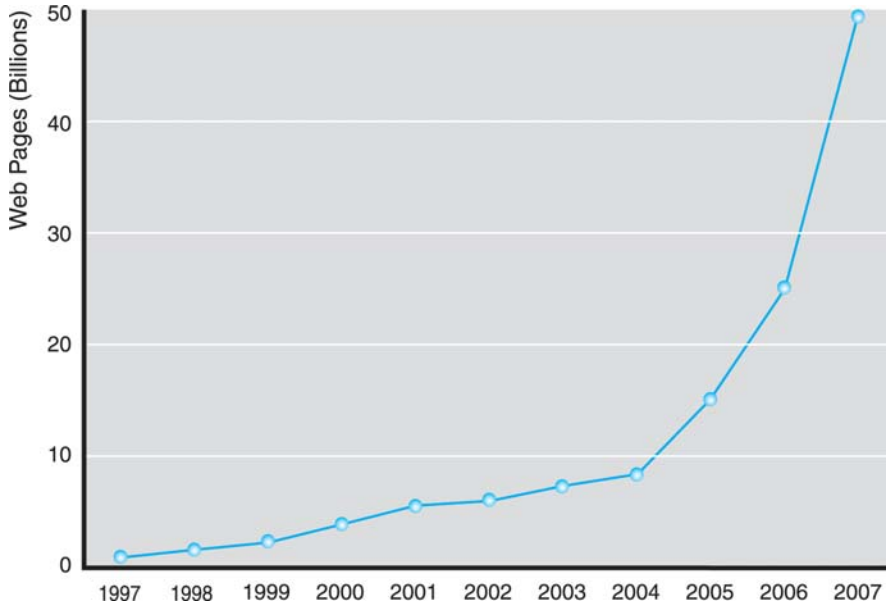


Growth in the size of the Internet 1993–2007 as measured by the number of Internet hosts with domain names.
SOURCE: Internet Systems Consortium, Inc. (www.isoc.org), 2007.

transfers, and remote computing. The Web introduced far more powerful and commercially interesting, colorful multimedia capabilities of direct relevance to commerce. In essence, the Web added color, voice, and video to the Internet, creating a communications infrastructure and information storage system that rivals television, radio, magazines, and even libraries.

There is no precise measurement of the number of Web pages in existence, in part because today's search engines index only a portion of the known universe of Web pages, and also because the size of the Web universe is unknown. It is estimated that Google, the Web's most popular and perhaps most comprehensive

FIGURE 1.4 **THE GROWTH OF WEB CONTENT, AS MEASURED BY WEB PAGES INDEXED BY GOOGLE**



The number of Web pages indexed by Google has grown from about 1 billion in 1998 to over 50 billion in 2007.
SOURCE: Based on data from Google Inc., and authors' estimates.

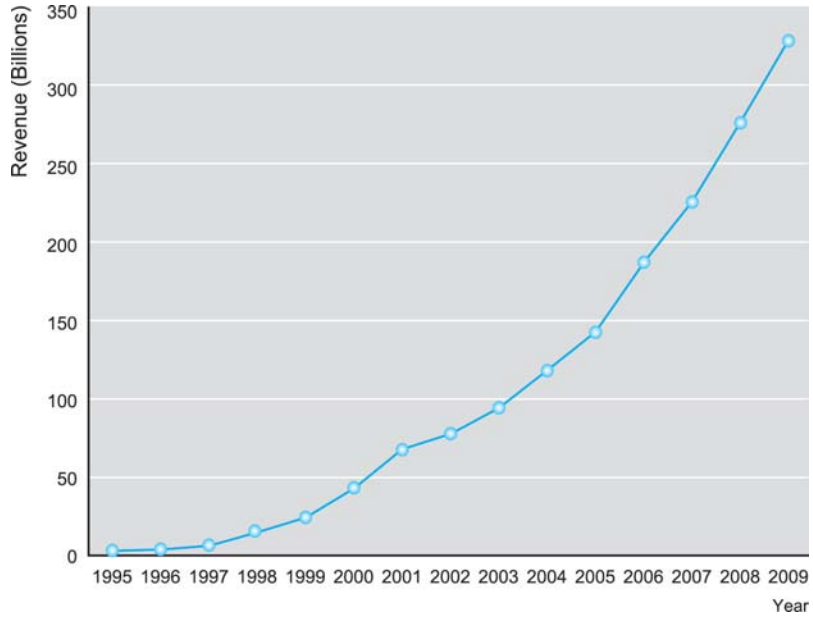
Web search engine, currently indexes over 50 billion pages. There are also an estimated 900 billion Web pages in the so-called "deep Web" that are not indexed by ordinary search engines such as Google. Nevertheless, it would be accurate to say that Web content has grown exponentially since 1993. **Figure 1.4** describes the growth of Web content as measured by the number of pages indexed by Google.

Read *Insight on Technology*: *Spider Webs, Bow Ties, Scale-Free Networks, and the Deep Web* on pages 26–27 for the latest view of researchers on the structure of the Web.

ORIGINS AND GROWTH OF E-COMMERCE

It is difficult to pinpoint just when e-commerce began. There were several precursors to e-commerce. In the late 1970s, a pharmaceutical firm named Baxter Healthcare initiated a primitive form of B2B e-commerce by using a telephone-based modem that permitted hospitals to reorder supplies from Baxter. This system was later expanded during the 1980s into a PC-based remote order entry system and was widely copied throughout the United States long before the Internet became a commercial environment. The 1980s saw the development of Electronic Data Interchange (EDI) standards that permitted firms to exchange commercial documents and conduct digital commercial transactions across private networks.

FIGURE 1.5 THE GROWTH OF B2C E-COMMERCE



In the early years, B2C e-commerce was doubling or tripling each year. Currently, B2C e-commerce is growing at about 25% per year, with seasonal spikes showing stronger year-to-year gains. (Note: Revenue shown includes retail sales and travel services revenues.)

SOURCES: Based on data from eMarketer, Inc., 2007a; U.S. Census Bureau, 2007; Forrester Research, 2007a; authors' estimates.

In the B2C arena, the first truly large-scale digitally enabled transaction system was deployed in France in 1981. The French Minitel was a videotext system that combined a telephone with an 8-inch screen. By the mid-1980s, more than 3 million Minitels were deployed, and over 13,000 different services were available, including ticket agencies, travel services, retail products, and online banking. The Minitel service continued in existence until December 31, 2006, when it was finally discontinued by its owner, France Telecom.

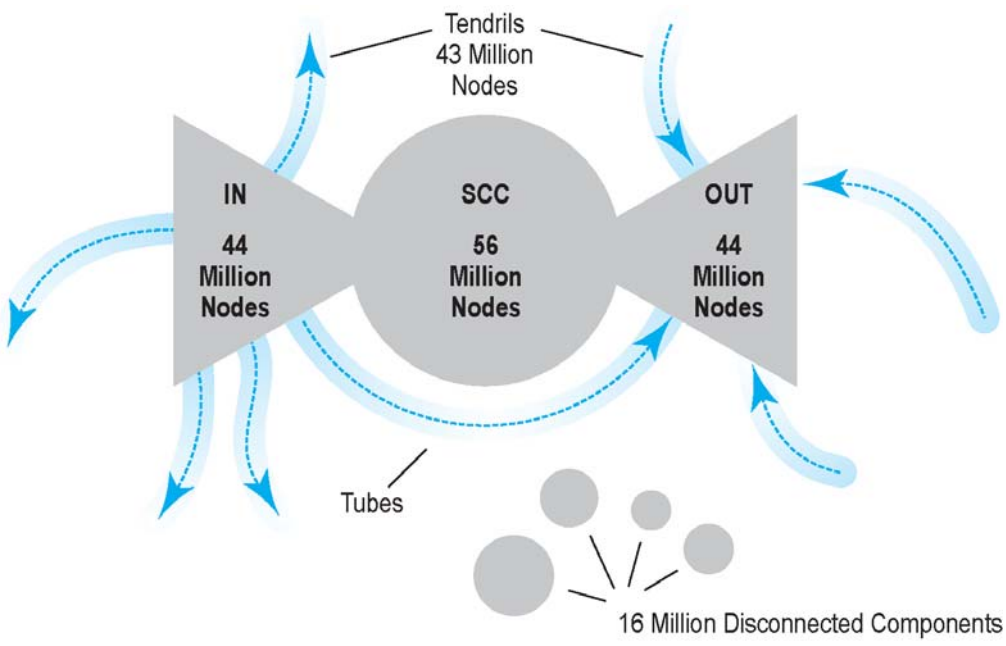
However, none of these precursor systems had the functionality of the Internet. Generally, when we think of e-commerce today, it is inextricably linked to the Internet. For our purposes, we will say e-commerce begins in 1995, following the appearance of the first banner advertisements placed by ATT, Volvo, Sprint, and others on Hotwired in late October 1994, and the first sales of banner ad space by Netscape and Infoseek in early 1995. Since then, e-commerce has been the fastest growing form of commerce in the United States. **Figure 1.5** and **Figure 1.6** (on page 28) chart the development of B2C e-commerce and B2B e-commerce, respectively, with projections for the next several years. Both graphs show a strong projected growth rate, but the dollar amounts of B2B e-commerce dwarf those of B2C.

INSIGHT ON TECHNOLOGY

SPIDER WEBS, BOW TIES, SCALE-FREE NETWORKS, AND THE DEEP WEB

The World Wide Web conjures up images of a giant spider web where everything is connected to everything else in a random pattern and you can go from one edge of the web to another by just following the right links. Theoretically, that's what makes the Web different from a typical index system: You can follow hyperlinks from one page to another. In the "small world" theory of the Web, every Web page is thought to be separated from any other Web page by an average of about 19 clicks. In 1968, sociologist Stanley Milgram invented small-world theory for social networks by noting that every human was separated from any other human by only six degrees of separation. On the Web, the small world theory was supported by early research on a small sampling of Web sites. But research conducted jointly by scientists at IBM, Compaq, and AltaVista found something entirely different. These scientists used a Web crawler to identify 200 million Web pages and follow 1.5 billion links on these pages.

The researchers discovered that the Web was not like a spider web at all, but rather like a bow tie (see figure below). The bow-tie Web had a "strongly connected component" (SCC) composed of about 56 million Web pages. On the right side of the bow tie was a set of 44 million OUT pages that you could get to from the center, but could not return to the center from. OUT pages tended to be corporate intranet and



(continued)

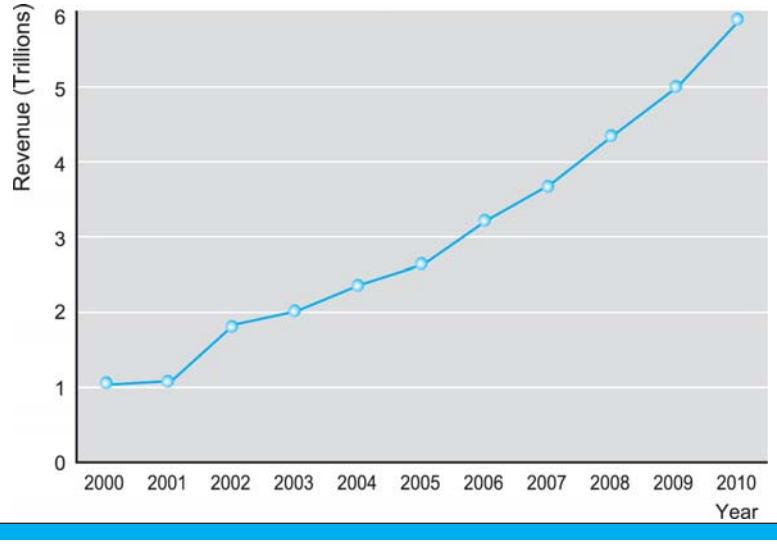
other Web site pages that are designed to trap you at the site when you land. On the left side of the bow tie was a set of 44 million IN pages from which you could get to the center, but that you could not travel to from the center. These were recently created pages that had not yet been linked to by many center pages. In addition, 43 million pages were classified as "tendrils," pages that did not link to the center and could not be linked to from the center. However, the tendril pages were sometimes linked to IN and/or OUT pages. Occasionally, tendrils linked to one another without passing through the center (these are called "tubes"). Finally, there were 16 million pages totally disconnected from everything.

Further evidence for the non-random and structured nature of the Web is provided in research performed by Albert-Lazlo Barabasi at the University of Notre Dame. Barabasi's team found that far from being a random, exponentially exploding network of 50 billion Web pages, activity on the Web was actually highly concentrated in "very-connected super nodes" that provided the connectivity to less well-connected nodes. Barabasi dubbed this type of network a "scale-free" network and found parallels in the growth of cancers, disease transmission, and computer viruses. As its turns out, scale-free networks are highly vulnerable to destruction: Destroy their super nodes and transmission of messages breaks down rapidly. On the upside, if you are a marketer trying to "spread the message" about your products, place your products on one of the super nodes and watch the news spread. Or build super nodes and attract a huge audience.

Thus, the picture of the Web that emerges from this research is quite different from earlier reports. The notion that most pairs of Web pages are separated by a handful of links, almost always under 20, and that the number of connections would grow exponentially with the size of the Web, is not supported. In fact, there is a 75% chance that there is no path from one randomly chosen page to another. With this knowledge, it now becomes clear why the most advanced Web search engines only index a very small percentage of all Web pages, and only about 2% of the overall population of Internet hosts (about 400 million). Search engines cannot find most Web sites because their pages are not well-connected or linked to the central core of the Web. Another important finding is the identification of a "deep Web" composed of over 900 billion Web pages that are not indexed at all. The pages are not easily accessible to Web crawlers that most search engine companies use. Instead, these pages are either proprietary (not available to crawlers and non-subscribers) like the pages of *The Wall Street Journal*) or are not easily available from home pages. In the last few years newer search engines (such as the medical search engine Mammahealth) and older ones such as Yahoo have been revised to search the deep Web. Because e-commerce revenues in part depend on customers being able to find a Web site using search engines, Web site managers need to take steps to ensure their Web pages are part of the connected central core, or "super nodes" of the Web. One way to do this is to make sure the site has as many links as possible to and from other relevant sites, especially to other sites within the SCC.

SOURCES: "Accessing the Deep Web," by Bin He, Mitesh Patel, Zhen Zhang, and Kevin Chen-Chuan Chang; *Communications of the ACM (CACM)* 50 (2): 94-101, May 2007; "Deep Web Research 2007," Marcus P. Zillman, llrx.com, December 17, 2006; "Yahoo Mines the "Deep Web," by Tim Gray, InternetNews.com, June 17, 2005; *Linked: The New Science of Networks,* by Albert-Lazlo Barabasi. Cambridge, MA: Perseus Publishing (2002); "The Bowtie Theory Explains Link Popularity," by John Heard, Searchengineposition.com, June 1, 2000. "Graph Structure in the Web," by A. Broder, R. Kumar, F. Maghoul, P. Raghaven, S. Rajagopalan, R. Stata, A. Tomkins, and J. Wiener, Proceedings of the 9th International World Wide Web Conference, Amsterdam, The Netherlands, pages 309-320. Elsevier Science, May 2000.

FIGURE 1.6 THE GROWTH OF B2B E-COMMERCE



B2B e-commerce is about ten times the size of B2C e-commerce. In 2010, B2B e-commerce is projected to be about $6 trillion. (Note: Does not include EDI transactions.)

SOURCES: Based on data from U.S. Census Bureau, 2007; authors' estimates.

TECHNOLOGY AND E-COMMERCE IN PERSPECTIVE

Although in many respects, e-commerce is new and different, it is also important to keep e-commerce in perspective. First, the Internet and the Web are just two of a long list of technologies that have greatly changed commerce in the United States and around the world. Each of these other technologies spawned business models and strategies designed to leverage the technology into commercial advantage and profit. They were also accompanied by explosive early growth, which was characterized by the emergence of thousands of entrepreneurial start-up companies, followed by painful retrenchment, and then a long-term successful exploitation of the technology by larger established firms. In the case of automobiles, for instance, in 1915, there were over 250 automobile manufacturers in the United States. By 1940, there were five. In the case of radio, in 1925, there were over 2,000 radio stations across the United States, with most broadcasting to local neighborhoods and run by amateurs. By 1990, there were fewer than 500 independent stations. There is every reason to believe e-commerce will follow the same pattern—with notable differences discussed throughout the text.

Second, although e-commerce has grown explosively, there is no guarantee it will continue to grow forever at these rates and much reason to believe e-commerce growth will cap as it confronts its own fundamental limitations. For instance, B2C e-commerce is still a small part (about 5%) of the overall retail market of $4 trillion. Under current projections, in 2009, all of B2C e-commerce will roughly equal the annual revenue of Wal-Mart—the world's largest and most successful retailer. On the other hand, with only 5% of all retail sales revenue now being generated online, there is tremendous upside potential.

POTENTIAL LIMITATIONS ON THE GROWTH OF B2C E-COMMERCE

A recent headline in *The New York Times* read "Online Sales Lose Steam," reporting on a Forrester Research report in 2007 (Richtel and Tedeschi, 2007). Forrester believes online sales will slow down from 25% annual growth to 9% by 2010. Unfortunately, the research confuses online retail sales of goods with all of e-commerce revenues, forgetting that online sales of services are exploding even faster than 25% and are likely to continue at this pace for some time. Nevertheless, there are several reasons to believe that e-commerce revenues from goods and services together will not expand forever at 25%. As online sales become a larger percentage of all sales, which grow in the 5%–6% range annually, online sales growth will approach the growth in all of retail and service sales. This point still appears to be a long way off. Online service sales, everything from music, to video, medical information, games and entertainment, have an even longer period to grow before they hit any ceiling effects.

There are other limitations on B2C e-commerce that have the potential to cap its growth rate and ultimate size. **Table 1.4** describes some of these limitations.

Some of these limitations may be eradicated in the next decade. For instance, it is likely that the price of entry-level PCs will fall to $200 by the year 2010. Other Internet-client gadgets as well as cell phones are within this price range now. This, coupled with enhancements in capabilities such as integration with televi-

TABLE 1.4 LIMITATIONS ON THE GROWTH OF B2C E-COMMERCE

LIMITING FACTOR	COMMENT
Expensive technology	Using the Internet requires a $400 PC (minimal) and a connect charge ranging from about $10 to $100 depending on the speed of service.
Sophisticated skill set	The skills required to make effective use of the Internet and e-commerce capabilities are far more sophisticated than, say, for television or newspapers.
Persistent cultural attraction of physical markets and traditional shopping experiences	For many, shopping is a cultural and social event where people meet directly with merchants and other consumers. This social experience has not yet been fully duplicated in digital form (although social shopping is a major new development).
Persistent global inequality limiting access to telephones and personal computers	Much of the world's population does not have telephone service, PCs, or cell phones.
Saturation and ceiling effects	Growth in the Internet population slows as its approaches the size of the at risk population.

sion, access to entertainment film libraries on a pay-per-view basis, and other software enhancements, will likely raise U.S. Internet household penetration rates to the level of cable television penetration (about 80%) by 2010. The PC operating system will also likely evolve from the current Windows platform to far simpler choice panels similar to the interface found on iPods and Palm OS handheld devices.

The most significant technology that can reduce barriers to Internet access is wireless Web technology (described in more detail in Chapter 3). Today, consumers can access the Internet via a variety of different mobile devices, such as mobile computers, cell phones, BlackBerries, and personal digital assistants (PDAs). In 2007, approximately half of the 175 - 200 million Internet users in the United States had a laptop with a wireless Wi-Fi capability, or a cell phone that can access the Internet. There are about 235 million cellular phone subscribers in the United States in 2007 and increasingly these phones are Web-enabled (eMarketer, Inc., 2007d). **Figure 1.7** illustrates the extremely rapid growth projected for both broadband home connections and wireless Web devices in the United States.

On balance, the current technological limits on e-commerce growth, while real, are likely to recede in importance over the next decade. The social and cultural limitations of e-commerce are less likely to change as quickly, but the Web is fast developing virtual social shopping experiences and virtual realities that millions find as entertaining as shopping or seeing their friends at the mall.

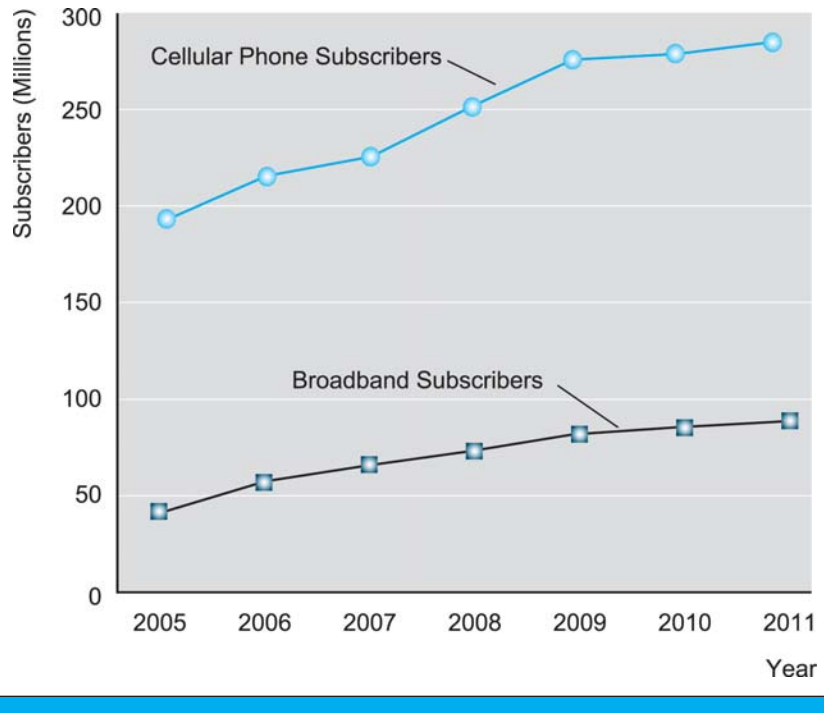
1.2 E-COMMERCE: A BRIEF HISTORY

Although e-commerce is a very recent phenomenon of the late 1990s, it already has a brief, tumultuous history. The history of e-commerce can be usefully divided into three periods. The early years of e-commerce were a period of explosive growth and extraordinary innovation, beginning in 1995 with the first widespread use of the Web to advertise products. This period of explosive growth was capped in March 2000 when stock market valuations for dot-com companies reached their peak and thereafter began to collapse. A sobering period of reassessment occurred, followed by strong double-digit growth through the current period. In 2006, e-commerce entered a period of re-definition with the appearance of social networking and user-generated content sharing Web sites that have attracted huge audiences.

E-COMMERCE 1995–2000: INNOVATION

The early years of e-commerce were one of the most euphoric of times in American commercial history. It was also a time when key e-commerce concepts were developed and explored. Thousands of dot-com companies were formed, backed by over $125 billion in financial capital—one of the largest outpourings of venture capital in United States history (PricewaterhouseCoopers, National Venture Capital Association MoneyTree Report, Data: Thomson Financial 2007). **Figure 1.8** (on page 32) depicts the amounts invested by venture capital firms in Internet-related businesses in the period 1995–2007. While venture investment has trended

FIGURE 1.7 **GROWTH PROJECTIONS FOR BROADBAND HOME CONNECTIONS AND WIRELESS WEB DEVICES IN THE UNITED STATES**



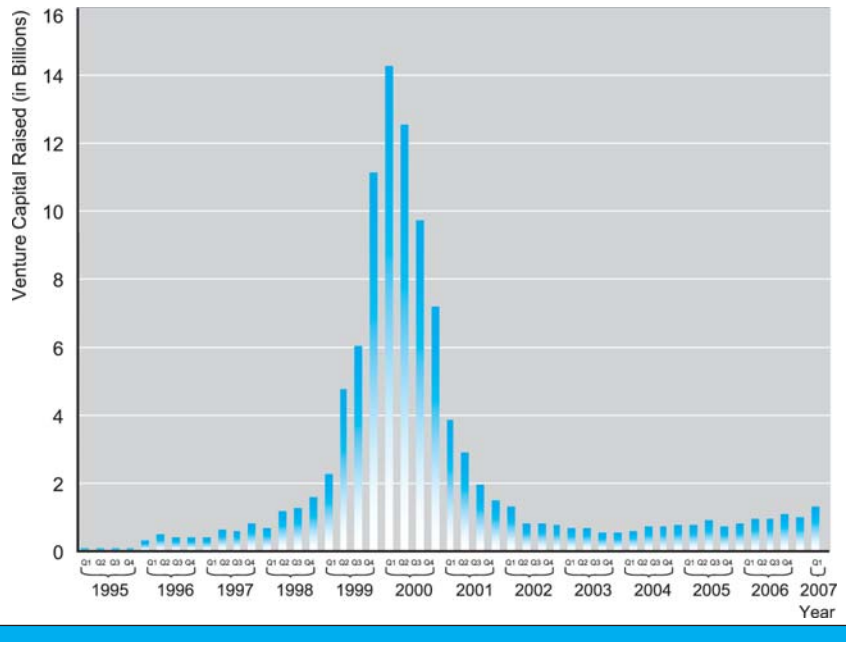
About 65 million households have broadband access and there are 235 million cellular phone subscribers in the United States who are increasingly connected to the Internet. Both of these developments provide a significant stimulus to mobile e-commerce.

SOURCES: Based on data from eMarketer, Inc. 2007d; Telecommunications Industry Association, 2007; authors' estimates.

markedly lower since 2000, it is still twice as large as 1995 levels, and investing in dot-com and Internet businesses continues at a strong pace in 2007. By 2004, dot-com IPOs were again being successfully floated on Wall Street, encouraged by Google's successful IPO in 2004, which raised more than $1.67 billion, and the fact that Google shares have since shot up from its offering price of $85 to almost $700 in 2007. Internet stock indices such as Baron's iOpportunity Fund continue to grow at 15% a year, trailing the 25% annual growth in e-commerce revenues and profits.

For computer scientists and information technologists, the early success of e-commerce was a powerful vindication of a set of information technologies that had developed over a period of forty years—extending from the development of the early Internet to the PC, to local area networks. The vision was of a universal communications and computing environment that everyone on Earth could access with cheap, inexpensive computers—a worldwide universe of knowledge stored on HTML pages created by hundreds of millions of individuals and thousands of libraries, governments, and scientific institutes. Technologists celebrated the fact that the Internet was not controlled by anyone or any nation, but was free to all.

FIGURE 1.8 **QUARTERLY AMOUNTS RAISED BY INTERNET-RELATED VENTURE-BACKED FIRMS**



The quarterly amounts raised by Internet-related venture-backed firms peaked during the 1999–2001 period, but the amount raised in the 2002–2006 period is still much higher than that raised in the periods prior to 1999.

SOURCES: Based on data from PricewaterhouseCoopers/National Venture Capital Association MoneyTree Report, Data: Thomson Financial, 2007.

They believed the Internet—and the e-commerce that rose on this infrastructure—should remain a self-governed, self-regulated environment.

For economists, the early years of e-commerce raised the realistic prospect of a perfect *Bertrand market:* where price, cost, and quality information is equally distributed, a nearly infinite set of suppliers compete against one another, and customers have access to all relevant market information worldwide. The Internet would spawn digital markets where information would be nearly perfect—something that is rarely true in other real-world markets. Merchants in turn would have equal direct access to hundreds of millions of customers. In this near-perfect information marketspace, transaction costs would plummet because search costs—the cost of searching for prices, product descriptions, payment settlement, and order fulfillment—would all fall drastically (Bakos, 1997). New shopping bot programs would automatically search the entire Web for the best prices and delivery times. For merchants, the cost of searching for customers would also fall, reducing the need for wasteful advertising. At the same time, advertisements could be personalized to the needs of every customer. Prices and even costs would be increasingly transparent to the consumer, who could now know exactly and instantly the worldwide best price, quality, and availability of most products. Information asymmetry would be greatly reduced. Given the instant nature of

Internet communications, the availability of powerful sales information systems, and the low cost involved in changing prices on a Web site (low menu costs), producers could dynamically price their products to reflect actual demand, ending the idea of one national price, or one suggested manufacturer's list price. In turn, market middlemen—the distributors, wholesalers, and other factors in the marketplace who are intermediates between producers and consumers, each demanding a payment and raising costs while adding little value—would disappear (**disintermediation**). Manufacturers and content originators would develop direct market relationships with their customers. The resulting intense competition, the decline of intermediaries, and the lower transaction costs would eliminate product brands, and along with it, the possibility of *monopoly profits* based on brands, geography, or special access to factors of production. Prices for products and services would fall to the point where prices covered costs of production plus a fair, "market rate" of return on capital, plus additional small payments for entrepreneurial effort (that would not last long). Unfair competitive advantages (which occur when one competitor has an advantage others cannot purchase) would be eliminated, as would extraordinary returns on invested capital. This vision was called **friction-free commerce** (Smith et al., 2000).

disintermediation
displacement of market middlemen who traditionally are intermediaries between producers and consumers by a new direct relationship between manufacturers and content originators with their customers

friction-free commerce
a vision of commerce in which information is equally distributed, transaction costs are low, prices can be dynamically adjusted to reflect actual demand, intermediaries decline, and unfair competitive advantages are eliminated

For real-world entrepreneurs, their financial backers, and marketing professionals, the idea of friction-free commerce was far from their own visions. For these players, e-commerce represented an extraordinary opportunity to earn far above normal returns on investment, far above the cost of borrowing capital. The e-commerce marketspace represented access to millions of consumers worldwide who used the Internet and a set of marketing communications technologies (e-mail and Web pages) that was universal, inexpensive, and powerful. These new technologies would permit marketers to practice what they always had done—segmenting the market into groups with different needs and price sensitivity, targeting the segments with branding and promotional messages, and positioning the product and pricing for each group—but with even more precision. In this new marketspace, extraordinary profits would go to **first movers**—those firms who were first to market in a particular area and who moved quickly to gather market share. In a "winner take all" market, first movers could establish a large customer base quickly, build brand name recognition early, create an entirely new distribution channel, and then inhibit competitors (new entrants) by building in *switching costs* for their customers through proprietary interface designs and features available only at one site. The idea for entrepreneurs was to create near monopolies online based on size, convenience, selection, and brand. Online businesses using the new technology could create informative, community-like features unavailable to traditional merchants. These "communities of consumption" also would add value and be difficult for traditional merchants to imitate. The thinking was that once customers became accustomed to using a company's unique Web interface and feature set, they could not easily be switched to competitors. In the best case, the entrepreneurial firm would invent proprietary technologies and techniques that almost everyone adopted, creating a **network effect**. A network effect occurs where all participants receive value from the fact that everyone else uses the same tool or product (for example, a common operating system, telephone system, or software application such as a proprietary instant messaging standard or an

first mover
a firm that is first to market in a particular area and that moves quickly to gather market share

network effect
occurs where users receive value from the fact that everyone else uses the same tool or product

operating system such as Windows), all of which increase in value as more people adopt them.[2] Successful first movers would become the new intermediaries of e-commerce, displacing traditional retail merchants and suppliers of content, and becoming profitable by charging fees of one sort or another for the value customers perceived in their services and products.

To initiate this process, entrepreneurs argued that prices would have to be very low to attract customers and fend off potential competitors. E-commerce was, after all, a totally new way of shopping that would have to offer some immediate cost benefits to consumers. However, because doing business on the Web was supposedly so much more efficient when compared to traditional "bricks-and-mortar" businesses (even when compared to the direct mail catalog business) and because the costs of customer acquisition and retention would supposedly be so much lower, profits would inevitably materialize out of these efficiencies. Given these dynamics, market share, the number of visitors to a site ("eyeballs"), and gross revenue became far more important in the earlier stages of an online firm than earnings or profits. Entrepreneurs and their financial backers in the early years of e-commerce expected that extraordinary profitability would come, but only after several years of losses.

Thus, the early years of e-commerce were driven largely by visions of profiting from new technology, with the emphasis on quickly achieving very high market visibility. The source of financing was venture capital funds. The ideology of the period emphasized the ungoverned "Wild West" character of the Web and the feeling that governments and courts could not possibly limit or regulate the Internet; there was a general belief that traditional corporations were too slow and bureaucratic, too stuck in the old ways of doing business, to "get it"—to be competitive in e-commerce. Young entrepreneurs were therefore the driving force behind e-commerce, backed by huge amounts of money invested by venture capitalists. The emphasis was on *deconstructing* (destroying) traditional distribution channels and disintermediating existing channels, using new pure online companies who aimed to achieve impregnable first mover advantages. Overall, this period of e-commerce was characterized by experimentation, capitalization, and hypercompetition (Varian, 2000a). Read *Insight on Business: Dot-com IPOs—It's Déjà Vu All Over Again* on pages 35–36 for a further look at the financing of e-commerce ventures.

The crash in stock market values for e-commerce throughout 2000 is a convenient marker for ending the early period in the development of e-commerce. Looking back at the first years of e-commerce, it is apparent that e-commerce has been, for the most part, a stunning technological success as the Internet and the Web ramped up from a few thousand to billions of e-commerce transactions per year, generating $225 billion in B2C revenues and around $3.6 trillion in B2B revenues in 2007, with around 116 million online buyers in the United States, and another 120 million worldwide. With enhancements and strengthening, described in later chapters, it is clear the e-commerce's digital infrastructure is solid enough to sustain significant growth in e-commerce during the next decade. The Internet scales well. The "e" in e-commerce has been an overwhelming success.

[2]The network effect is quantified by Metcalfe's Law, which postulates that the value of a network grows by the square of the number of participants.

INSIGHT ON BUSINESS

DOT-COM IPOS: IT'S DÉJÀ VU ALL OVER AGAIN

E-commerce was built on Internet technology, but what makes it run is money—big money. Between 1998 and 2000, venture capitalists poured an estimated $120 billion into approximately 12,450 dot-com start-up ventures. Investment bankers then took 1,262 of these companies public in what is called an initial public offering (IPO) of stock. To prepare for an IPO, investment bankers analyze a company's finances and business plans and attempt to arrive at an estimate of how much the company is "worth"—how much the investing public might be willing to pay for the shares and how many shares might be purchased by the public and other institutions. The bankers then underwrite the stock offering and sell the stock on a public stock exchange, making enormous fees for underwriting in the process. The basic process has not changed over time, but the style and fashions have changed since the good old "bad days" of e-commerce.

In the early years of e-commerce, from 1998 to 2000, dot-com IPO shares often skyrocketed within minutes of hitting the trading floor. Some shares tripled and quadrupled in the first day, and a 50% "pump" (or increase in value) was considered just a reasonable showing. IPO shares for dot-com companies were often targeted to open at around $15 per share, and it was not uncommon for them to be trading at $45 a share or even much more later the same day. Therefore, getting in on the ground floor of an IPO—which meant arranging to purchase a fixed number of shares prior to actual trading on the first day—was a privilege reserved for other large institutions, friends of the investment bankers, or other investment bankers. In what was called "stock spinning," the underwriter would sell IPO shares to entrepreneurs it hoped to obtain business from in the future. The Securities and Exchange Commission made this practice illegal in 1999.

What has happened to the dot-com IPOs of this period? According to a financial services research firm, Thomson Financial, 12% of the companies that went public between 1998 and 2000 were trading at $1 or less a share in April 2001, a fairly shocking development when one considers that just a relatively short time previously, those companies' shares were trading at upwards of 10 to 100 times that price. Among the companies that fell below $1 in share price were Autoweb, iVillage, and Drugstore.com. In mid-2005, Autoweb merged with Autobytel and the combined company sells for about $4 a share; iVillage sold to NBC Universal in 2006 and remains the most popular Web destination for women—but not as an independent company. Drugstore.com sells in the $2–$4 range. Each of these companies is showing strong growth (10% a year or more). In 2007, seven years after the peak of the dot-com frenzy, at least 5,000 Internet companies have either been acquired or shut down. On a more positive note, recent research shows that the attrition rate of these early firms was about 20% a year, on par with what occurred in other industries during their early boom years. More than half the early dot-coms are still in business in 2007.

Nevertheless, after the big bust of March 2000, venture capitalists turned away from the "Get Big Fast" and "First Mover Advantage" religion, and instead focused on companies that demonstrated a profitable prior history. In this second period of IPOs, the VCs invested over $200 billion for the purchase of over 4,000 Web companies. In this period, the hot properties included Internet shopping sites (such as Shopping.com, purchased for $620 million by eBay and Shopzilla, purchased for $525 million

(continued)

by The E.W. Scripps Company), Internet advertising firms (such as DoubleClick, purchased for $1.1 billion by buyout firm Hellman & Friedman), search engine properties (such as Ask Jeeves (now Ask.com), purchased by IAC/InterActive Corp for $1.85 billion), and community sites (such as About.com, purchased by The New York Times for $410 million, and Intermix, owner of the social networking site MySpace, purchased by News Corp.'s Fox Interactive Media division for $580 million). This period of solid investing based on fundamentals (such as profit) culminated with Google's IPO in late 2004. Google had been profitable for three years before going public.

But then something strange happened on the way to the bank, and the period of capital discipline was history. As Google's shares soared from the $85 offering price to almost $700 in 2007, VCs and investors returned to their bad old ways—investing in ideas, Get Big Fast companies, and revenue growth (not profits). About 62% of tech firms going public since 2006 were not profitable companies (still short of the all-time 85% unprofitable in 2000). King of the Get Big Fast mentality is YouTube, an unprofitable company with an estimated $135 million in revenue for which Google paid $1.65 billion. Facebook, which has not yet been acquired, is currently being valued by investors at up to $15 billion, estimated to be 32 times its current revenue.

So for now, the good ol' bad days are back. Enjoy the ride, and brace yourself.

SOURCES: "Silicon Valley Start-Ups Awash in Dollars, Again," by Brad Stone and Matt Richtel, *New York Times*, October 17, 2007; "Tech Companies Bleeding Red Ink Pursue IPO Gold," by Pui-Wing Tam, *Wall Street Journal*, March 13, 2007; "The Dot Com Bubble is Reconsidered—and Maybe Relived," by Lee Gomes, *Wall Street Journal*, November 8, 2006; "Was There Too Little Entry During the Dot Com Era?" by Brent Goldfarb, David Kirsch, and David Miller, Robert H. Smith School Research Paper No. RHS 06-029, April 24, 2006; "Shopping That Really Sells," BizReport, June 9,2005; "Those IPO's are Sizzling Hot. Uh-Oh," by Gary Rivlin, *New York Times*, January 8, 2005; "Internet Returns as Active Sector," by Raymond Hennessey, *New York Times*, November 8,2004; "The Return of the Venture Capitalists," by Anne Field, *New York Times*, September 2, 2004.

From a business perspective, though, the early years of e-commerce were a mixed success, and offered many surprises. Only about 10% of dot-coms formed since 1995 have survived as independent companies in 2007. Only a very tiny percentage of these survivors are profitable. Yet online B2C sales of goods and services are still growing at 25% per year. Consumers have learned to use the Web as a powerful source of information about products they actually purchase through other channels, such as at a traditional "bricks-and-mortar" store. This is especially true of expensive consumer durables such as appliances, automobiles, and electronics. For instance, over 70% of new car buyers research on the Web first, then purchase from a dealer (Tedeschi, 2007). This "Internet-influenced" commerce is estimated to account for $400 billion in sales in 2007 (Forrester Research, Inc., 2007b; eMarketer, Inc., 2007a). Altogether then, B2C e-commerce (both actual purchases and purchases influenced by Web shopping but actually buying in a store) amounts to over $600 billion in 2007, or about 17% of total retail sales. The "commerce" in e-commerce is basically very sound, at least in the sense of attracting a growing number of customers and generating revenues.

E-COMMERCE 2001–2006: CONSOLIDATION

E-commerce entered a period of consolidation beginning in 2001 and lasting until 2006. Emphasis shifted to a more "business driven" approach rather than technology driven; large traditional firms learned how to use the Web to strengthen their market positions; brand extension and strengthening became more important than creating

new brands; financing shrunk as capital markets shunned start-up firms; and traditional bank financing based on profitability returned.

E-COMMERCE 2006—PRESENT: REINVENTION

E-commerce entered a third period in 2006 that extends through the present day and into the uncertain future. Google has been one of the driving forces, but so have other large media firms who have quickly bought out very fast-moving entrepreneurial firms, such as MySpace and YouTube. It is a period of reinvention involving the extension of Internet technologies, the discovery of new business models based on consumer-generated content, social networking, and virtual online lives. This period is as much a sociological phenomenon, as it is a technological or business phenomenon. Few of the new models have been able to monetize their huge audiences into profitable operations yet, but many eventually will.

Table 1.5 summarizes e-commerce in each of these three periods.

TABLE 1.5 EVOLUTION OF E-COMMERCE

1995–2000 INNOVATION	2001–2006 CONSOLIDATION	2006–FUTURE RE-INVENTION
Technology-driven	Business-driven	Audience, customer, and community driven
Revenue growth emphasis	Earnings and profits emphasis	Audience and social network growth emphasis
Venture capital financing	Traditional financing	Smaller VC investments; early small firm buyouts by large online players
Ungoverned	Stronger regulation and governance	Extensive government surveillance
Entrepreneurial	Large traditional firms	Large pure Web-based firms
Disintermediation	Strengthening intermediaries	Proliferation of small online intermediaries renting business processes of larger firms
Perfect markets	Imperfect markets, brands, and network effects	Continuation of online market imperfections; commodity competition in select markets
Pure online strategies	Mixed "bricks and clicks" strategies	Return of pure online strategies in new markets; extension of bricks and clicks in traditional retail markets
First-mover advantages	Strategic follower strength; complimentary assets	First-mover advantages return in new markets as traditional Web players catch up

ASSESSING E-COMMERCE: SUCCESSES, SURPRISES, AND FAILURES

Although e-commerce has continued to grow at an extremely rapid pace in customers and revenues throughout its history, it is clear that many of the visions, predictions, and assertions about e-commerce developed in the early years have not have been fulfilled. For instance, economists' visions of "friction-free" commerce have not been entirely realized. Prices are sometimes lower on the Web, but the low prices are sometimes a function of entrepreneurs selling products below their costs. Consumers are less price sensitive than expected; surprisingly, the Web sites with the highest revenue often have the highest prices. There remains considerable persistent and even increasing price dispersion on the Web: the difference between the lowest price and the average price for a basket of goods increased from 8% of the average price in 2000 to 10% in 2007 (Nash-equilibrium.com, 2007). In other words, the standard deviation in Web prices is about 10% of the average price for the same product on the Web. Shop around! The concept of one world, one market, one price has not occurred in reality as entrepreneurs discover new ways to differentiate their products and services. While for the most part Internet prices save consumers about 20% on average when compared to in-store prices, sometimes prices on the Web are higher than for similar products purchased offline, especially if shipping costs are considered. For instance, prices on books and CDs vary by as much as 50%, prices for airline tickets as much as 20% (Baye and Morgan, 2004; Baye, et al., 2004; Bailey, 1998a, b; Brynjolfsson and Smith, 2001). Merchants have adjusted to the competitive Internet environment by engaging in "hit-and-run pricing" or changing prices every day or hour so competitors never know what they are charging (neither do customers); by making their prices hard to discover and sowing confusion among consumers by "baiting and switching" customers from low-margin products to high-margin products with supposedly "higher quality." Finally, brands remain very important in e-commerce—consumers trust some firms more than others to deliver a high-quality product on time (Slatalla, 2005).

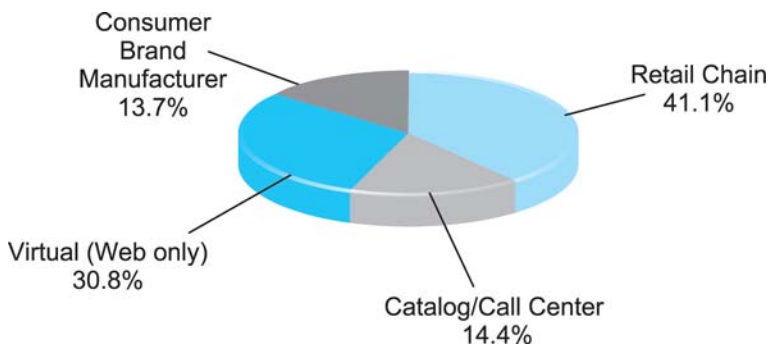
The Bertrand model of extreme market efficiency has not entirely come to pass. Merchants and marketers are continually introducing information asymmetries. Search costs have fallen overall, but the overall transaction cost of actually completing a transaction in e-commerce remains high because users have a bewildering number of new questions to consider: Will the merchant actually deliver? What is the time frame of delivery? Does the merchant really stock this item? How do I fill out this form? Nearly 60% of potential e-commerce purchases are terminated in the shopping cart stage because of these consumer uncertainties. In many product areas, it is easier to call a trusted catalog merchant on the telephone than order on a Web site. Finally, intermediaries have not disappeared as predicted, and few manufacturers or producers have actually developed a one-to-one sales relationship with their ultimate consumers. Most manufacturers, for instance, have not adopted the Dell model of online sales, and Dell itself in 2007 is moving towards a mixed model heavily reliant on in-store sales where customers can kick the tires, or try the keyboard. People still like to shop in a physical store.

If anything, e-commerce has created many new opportunities for middlemen to aggregate content, products, and services into portals and search engines and thereby introduce themselves as the "new" intermediaries. Yahoo, MSN, Google, and Amazon,

along with third-party travel sites such as Orbitz and Expedia, are all examples of this kind of new intermediary. As illustrated in **Figure 1.9**, e-commerce did not drive existing retail chains and catalog merchants out of business although it has created opportunities for new entrepreneurial Web-only firms to succeed. In fact, existing retail chains with physical stores as well as Web sites earned the largest portion of online sales in 2006.

The visions of many entrepreneurs and venture capitalists for e-commerce have not materialized exactly as predicted. First-mover advantage appears to have succeeded only for a very small group of sites. Historically, first movers have been long-term losers, with the early-to-market innovators usually being displaced by established "fast-follower" firms with the financial, marketing, legal, and production complimentary assets needed to develop mature markets, and this has proved true for e-commerce as well. A number of e-commerce first movers, such as eToys, FogDog (sporting goods), WebVan (groceries), and Eve.com (beauty products) are out of business. Customer acquisition and retention costs during the early years of e-commerce were extraordinarily high, with some firms, such as E*Trade and other financial service firms, paying up to $400 to acquire a new customer. In 2004, certain law firms engaged in asbestos and tobacco liability suits were paying $90 each time someone clicked on their Google ad (Bialik, 2004). The overall costs of doing business on the Web—including the costs of technology, site design and maintenance, and warehouses for fulfillment—are no lower than the costs faced by the most efficient bricks-and-mortar stores. A large warehouse costs tens of millions of dollars regardless of a firm's Web presence. The knowledge of how to run the warehouse is priceless, and not easily moved. The start-up costs can be staggering. Attempting to achieve profitability by raising prices has often led to large customer defections. From the e-commerce merchant's perspective, the "e" in e-commerce does not stand for "easy."

FIGURE 1.9 SHARE OF RETAIL ONLINE SALES BY TYPE OF COMPANY



Web-only firms account for less than one-third of online retail firm revenues.

SOURCE: Internet Retailer, 2007.

PREDICTIONS FOR THE FUTURE: MORE SURPRISES

Given that e-commerce has changed greatly in the last two years, its future cannot be predicted except to say watch for more surprises. There are five main factors that will help define the future of e-commerce. First, there is little doubt that the technology of e-commerce—the Internet, the Web, and the growing number of wireless Internet devices, including cellular devices such as the iPhone and BlackBerry, continue to propagate through all commercial activity. The overall revenues from e-commerce (goods and services) will continue to rise on a steep growth path, most likely in the range of 20%–25% per year through 2010. The number of products and services sold on the Web and the size of the average purchase order are both growing at double-digit rates. The number of online shoppers in the United States will continue to grow at a modest rate of less than 5% per year. There has also been a significant broadening of the online product mix compared to the early years when books, computer software, and hardware dominated e-commerce (see **Table 1.6**). This trend will continue as trust in e-commerce transactions grows. The fastest-growing major non-travel e-commerce categories include health and beauty products, apparel/accessories, home products, flowers/cards and gifts, sporting goods, and jewelry/luxury goods. (See Chapter 9 for changes in retail products and services.)

Second, e-commerce prices will rise to cover the real costs of doing business on the Web, and to pay investors a reasonable rate of return on their capital. Third, e-commerce *margins* (the difference between the revenues from sales and the cost of goods) and profits will rise to levels more typical of all retailers. Fourth, the cast of players will change radically. Traditional well-endowed, experienced Fortune 500 companies will play a growing and dominant role in e-commerce while at the same time new start-up ventures will quickly gain large online audiences for new products and services not dominated by the large players. There will also be a continuation of audience consolidation on the Internet in general, with the top 25 sites garnering over 90% of the audience share, and nearly one-third of all online sales. **Table 1.7** on page 42 lists the top 25 online retailers, as ranked by 2006 online sales. The table shows an unmistakable trend toward the appearance in the top 25 sites of some very well-known, traditional brands from strong traditional businesses, with Staples, Office Depot, Hewlett-Packard, OfficeMax, Sears, Sony, Best Buy, JCPenney, and Wal-Mart all in the top 15.

Fifth, the number of successful pure online companies will remain smaller than integrated online/offline stores that combine traditional sales channels such as physical stores and printed catalogs with online efforts. For instance, traditional catalog sales firms such as L.L.Bean have transformed themselves into integrated online and direct mail firms with more than half of their sales coming from the online channel. Procter & Gamble will continue to develop informative Web sites such as Tide.com; and the major automotive companies will continue to improve the content and value of their Web sites even if they do not enter into direct sales relationships with consumers, but instead use the Web to assist sales through dealers (thereby strengthening traditional intermediaries and channels).

The future of e-commerce will include the growth of regulatory activity both in the United States and worldwide. Governments around the world are challenging the

TABLE 1.6 ONLINE RETAIL SALES BY CATEGORY, 2007

CATEGORY	ANNUAL SALES (IN BILLIONS)	ANNUAL SALES (IN BILLIONS)	COMPOUND ANNUAL GROWTH RATE (CAGR)
	2006	2010	2006–2012
Mass merchant/department store	$22.3	$25.3	12.9%
Computers/electronics	$19.7	$22.7	14.7%
Office supplies	$12.3	$14.2	16.0%
Apparel/accessories	$9.9	$11.5	15.8%
Housewares/home furnishings	$3.2	$3.8	16.3%
Books/CDs/DVDs	$3.1	$3.6	14.5%
Specialty/non-apparel	$3.0	$3.4	12.0%
Health/beauty	$2.2	$2.7	21.6%
Food/drug	$2.1	$2.4	15.0%
Sporting goods	$1.2	$1.4	16.0%
Flower/gifts	$1.2	$1.4	16.0%
Hardware/home improvement	$1.2	$1.4	16.0%
Toys/hobbies	$.97	$1.0	9.8%

SOURCES: Based on data from eMarketer, 2007a; Internet Retailer, 2007; authors' estimates.

early vision of computer scientists and information technologists that the Internet remain a self-regulating and self-governing phenomenon. The Internet and e-commerce have been so successful and powerful, so all-pervasive, that they directly involve the social, cultural, and political life of entire nations and cultures. Throughout history, whenever technologies have risen to this level of social importance, power, and visibility, they become the target of efforts to regulate and control the technology to ensure that positive social benefits result from their use and to guarantee the public's health and welfare. Radio, television, automobiles, electricity, and railroads are all the subject of regulation and legislation. Likewise, with e-commerce. In the U.S. Congress, there have already been hundreds of bills proposed to control various facets of the Internet and e-commerce, from consumer privacy to pornography, child abuse, gambling, and encryption. We can expect these efforts at regulation in the United States and around the world to increase as e-commerce extends its reach and importance.

In summary, the future of e-commerce will be a fascinating mixture of traditional retail, service and media firms extending their brands to online markets, early period e-commerce firms such as Amazon and eBay strengthening their financial results and dominant positions, and a bevy of entirely new entrepreneur-

TABLE 1.7 TOP 25 ONLINE RETAILERS RANKED BY ONLINE SALES

ONLINE RETAILER	ONLINE SALES (2006) (IN BILLIONS)
Amazon	$10.71
Staples	$ 4.90
Office Depot	$ 4.30
Dell.com	$ 3.96
HP Home and Office	$ 3.05
Office Max	$ 2.85
Sears Holdings Corporation	$ 2.38
CDW Corp	$ 2.00
SonyStyle.com	$ 1.69
Newegg.com	$ 1.50
Best Buy Co.	$ 1.42
JCPenney	$ 1.30
Wal-Mart Stores	$ 1.26
QVC Corp	$ 1.26
Apple Computer	$ 1.14
Victoria Secret Direct	$ 1.10
Circuit City Stores	$ 1.00
Netflix.com	$ .99
Target Corp.	$ .99
Williams Sonoma Inc.	$ .93
Costco Wholesale Corp.	$ .88
Quixtar	$ .88
L.L. Bean	$ .83
Systemax Inc.	$ .82
Overstock.com	$ .80

SOURCES: Based on data from Internet Retailer, 2007; Company Reports on Form 10-K filed with the Securities and Exchange Commission.

ial firms with the potential to rocket into prominence by developing huge new audiences in months.

1.3 UNDERSTANDING E-COMMERCE: ORGANIZING THEMES

Understanding e-commerce in its totality is a difficult task for students and instructors because there are so many facets to the phenomenon. No single academic discipline

is prepared to encompass all of e-commerce. After teaching the e-commerce course for several years and preparing this book, we have come to realize just how difficult it is to "understand" e-commerce. We have found it useful to think about e-commerce as involving three broad interrelated themes: technology, business, and society. We do not mean to imply any ordering of importance here because this book and our thinking freely range over these themes as appropriate to the problem we are trying to understand and describe. Nevertheless, as in previous technologically driven commercial revolutions, there is an historic progression. Technologies develop first, and then those developments are exploited commercially. Once commercial exploitation of the technology becomes widespread, a host of social, cultural, and political issues arise.

TECHNOLOGY: INFRASTRUCTURE

The development and mastery of digital computing and communications technology is at the heart of the newly emerging global digital economy we call e-commerce. To understand the likely future of e-commerce, you need a basic understanding of the information technologies upon which it is built. E-commerce is above all else a technologically driven phenomenon that relies on a host of information technologies as well as fundamental concepts from computer science developed over a 50-year period. At the core of e-commerce are the Internet and the World Wide Web, which we describe in detail in Chapter 3. Underlying these technologies are a host of complementary technologies: personal computers, hand-held cell phone/computers such as the iPhone, local area networks, relational databases, client/server computing, and fiber-optic switches, to name just a few. These technologies lie at the heart of sophisticated business computing applications such as enterprise-wide computing systems, supply chain management systems, manufacturing resource planning systems, and customer relationship management systems. E-commerce relies on all these basic technologies—not just the Internet. The Internet—while representing a sharp break from prior corporate computing and communications technologies—is nevertheless just the latest development in the evolution of corporate computing and part of the continuing chain of computer-based innovations in business.

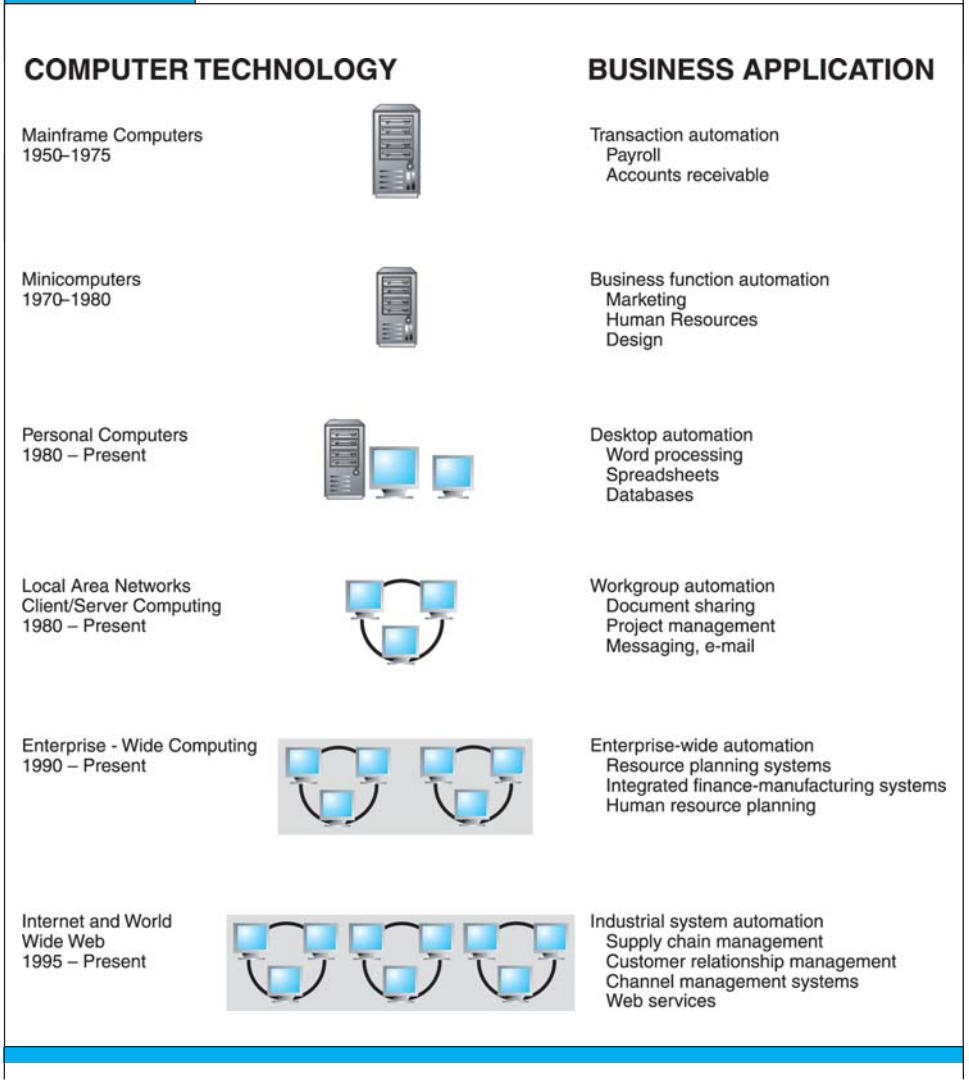
Figure 1.10 illustrates the major stages in the development of corporate computing and indicates how the Internet and the Web fit into this development trajectory.

To truly understand e-commerce, then, you will need to know something about client/server computing, packet-switched communications, protocols such as TCP/IP, Web servers, and HTML. All of these topics are described fully in Part 2 of the book (Chapters 3–5).

BUSINESS: BASIC CONCEPTS

While the technology provides the infrastructure, it is the business applications—the potential for extraordinary returns on investment—that create the interest and excitement in e-commerce. New technologies present businesses and entrepreneurs

FIGURE 1.10 THE INTERNET AND THE EVOLUTION OF CORPORATE COMPUTING



The Internet and World Wide Web are the latest in a chain of evolving technologies and related business applications, each of which builds on its predecessors.

with new ways of organizing production and transacting business. New technologies change the strategies and plans of existing firms: old strategies are made obsolete and new ones need to be invented. New technologies are the birthing grounds where thousands of new companies spring up with new products and services. New technologies are the graveyard of many traditional firms, like record stores. To truly understand e-commerce, you will need to be familiar with some key business concepts, such as the nature of digital electronic markets, digital goods, business

models, firm and industry value chains, value webs, industry structure, and consumer behavior in digital markets. We'll examine each of these concepts further in Chapter 2 and throughout the book.

SOCIETY: TAMING THE JUGGERNAUT

With around 175-200 million adult Americans now using the Internet, many for e-commerce purposes, and over 1 billion users worldwide, the impact of the Internet and e-commerce on society is significant and global. Increasingly, e-commerce is subject to the laws of nations and global entities. You will need to understand the pressures that global e-commerce places on contemporary society in order to conduct a successful e-commerce business or understand the e-commerce phenomenon. The primary societal issues we discuss in this book are intellectual property, individual privacy, and public welfare policy (such as the protection of children from Internet pornography). Because the cost of distributing digital copies of copyrighted intellectual property—tangible works of the mind such as music, books, and videos—is nearly zero on the Internet, e-commerce poses special challenges to the various methods societies have used in the past to protect intellectual property rights.

Since the Internet and the Web are exceptionally adept at tracking the identity and behavior of individuals online, e-commerce raises difficulties for preserving privacy—the ability of individuals to place limits on the type and amount of information collected about them, and to control the uses of their personal information. Read *Insight on Society: Holding On To Your Privacy Online* to get a view of some of the ways e-commerce sites use personal information.

The global nature of e-commerce also poses public policy issues of equity, equal access, content regulation, and taxation. For instance, in the United States, public telephone utilities are required under public utility and public accommodation laws to make basic service available at affordable rates so everyone can have telephone service. Should these laws be extended to the Internet and the Web? If goods are purchased by a New York state resident from a Web site in California, shipped from a center in Illinois, and delivered to New York, what state has the right to collect a sales tax? Should some heavy Internet users who consume extraordinary amounts of bandwidth be charged extra for service or should the Internet be neutral with respect to usage? If some societies choose to ban selected images, selected commercial activity (such as gambling), or political messages from their public media, then how can that society exercise content and activity control over a global e-commerce site? What rights do nation-states and their citizens have with respect to the Internet, the Web, and e-commerce?

ACADEMIC DISCIPLINES CONCERNED WITH E-COMMERCE

The phenomenon of e-commerce is so broad that a multidisciplinary perspective is required (see **Figure 1.11**). There are two primary approaches to e-commerce: technical and behavioral.

INSIGHT ON SOCIETY

HOLDING ON TO YOUR PRIVACY ONLINE

Ever have the feeling you've lost control over your personal information on the Internet? Feel people are following you around online? Do you ever have the feeling that you no longer control your computer screen, or your e-mail inbox? Join the crowd: most Internet users often feel that way too. Today, upwards of 75% of all e-mail is unsolicited junk mail called spam. In a year, thousands of "display" ads (banners) will appear on your screen that you never asked for and are often irrelevant to you. Yet one of the virtues, or vices (depending on your perspective), of e-commerce technology is that it permits online merchants to send you advertising that supposedly reflects personal information the merchant has gathered about you. This is called "one-to-one" marketing or "personalization." This personal information might include what products you have previously purchased from the merchant, what kind of content you have viewed at its site, how you arrived at the site (where you were previously), as well as all of your clicking behavior at the site or all other sites on the Web. This clickstream becomes the basis for constructing a digital profile of you. Your clickstream and resulting profile is a marketer's and merchant's gold mine: if you know what people like and what they have recently purchased, you stand a good chance of being able to sell them something else. How does a Web-based company find out about your clickstream?

Let's start with Google—the site that 80 million people in the United States use everyday to find what they're looking for. So what does Google know about your clicks? Here's a sampler:

- Google Search: Search terms
- Google Desktop: Index of users' computer files, e-mail, music, photos, and chat and Web browser history
- Google Talk: instant message chats
- Google Maps: addresses, including user home address
- Google Mail: user e-mail history
- Google Calendar: users' schedules
- Google YouTube: video viewing history
- Google Checkout: credit card, payment information

Google keeps this information for 18–24 months, and uses it to pitch ads to you. Google claims it does not really know who you are, only your computer's IP address and browser information. But critics point out that nearly 90% of Americans can be identified by name with just three pieces of information: birth date, gender, and ZIP code.

Actually just about any four pieces of information stored by Google from the list above would identify the vast majority of users by name.

There are no legal or technical restrictions on how Google uses this personally identifiable information. If you've ever wondered how much this information is worth, consider Google's stock price is almost $700 a share, and its market capitalization over $200 billion. This value derives from "monetizing" the consumer information Google owns, i.e. selling it to the highest bidder.

Under pressure from privacy groups, Google has announced it would "anonymize" its search logs after 24 months. Privacy groups were not impressed: why keep the logs that long? Why not 12 months or six months? Meanwhile, Apple has added to its latest version of iTunes the ability to monitor every song you listen to on your computer (as well as all the songs you listen to on the iTunes Web site).

Another way your clickstream gets privatized by Web marketers is through advertising networks

(continued)

such as DoubleClick, ValueClick Media, and 24/7 Real Media. These advertising networks insert themselves between you and the merchant, and track your movements through their networks. They do this so well that Google bought DoubleClick in April 2007 for $3.1 billion; Yahoo bought RightMedia in the same month for $580 million; and Microsoft, fast on their heels, bought aQuantive for $6 billion in May 2007. There's money to be made invading people's privacy.

When you visit any of thousands of Web sites in these ad networks, the network firms log your access to the site, and then follow your movements through the site (as does the merchant). Your clickstream behavior is merged with that of thousands of other consumers, and then these firms pop banner ads on your browser when visiting the other network sites.

Merchant sites also keep a complete contact log of every click you make and every object you choose to see on their Web sites. This is a built-in capability of Web server software. This data is stored and can be mined to create a profile of your behavior on the site. All Web sites use cookies and many use Web bugs. A cookie is a small text file downloaded onto your hard drive by a Web site. The cookie file contains whatever identifying information the merchant chooses to put in it. They can be read by other Web sites you visit and used to track your movement among sites. A Web bug is a tiny graphic, typically one pixel wide and one pixel deep, embedded within a Web page or e-mail. It usually is transparent or blends into the background color. A Web bug in a Web page can report information such as a visitor's IP address, cookie information, and referring URL back to the sending server or to the server of a third party, such as a Web advertising company. Hidden inside e-mail messages, a Web bug can tell the merchant whether you opened the e-mail, and even more alarming to privacy advocates, can match the e-mail address with a previously set cookie, thereby allowing the merchant to coordinate a specific individual with their actions on the Web. The merchant then has a great deal of both clickstream behavior and personal information about you generated at the merchant's site, including all the information entered into shopping carts and payment information. So when you return to Amazon, Amazon knows your purchase history and can recommend new titles.

Now let's go over the top: spyware, sometimes also known as adware. People often make a distinction between adware and spyware: adware is designed to serve you ads, and spyware is designed to record information from your computer (such as your credit card number or any other personal information) and send it to a remote server. Both operate on the same principle: these are small software programs that secretly install themselves on your computer by piggybacking on larger applications, or by downloading potentially any file from the Web. The most common source of adware and spyware are music-sharing P2P network programs such as eDonkey and BitTorrent and online contests where you need to download a program in order to participate. Once installed, adware calls out to other sites to send banner ads and other obnoxious unsolicited material to your screen. Spyware also can report your movements on the Internet to other computers. If, for instance, you ask your browser to go to Llbean.com, adware can divert you to a competitor, or pop a banner ad on your screen offering a 10% discount if you visit the competitor's site. Spyware really lives up to its name when it is used to transmit user keystrokes to remote servers. In this application, anything you enter on your keyboard—including passwords, personal names, your address or financial information—can all be sent to remote servers without you knowing about it.

All of this tracking behavior of large advertising, media and retail firms makes Web users nervous and distrustful. Over 50% of Internet users are more concerned about

(continued)

security and privacy this year than last year. More than 36% of Internet users never buy online for fear of privacy and security issues. Many people feel that efforts to market products and services based on their online behavior is an invasion of their privacy. They believe that while it may increase sales in the short term, violating personal privacy on the Web is bad business. In its annual Digital Future Report, the USC Annenberg School found 87% of Internet users reported some level of concern about the lack of online privacy, and 46% were "very or extremely concerned" about privacy while shopping online. eMarketer and Forrester Research report that 52% of Internet users think Web sites ask for too much information when registering, 45% believe their privacy has eroded since going online, and 56% oppose Web sites collecting non-personally identifiable information even if it results in more relevant advertising. On the other hand, millions of online consumers willingly give up their private information in return for a benefit such as premium information content (reports and white papers), or simply the chance to win a contest. Other millions give up their names, pictures, friends, and contact information on social networking sites.

Can you protect your privacy in the Internet age (and still use the Web for convenient shopping)? There are several kinds of solutions: merchant privacy policy, advertising network privacy policy, technology, and enforcement of existing and new laws. Some new technologies that can help are called anonymizers. Companies such as Anonymizer.com have developed software packages and their own Web servers that you can use to hide your identity online. Software programs such as SpySweeper and Ad-aware can help remove spyware programs.

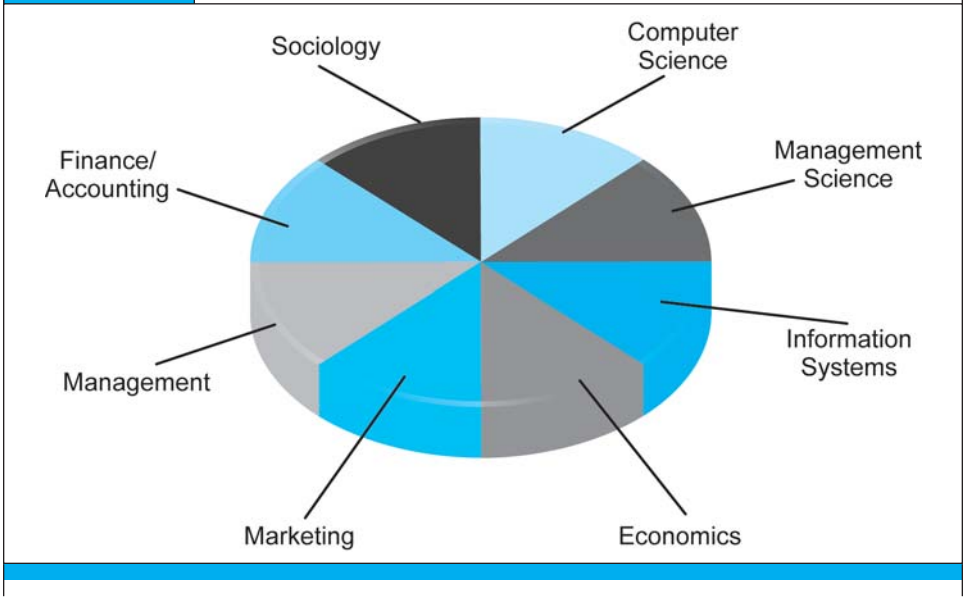
Laws and aggressive prosecutors help also. In August, 2006, Washington State attorney general Rob McKenna a filed a lawsuit under the state's Computer Spyware Act against Movieland.com and its associates alleging that this movie sharing site used malware tactics to bombard millions of visitors with aggressive pop-up ads that demanded payment for its download service. The pop-ups demanding payment took up users' screens and prevented further work on the computer until they agreed to pay $19.95 to Movieland.

Do customers in an open marketplace have a "right" to privacy, or a legitimate expectation of privacy? As we describe in later chapters (especially Chapter 8), efforts to regulate online privacy and create new laws to protect online commercial privacy have not been widely successful, although self-regulation by advertising networks has produced some progress.

Most Web merchants are learning that it pays to be sensitive to customers' concerns about privacy. Trust is critical to successful e-commerce. Almost all sites have "opt-out" check boxes that allow visitors the option to not receive e-mail and other marketing information from the site. Many sites have "opt-in" policies that require customers to check a box if they want to receive additional marketing messages. All of the Web's top 25 e-merchants, as well as many others, have privacy policies posted on their sites. The question remains: Do these Web site privacy policies achieve what consumers want?

SOURCES: "Is it OK that Google Owns Us?" by Lisa Vaas, *eWeek*, June 17, 2007; "Internet Giants Vie to Snap Up Web Ad Firms," by Miguel Helft, *New York Times*, May 19, 2007; "Online Ads vs. Privacy," by Dan Mitchell, *New York Times,* May 12, 2007; USC Annenberg School Center for the Digital Future, 2007 Digital Future Project, November 29, 2006; "Online Privacy and Security: the Fear Factor," eMarketer, Inc., April 2006; "A Growing Web of Watchers Builds a Surveillance Society," by David Shenk, *New York Times,* January 25, 2006; "Take My Privacy, Please!" by Ted Koppel, *New York Times*, June 15, 2005; "Trail Re-identification: Learning Who You Are From Where You Have Been," Carnegie Mellon University, School of Computer Science, Data Privacy Laboratory Technical Report LIDAP-WP12,, February 2003.

FIGURE 1.11 DISCIPLINES CONCERNED WITH E-COMMERCE



Many disciplines are directly involved in the study and understanding of e-commerce.

Technical Approaches

Computer scientists are interested in e-commerce as an exemplary application of Internet technology. They are concerned with the development of computer hardware, software, and telecommunications systems, as well as standards, encryption, and database design and operation. Management scientists are primarily interested in building mathematical models of business processes and optimizing these processes. They are interested in e-commerce as an opportunity to study how business firms can exploit the Internet to achieve more efficient business operations.

Behavioral Approaches

In the behavioral area, information systems researchers are primarily interested in e-commerce because of its implications for firm and industry value chains, industry structure, and corporate strategy. The information systems discipline spans the technical and behavioral approaches. For instance, technical groups within the information systems specialty also focus on data mining, search engine design, and artificial intelligence. Economists have focused on consumer behavior at Web sites, pricing of digital goods, and on the unique features of digital electronic markets. The marketing profession is interested in marketing, brand development and extension, consumer behavior on Web sites, and the ability of Internet technologies to segment and target consumer groups, and differentiate products. Economists share an interest with marketing scholars who have focused on e-commerce consumer response to marketing and advertising campaigns, and the ability of firms to brand,

segment markets, target audiences, and position products to achieve above-normal returns on investment.

Management scholars have focused on entrepreneurial behavior and the challenges faced by young firms who are required to develop organizational structures in short time spans. Finance and accounting scholars have focused on e-commerce firm valuation and accounting practices. Sociologists—and to a lesser extent psychologists—have focused on general population studies of Internet usage, the role of social inequality in skewing Internet benefits, and the use of the Web as a social networking and group communications tool. Legal scholars are interested in issues such as preserving intellectual property, privacy, and content regulation.

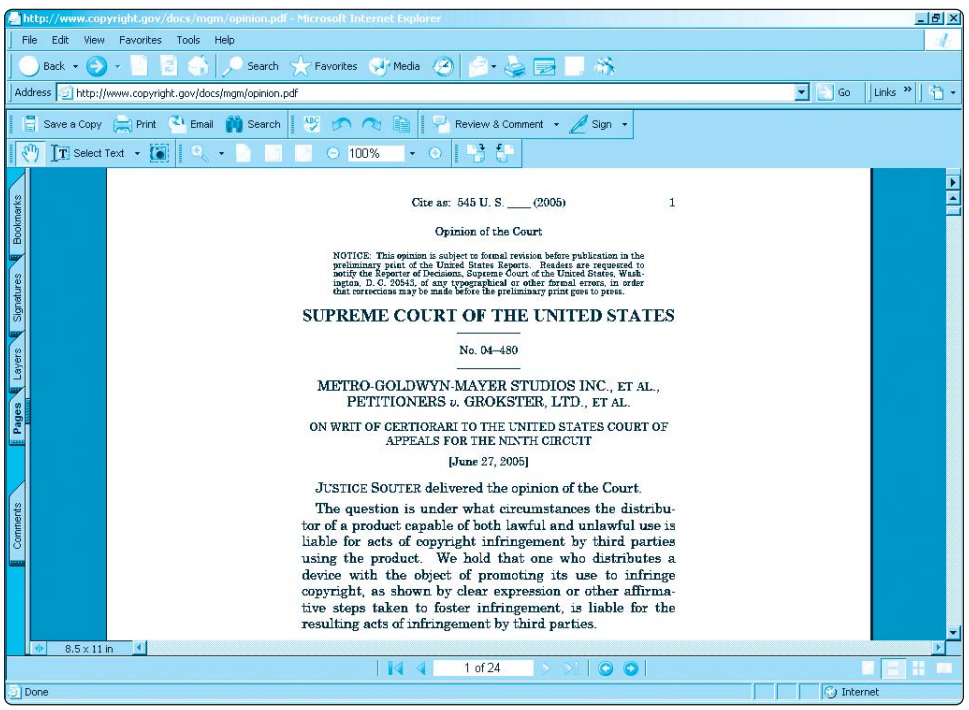
No one perspective dominates research about e-commerce. The challenge is to learn enough about a variety of academic disciplines so that you can grasp the significance of e-commerce in its entirety.

1.4 CASE STUDY

P2P NETWORKS ROCK,

Music Industry Rolls.

In 2005, after several years of heated court battles, the case of *Metro Goldwyn Mayer Studios v. Grokster, et al*. finally reached the U.S. Supreme Court. In June 2005, the Court handed down its unanimous decision: Internet file-sharing services such as Grokster, StreamCast, BitTorrent, and Kazaa can be held liable for copyright infringement because they intentionally sought to induce, enable, and encourage users to share music that was owned by the record labels. Indeed, it was their business model: steal the music, gather a huge audience, and monetize the audience by advertising. Since the court ruling, Kazaa, Morpheus, Grokster, BearShare, iMesh, and many others have either gone out of business or settled with the music label firms and converted themselves into legal file-sharing sites by entering into relationships with the labels.



But, this legal victory has not proven to be the magic bullet that miraculously solves all the problems facing the music industry. In addition to the issue of illegal downloads, legitimate digital music sales have so far failed to make up for the falling CD sales revenues. These two problems are interrelated: if customers can get the music for free, why should they buy a digital copy or a CD?

CD sales have continued to slide, leading to a disastrous financial performance not just at the music label firms but also among their music distributors—the large retail outlets that sell CDs such as Tower Records, Sam Goody, Wal-Mart, and Best Buy. The big three record labels (EMI, Warner Music, and Sony Music) make nearly all their money selling CDs—collections of 12 or more songs in a physical bundle. Sales of CDs started falling in 2004 as the Internet ramped up its broadband connectivity. In 2007, sales of CDs plunged 20% in one year; 800 music retail stores closed in 2006; Wal-Mart cut back its shelfspace devoted to CDs and now carries only the top titles.

Downloading music—legal or illegal—is a major American pastime. About 70 million people downloaded music in 2007. Approximately 35 million of these use illegal P2P networks, and the rest download from legal sites that charge for music. Those who use the illegal free sites are predominantly young, tech-savvy males in the 14–21 year age group. People older than 21 tend to use legitimate downloading sites such as iTunes. The presence of so many young people on illegal P2P sites makes selling advertising on these sites very lucrative. Every month, about 1 billion songs are shared on illegal file-sharing P2P networks. In contrast, it took Apple iTunes about two years to achieve that many downloads! Illegal downloads are about 90% of the music download traffic. How can this be if the Supreme Court declared these networks illegal?

At the same time, legal sales of music at iTunes, Rhapsody, and eMusic have been growing at about 50% per year since 2006. While a hopeful sign, these revenues are typically generated by sales of individual songs at 99 cents each, not entire albums at $15–$20 retail. Digital music sales have just not been strong enough to compensate for the plunging CD sales. Why not?

Let's take these questions one at a time. Why has illegal file sharing continued if these sites are illegal and can be prosecuted? To answer this question you need to know a bit about P2P networks.

Peer-to-peer computer networks rely on the computing power of participants in the network rather than on a single central server or group of servers. A software program coordinates the communications among the participant computers who "donate" their storage, communication, and processing power. As more people join the network, the more power it has, and the faster you can find and exchange files.

P2P networks followed in the footsteps of Napster—the first world champion of free music downloads. Founded in 1999, Napster had over 80 million users worldwide by 2001, but it was put out of business by a U.S. federal court decision in 2001 that required Napster to shut down its central servers that indexed music titles stored on users' computers. By maintaining a central index of available music located on network members' computers, Napster was directly enabling the sharing of music and the violation of copyright protections, i.e., users were not paying the owners of the music for listening.

Later P2P networks operate differently and do not require a central index of titles. Kazaa relies on a software program called FastTrack, which was invented in 1997 by two engineers: Niklas Zennstrom (Swedish) and Janus Friis (Dutch). Here's how it works: Users download the FastTrack software free from any of several sources on the Internet. The software helps users create a local shared directory where they can store music tracks they are willing to share and download tracks from others on the network. When users want to search the Web for new tracks, they launch FastTrack and the software searches first for FastTrack "super nodes" on the Internet—high-speed servers volunteered by other users—that contain pointers to other users who have the desired music tracks. From there, the requesting and sharing computers use their local client Fast Track software to establish a direct peer-to-peer link, and the file swap occurs. The super nodes speed up file transfer by identifying several sources of the same music track and establishing multiple download links. The software automatically identifies which computers on the network are capable of acting as super nodes without direction from outside.

A much more powerful P2P network, BitTorrent, was created by Bram Cohen in 2001, and is distributed by BitTorrent Inc. Ideally suited for sharing movies online, BitTorrent is a protocol (and a client program) in which very large files are distributed in chunks over a large number of Internet client computers. When you request a file (such as a movie), the BitTorrent program finds machines in your vicinity which are storing parts of the movie, and requests their download to your client computer. The downloading process is much faster than downloading from a single server.

How do P2P networks make money? In the early years, downloading FastTrack brought with it many other programs and occasional viruses. In order to make money, Kazaa loaded FastTrack with so-called spyware and adware programs (discussed in the *Insight on Society* story in this chapter, and in later chapters), which in turn go out on the Internet and request pop-up advertisements and unsolicited e-mail from vendors who pay for this service. In that sense, FastTrack was an "advertising network" that made its money not from selling music but from selling to advertisers access to millions of users.

The music available on Kazaa functioned as a draw to a huge Internet audience. Most other file-sharing services operate under the same principles, with few variations on the central theme of using copyrighted music to create an audience that downloads software, which in turn displays ads on users' computers. After settling their lawsuits with the record labels in 2006, sites such as Kazaa have cleaned up their software and no longer force users to accept spyware or adware. Instead they make money from music sales, advertising directly on their sites (they are popular among millions of people) and through their distributed software.

After the major U.S. P2P networks were shut down or changed their business models to become legitimate music vendors, the software itself has propagated throughout the Web, and many new open source P2P programs have also propagated (such as eDonkey, the most popular). Anyone can download the programs and protocols for P2P file sharing. The result is that thousands of smaller P2P networks have sprung up around the world, many in foreign countries such as Sweden and Russia where they cannot be held liable for illegal sharing of music. Sites in these

countries claim to be operating within the copyright laws of their countries. An estimated 95% of online music in Russia is pirated, a figure which is true throughout much of the world including Europe. The Russian authorities shut down the leading Russian site, AllofMP3.com, during President Putin's visit to the United States in July 2007.

Enter "free music" into a search engine and you will receive over 3 million entries, many of which are illegal file-sharing sites. Caution: It's user beware when it comes to downloading these files and programs. Some of them have been corrupted by the record labels, and others may contain viruses, adware, or spyware. About 10 million people are logged onto to P2P music-sharing sites during a typical day in the United States.

So P2P networks are likely to propagate and pirated music is likely to be with us and the music industry for a very long time. Independent bands ("Indie music"), and even some well-known stars are starting to distribute their music on their own Web sites without a company label backing them. This spells more trouble for the traditional record label business and requires a new digital business model for the industry.

Why haven't sales of digital music made up for the loss of CD sales? At 99 cents a song, about the same price as a typical blank CD, one would think the record labels are making as much on songs as before. The difference is they are not selling 12–15 songs on a CD, but single songs, one at a time. The loss of the bundle concept—the CD—has reduced sales drastically. Because consumers can buy one song at a time on the Internet, the whole concept of "an album" is lost on the consumer. The culture of music has changed for consumers. Also, the legal sites use fairly complex digital rights management software to prevent users from freely playing the songs on a variety of devices, or moving them among client computers, such as from a laptop to a desktop PC. When you buy a CD you own it. When you purchase a song online at iTunes, you license the song for limited use, and you can't play it on other players or move it from one machine to another without a lot work. EMI, along with other labels, as well as Apple are considering the elimination of digital rights management protections and moving to a "pay once" concept with unlimited playback. But Apple's entire business model is based on its proprietary audio format ACC. Apple is not considering making its audio compression software and file standards available to other device manufacturers. So the question of how to play your iTunes tunes on a Zune or other player is still hard to answer for the average consumer.

Other changes the industry is making includes developing "teaser" tracks of video and audio and distributing these on BitTorrent and other P2P networks, in essence, using the P2P networks to advertise their products; and selling MP3s directly online without any copyright protection or allowing others such as Yahoo to sell their MP3s.

Until the labels and device makers can agree on how to sell music on the Internet at a fair price and with few limitations on playback, the greatest music box on Earth—the Internet—will remain a threat to the very industry that makes the music.

SOURCES: "Amazon to Sell Music Without Copy Protection," by Brad Stone and Jeff Leeds, *New York Times*, May 17, 2007; "The Album, a Commodity in Disfavor," by Jeff Leeds, *New York Times*, March 26, 2007; "Sales of Music, Long in Decline, Plunge Sharply," by Ethan Smith, *Wall Street Journal*, March 21, 2007; "EMI Mulls Lifting Online-Music Restrictions," by Ethan Smith and, *Wall Street Journal*, February 9, 2007; "Digital Music Up 80% but Shy of Lost Revenue," by Eric Pfanner, *New York Times*, January 18, 2007; "Record Labels Turn Piracy Into a Marketing Opportunity," *Wall Street Journal*, October 18, 2006.

Case Study Questions

1. How can P2P file-sharing networks make money if they do not sell music?
2. Into which category or categories of e-commerce do P2P file-sharing networks fall?
3. What social issues are raised by P2P file-sharing protocols and programs such as BitTorrent? Is the record industry justified in attempting to shut them down? Why or why not?
4. Will the Supreme Court's decision inhibit the development of P2P technology or the Internet itself, as proponents of P2P services have claimed?
5. Why do people older than 21 tend to use legitimate downloading sites whereas younger people tend to use illegal sites?
6. What difference would it make if the existing music labels disappeared for lack of revenue? What legitimate function do the music labels perform in the creation and distribution of original music?

1.5 REVIEW

KEY CONCEPTS

■ **Define e-commerce and describe how it differs from e-business.**

- E-commerce involves digitally enabled commercial transactions between and among organizations and individuals. Digitally enabled transactions include all those mediated by digital technology, meaning, for the most part, transactions that occur over the Internet and the Web. Commercial transactions involve the exchange of value (e.g., money) across organizational or individual boundaries in return for products or services.
- E-business refers primarily to the digital enabling of transactions and processes within a firm, involving information systems under the control of the firm. For the most part, e-business does not involve commercial transactions across organizational boundaries where value is exchanged.

■ **Identify and describe the unique features of e-commerce technology and discuss their business significance.**

There are eight features of e-commerce technology that are unique to this medium:

- *Ubiquity*—available just about everywhere, at all times, making it possible to shop from your desktop, at home, at work, or even from your car.
- *Global reach*—permits commercial transactions to cross cultural and national boundaries far more conveniently and cost-effectively than is true in traditional commerce.

- *Universal standards*—shared by all nations around the world. In contrast, most traditional commerce technologies differ from one nation to the next.
- *Richness*—refers to the complexity and content of a message. It enables an online merchant to deliver marketing messages with text, video, and audio to an audience of millions, in a way not possible with traditional commerce technologies such as radio, television, or magazines.
- *Interactivity*—allows for two-way communication between merchant and consumer and enabling the merchant to engage a consumer in ways similar to a face-to-face experience, but on a much more massive, global scale.
- *Information density*—is the total amount and quality of information available to all market participants. The Internet reduces information collection, storage, processing, and communication costs while increasing the currency, accuracy, and timeliness of information.
- *Personalization* and *customization*—merchants can target their marketing messages to specific individuals by adjusting the message to a person's name, interests, and past purchases. Because of the increase in information density, a great deal of information about the consumer's past purchases and behavior can be stored and used by online merchants. The result is a level of personalization and customization unthinkable with existing commerce technologies.
- *Social technology*—provides a many-to-many model of mass communications. Millions of users are able to generate content consumed by millions of other users. The result is the formation of social networks on a wide scale and the aggregation of large audiences on social network platforms.

■ Describe and identify Web 2.0 applications

- A new set of applications has emerged on the Internet, loosely referred to as Web 2.0. These applications attract huge audiences and represent significant new opportunities for e-commerce revenues. Web 2.0 applications such as social networks, photo-and video-sharing sites, Wikipedia, and virtual life sites support very high levels of interactivity compared to other traditional media.

■ Describe the major types of e-commerce.

There are five major types of e-commerce:

- B2C involves businesses selling to consumers and is the type of e-commerce that most consumers are likely to encounter. In 2007, consumers spent about $225 billion in B2C transactions.
- B2B e-commerce involves businesses selling to other businesses and is the largest form of e-commerce, with an estimated $3.6 trillion in transactions occurring in 2007.
- C2C is a means for consumers to sell to each other. In C2C e-commerce, the consumer prepares the product for market, places the product for auction or sale, and relies on the market maker to provide catalog, search engine, and transaction clearing capabilities so that products can be easily displayed, discovered, and paid for.
- P2P technology enables Internet users to share files and computer resources directly without having to go through a central Web server. Music and file-sharing services, such as BitTorrent, Kazaa, and eDonkey, are prime examples of this type of e-commerce, because consumers can transfer files directly to other consumers without a central server involved.

- M-commerce involves the use of wireless digital devices to enable transactions on the Web.

■ Understand the evolution of e-commerce from its early years to today.

E-commerce has gone through three stages: innovation, consolidation, and reinvention. The early years of e-commerce were a period of explosive growth, beginning in 1995 with the first widespread use of the Web to advertise products and ending in 2000 with the collapse in stock market valuations for dot-com ventures.

- The early years of e-commerce were a technological success, with the digital infrastructure created during the period solid enough to sustain significant growth in e-commerce during the next decade, and a mixed business success, with significant revenue growth and customer usage, but low profit margins.
- E-commerce during its early years did not fulfill economists' visions of the perfect Bertrand market and friction-free commerce, or fulfill the visions of entrepreneurs and venture capitalists for first-mover advantages, low customer acquisition and retention costs, and low costs of doing business.
- E-commerce entered a period of consolidation beginning in March 2000 and extending through 2005.
- E-commerce entered a period of reinvention in 2006 with the emergence of social networking and Web 2.0 applications that attracted huge audiences in a very short time span.

■ Identify the factors that will define the future of e-commerce.

Factors that will define the future of e-commerce include the following:

- E-commerce technology will continue to propagate through all commercial activity, with overall revenues from e-commerce, the number of products and services sold over the Web, and the amount of Web traffic all rising.
- E-commerce prices will rise to cover the real costs of doing business on the Web.
- E-commerce margins and profits will rise to levels more typical of all retailers.
- Traditional well-endowed and experienced Fortune 500 companies will play a growing and more dominant role.
- Entrepreneurs will continue to play an important role in pioneering new social applications.
- The number of successful pure online companies will continue to decline and most successful e-commerce firms will adopt an integrated, multi-channel bricks-and-clicks strategy.
- Regulation of e-commerce and the Web by government will grow both in the United States and worldwide.

■ Describe the major themes underlying the study of e-commerce.

E-commerce involves three broad interrelated themes:

- *Technology*—To understand e-commerce, you need a basic understanding of the information technologies upon which it is built, including the Internet and the World Wide Web, and a host of complimentary technologies—personal computers, local area networks, client/server computing, packet-switched communications, protocols such as TCP/IP, Web servers, HTML, and relational databases, among others.

- *Business*—While technology provides the infrastructure, it is the business applications—the potential for extraordinary returns on investment—that create the interest and excitement in e-commerce. New technologies present businesses and entrepreneurs with new ways of organizing production and transacting business. Therefore, you also need to understand some key business concepts such as electronic markets, information goods, business models, firm and industry value chains, industry structure, and consumer behavior in electronic markets.
- *Society*—Understanding the pressures that global e-commerce places on contemporary society is critical to being successful in the e-commerce marketplace. The primary societal issues are intellectual property, individual privacy, and public policy.

■ Identify the major academic disciplines contributing to e-commerce.

There are two primary approaches to e-commerce: technical and behavioral. Each of these approaches is represented by several academic disciplines. On the technical side:

- Computer scientists are interested in e-commerce as an application of Internet technology.
- Management scientists are primarily interested in building mathematical models of business processes and optimizing them to learn how businesses can exploit the Internet to improve their business operations.
- Information systems professionals are interested in e-commerce because of its implications for firm and industry value chains, industry structure, and corporate strategy.
- Economists have focused on consumer behavior at Web sites, and on the features of digital electronic markets.

On the behavioral side:

- Sociologists have focused on studies of Internet usage, the role of social inequality in skewing Internet benefits, and the use of the Web as a personal and group communications tool.
- Finance and accounting scholars have focused on e-commerce firm valuation and accounting practices.
- Management scholars have focused on entrepreneurial behavior and the challenges faced by young firms who are required to develop organizational structures in short time spans.
- Marketing scholars have focused on consumer response to online marketing and advertising campaigns, and the ability of firms to brand, segment markets, target audiences, and position products to achieve higher returns on investment.

QUESTIONS

1. What is e-commerce? How does it differ from e-business? Where does it intersect with e-business?
2. What is information asymmetry?
3. What are some of the unique features of e-commerce technology?
4. What is a marketspace?

5. What are three benefits of universal standards?
6. Compare online and traditional transactions in terms of richness.
7. Name three of the business consequences that can result from growth in information density.
8. What is Web 2.0? Give examples of Web 2.0 sites and explain why you included them in your list.
9. Give examples of B2C, B2B, C2C, and P2P Web sites besides those listed in the chapter materials.
10. How are the Internet and the Web similar to or different from other technologies that have changed commerce in the past?
11. Describe the three different stages in the evolution of e-commerce.
12. What are the major limitations on the growth of e-commerce? Which is potentially the toughest to overcome?
13. What are three of the factors that will contribute to greater Internet penetration in U.S. households?
14. Define disintermediation and explain the benefits to Internet users of such a phenomenon. How does disintermediation impact friction-free commerce?
15. What are some of the major advantages and disadvantages of being a first mover?
16. Discuss the ways in which the early years of e-commerce can be considered both a success and a failure.
17. What are five of the major differences between the early years of e-commerce and today's e-commerce?
18. What factors will help define the future of e-commerce over the next five years?
19. Why is a multidisciplinary approach necessary if one hopes to understand e-commerce?

PROJECTS

1. Search the Web for an example of each of the five major types of e-commerce described in Section 1.1. Create a PowerPoint slide presentation or written report describing each Web site (take a screenshot of each, if possible), and explain why it fits into one of the five types of e-commerce.

2. Choose an e-commerce Web site and assess it in terms of the eight unique features of e-commerce technology described in Table 1.2. Which of the features does the site implement well, and which features poorly, in your opinion? Prepare a short memo to the president of the company you have chosen detailing your findings and any suggestions for improvement you may have.

3. Given the development and history of e-commerce in the years from 1995–2007, what do you predict we will see during the next five years of e-commerce? Describe some of the technological, business, and societal shifts that may occur as the Internet continues to grow and expand. Prepare a brief PowerPoint slide presentation or written report to explain your vision of what e-commerce looks like today.

4. Follow up on events at Facebook and MySpace subsequent to June 2007 (when the opening case was prepared). Has Facebook continued to challenge the dominance of MySpace (the world's largest social networking site)? What are its current prospects for success or failure? Prepare a short report on your findings.

WEB SITE RESOURCES www.prenhall.com/laudon

- News: News stories relevant to the material in this chapter
- Research: Important e-commerce research abstracts and links to articles
- Additional projects, exercises, and tutorials
- Careers: Explore career opportunities in e-commerce
- Raising capital and business plans