
Overview

What Is Electronic Commerce?

Electronic commerce is a shorthand term that encompasses a complex of technologies, infrastructures, processes, and products. It brings together whole industries and narrow applications, producers and users, information exchange, and economic activity into a global marketplace called the Internet.

There is no universal definition of electronic commerce because the Internet marketplace and its participants are so numerous and their intricate relationships are evolving so rapidly.¹ (See box 1.1 for how electronic commerce over the Internet differs from electronic data interchange (EDI), a more traditional form of electronic commerce.) Nonetheless, the best way to understand electronic commerce is to consider the elements of its infrastructure, how it affects the traditional marketplace, and the continuum of ways in which electronic commerce is manifested.

Prerequisites in the Services Sectors

As it has evolved today, electronic commerce relies on a variety of computer and telecommunications technologies, the development of which is proceeding at breakneck speed. The arteries (or “backbone”) for infor-

1. For a more elaborate discussion of definitions, see <http://www.oecd.org/dsti/sti/it/ec/act/sacher.htm/> and OECD (1999, 28-9, box 1) and UNCTAD (2000, 9-23).

Box 1.1 Electronic commerce vs. EDI

Electronic commerce over the Internet is substantially different from a more traditional form of electronic commerce, electronic data interchange (EDI). EDI uses separate and proprietary systems, while the Internet is based on an open, non-proprietary protocol (Transport Control Protocol/Internet Protocol, or TCP/IP) and there is a standard coding system (hypertext markup language, or HTML) for representing data on the World Wide Web. In addition, widely-disseminated Internet browsers like Netscape provide a standard, user-friendly interface on the Web for the individual user.

Thus, unlike EDI, electronic commerce over the Internet can take place independent of any one operating platform. And because businesses do not have to invest in creating new protocols and standards, it costs much less to sell goods and services over the Internet. In fact, EDI transactions are about ten times more expensive than Internet based electronic commerce transactions. In addition, over the Internet, companies can offer interactive, media-rich marketing and customer feedback, services traditionally unavailable through EDI. Given these differences, EDI can be thought of as one market, while electronic commerce over the Internet can be thought of as an entire marketplace, in which all types of buyers and sellers interact.

Source: OECD. (1999b)

mation traffic increasingly thread through every country and girdle the globe, and include telecommunications wires, coaxial and fiber-optic cable, and satellites. Internet service providers (ISPs) collect and connect businesses and individuals to this backbone. End-user devices such as personal computers (PCs), televisions (TVs), and mobile telephones complete the delivery of the Internet to the individual user.

Electronic commerce also requires the technological and processing capability to make on-line payments and to deliver goods and services to consumers both physically and over the Internet. Credit, debit, and smart cards and digital cash link the Internet with the financial marketplace and speed the transaction process. Rapid and multimodal distribution and delivery bring those products purchased online to the business and consumer and interweave the Internet and physical marketplaces.

Electronic commerce needs standards, regulations, and laws to create an environment of certainty, trust, and security for the purchase and sale of products online, as well as for the conveyance and use of information provided online. Examples include technical communications standards; the legality of electronic signatures and certification; encryption and interconnectivity standards; and disclosure, privacy, and content regulations.

Process and Product Changes in the Traditional Marketplace

Electronic commerce simplifies, makes more efficient, reduces the cost of, or otherwise alters, the process by which a transaction takes place. For

example, when Cisco Systems replaced its phone and fax ordering process with on-line ordering, the company saved more than half a billion dollars and reduced error rates from 25 percent to 2 percent (OECD 1999b, 60-1). As Marketplace by Marriott (the \$5 billion procurement division for Marriott International's 2,000 hotel properties around the world) moves its ordering system online, it expects each hotel to save 20 to 30 percent on items like bed frames, mattresses, shampoo, towels, and light bulbs. And when IBM moved its procurement of \$13 billion in goods and services online in 1999, the company eliminated five million pieces of paper, saving an estimated \$270 million (*Business Week Online*, 3 April 2000).

Electronic commerce also creates or facilitates new products and new industries not previously available. Internet appliances tailored to a specific need (such as e-mail-only devices) are now available in retail stores in both the United States and China. The MP3 online medium for music allows artists to record music onto a computer; consumers can then download it onto a CD-ROM or a mobile player, thus creating a new medium to produce, market, and distribute music. Companies like WebMD repack-age health information in an easy-to-use online format, offer opportunities for people with similar health concerns to "chat," and provide real-time answers to health questions. Personal digital assistants like Palm Pilots and high-functionality cellular phones allow consumers to surf the Internet (or compare prices while in the aisle of the store) and buy products online using the mobile connection. How products and industries made available over the Internet, particularly those using high-speed broadband or cable delivery will evolve, is still unknown.

Facilitation of New Markets and Marketplaces

Electronic commerce creates new markets in time, space, and information where previously transaction and coordination costs were prohibitively high. The Brazilian bank, Banco 1, offers 24-hour online banking services. PeopleLink advertises globally via the Internet on behalf of artisans in remote parts of Latin America and Africa. Auctions through Priceline tell businesses exactly what prices buyers are willing to pay for products ranging from groceries to gasoline. And eSteel.com aggregates steel producers and purchasers from around the world into a single online marketplace.

The key forces that create this Internet marketplace and affect its participants are: synergies among services sectors, new processes of supply and demand, information richness and global reach.

How Fast Are Growth and Diffusion?

The Internet and electronic commerce are growing so fast that forecasters regularly underestimate how many users will be online and how much

Box 1.2 Measuring the Internet marketplace

Many researchers disagree on how to measure Internet access and electronic commerce revenue. This box highlights where the debate stands between the differing methodologies.

Internet access can be measured as either the number of computers connected to the Internet (“host computers”), or the number of individuals accessing the Internet through those computers. Some researchers count only those individuals accessing the Internet at least once a week, or distinguish between those who surf the Internet and those who dial up only to check electronic mail. Measuring any of these data is problematic, since it is difficult to ascertain in which country a host computer is located, or how many individuals are using any given computer and for what purpose.

Methodologies to measure *e-commerce revenues* are similarly varied. Most measurements include both business-to-business (B2B) transactions and business-to-consumer (B2C) transactions. Others distinguish between goods and services purchased over the Internet and delivered physically to the buyer, and those delivered digitally, such as music downloaded onto a CD-ROM. The US Department of Commerce’s quarterly data of retail sales, for example, omits online travel and financial brokerage revenues, two of the largest areas of B2C electronic commerce.¹ And it remains highly controversial how to value nontransaction services like bid posting and customer service.²

These differing methodologies clash particularly when researchers try to calculate the economic impact of the Internet and electronic commerce. Particularly difficult is separating out this impact from the broader influence of the information technology sector, which also includes computer hardware and software. The US Bureau of Economic Analysis, for example, is working to improve its IT-sector data, including improving price indexes and real output measures, developing new estimates of software investment, and improving measures of electronic commerce retail and B2B sales. Assisting these efforts is a program by the University of Texas, commissioned by Cisco Systems, to calculate revenue and growth of the US “Internet Economy,” a measure including infrastructure, applications, intermediaries, and electronic commerce.³

1. See <http://www.census.gov/epcd/www/ebusiness.htm>.

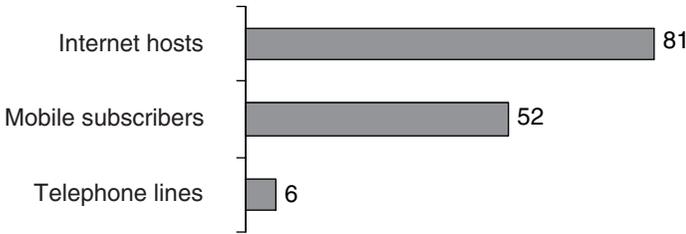
2. Haltiwanger John, and Ron Jarmin. 1999. “Measuring the Digital Economy,” paper prepared for the US Department of Commerce’s conference “Understanding the Digital Economy: Data, Tools, and Research,” (25 May): 4.

3. See <http://www.Internetindicators.com>.

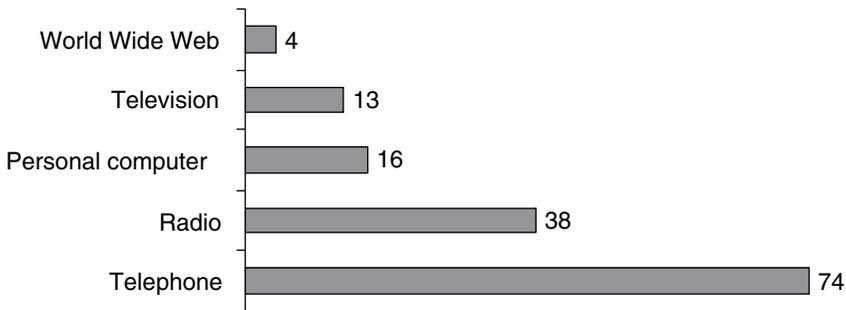
revenue will be generated by electronic commerce (see box 1.2). While growth has been fastest and activity remains greatest for the early adopter—the United States—as electronic commerce diffuses, growth rates (though not necessarily the amount of activity) are expected to be higher in other parts of the globe soon. The Internet and electronic commerce will no longer represent only a part of a domestic business strategy or an alternative way for people to communicate. It will be integral to the economic and social fabric of countries and commerce.

Figure 1.1 Exponential growth of the Internet

Compound annual growth rate 1990 (percent)



Years to reach 50 million users



Source: International Telecommunications Union (ITU), *Challenges to the Network: Internet for Development*, Geneva: ITU, 1999.

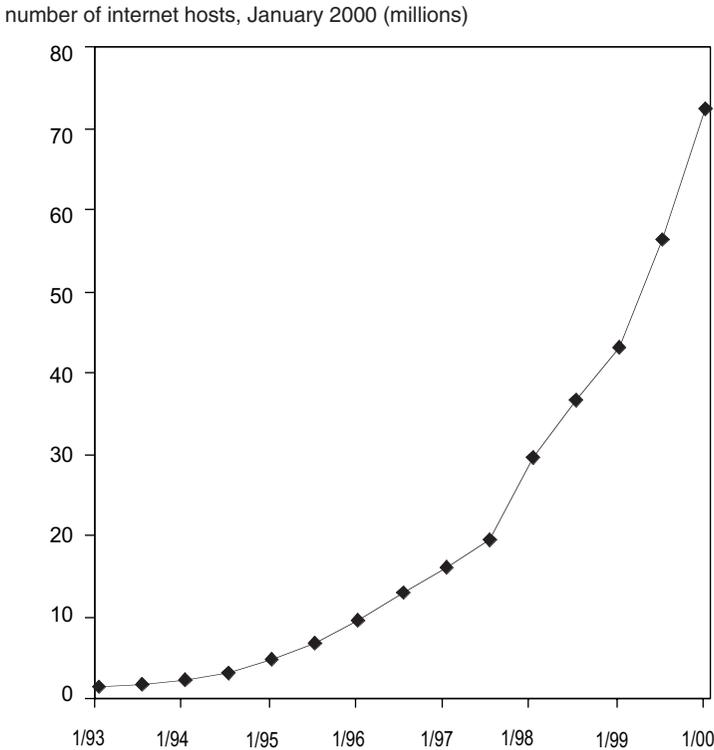
Internet Growth and Diffusion

As recently as 1990, the Internet was essentially a tool for the military and academics. Today it is globally pervasive and highly commercial. The Internet has attracted more users in more countries in a shorter period of time than any other communications tool in history: it took only four years for the Internet to reach 50 million users, compared to 74 years for the telephone and 13 years for TV (ITU 1999, 2). (See figure 1.1.) As of January 2000, there were over 72 million computers from more than 220 countries connected to the Internet (also known as Internet “hosts”), with each computer giving access to one or more users (see figure 1.2). E-mail is a common form of communication not only in the United States but around the world.

Three factors have contributed to the breathtaking growth of the Internet:

- The steep decline in the prices of information technology (IT) products, such as computers and software;

Figure 1.2 Growing Internet connections, 1993-2000



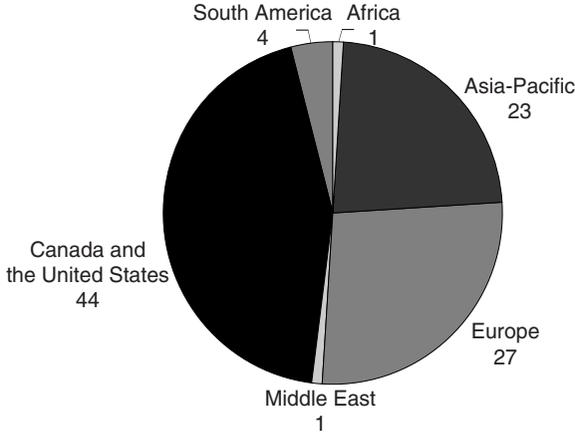
Source: Internet Software Consortium, *Internet Domain Survey*, <http://www.isc.org>, January 2000.

- The development of interoperable platforms like TCP/IP, and the mass distribution of Internet browsers like Netscape, which on the one hand provide a relatively easy way for firms to develop user-friendly interfaces such as Web sites and on the other enable individuals to receive and send electronic documents and surf the World Wide Web.
- The commercialization of the Web itself with media-rich content and electronic commerce.

Currently, Internet use is concentrated in the United States, with Japan and Western Europe catching up fast (see figure 1.3), but most growth over the next three to five years is expected to take place in Asia and Latin America. The share of weekly Internet users in those areas could increase from 23 percent in 1999 to 35 percent in 2002.² In India, for

2. October 1999 statistic from <http://www.emarketer.com>.

Figure 1.3 Internet users by region (percent)



Source: Nua Internet Surveys, <http://www.nua.ie/surveys/how-many-online/index.html>.

example, the number of Internet users nearly doubled in 1999 to 270,000 and could rise to over 2 million by the end of 2000, a ten-fold increase in one year.³ In Latin America, Internet usage rose nearly eight-fold between 1995 and 1997 (ITU 1999, 47). While Internet access growth has been slower for much of Africa, all countries on that continent save for Eritrea are now connected to the Internet.⁴

As the Internet diffuses around the globe, companies are racing to satisfy an increasingly diverse customer base. Although by far most Web sites are in English and based in the United States, sites in other languages are taking off as firms respond to demand. These sites tailor on-line content and products to firms and individuals in different countries and often to communities within those countries.

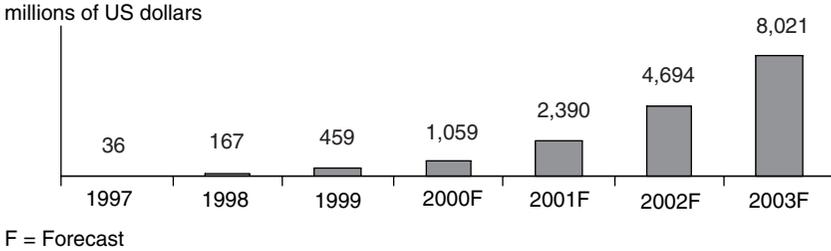
For example, one of the fastest growing languages on the Internet is Spanish, as Telefonica's Terra Networks takes off. ZonaFinanciera offers information in English, Portuguese, and Spanish about loans, certificates of deposit, insurance, and regional stock exchanges in Latin America.

Chinese is growing rapidly too. China.com, an online portal for users in China, offers a wide range of general, financial, and cultural news in English and Chinese. AfricaOnline tailors its content and language to users in the Ivory Coast, Ghana, Kenya, Swaziland, Tanzania, Uganda, and Zimbabwe.

3. See <http://www.emarketer.com/estats/102599india.html>.

4. Mike Jensen follows Internet access trends in all the African countries. His reports and data are available at <http://www3.sn.apc.org/africa/>.

Figure 1.4 E-commerce spending in Latin America



Source: *Latin Trade*, March 2000, 38, using data from IDC.

Electronic Commerce Growth and Diffusion

Growth in electronic commerce is similarly explosive. It is now projected that by 2005, electronic commerce in the United States alone could surpass the \$6 trillion mark (Jupiter Communications, 27 June 2000). This figure is far larger than any of the forecasts for these same years published in an Organization for Economic Cooperation and Development (OECD) study in 1997; these ranged from \$10 billion to \$1.5 trillion (OECD 1999b, 27). Ninety percent of businesses in the United States say that electronic commerce soon will affect how they do business. Since these companies source from firms overseas and sell to buyers overseas, this implies that the tide of electronic commerce will not stop at the US border.

Indeed, though close to 85 percent of electronic commerce is concentrated in the United States—other parts of the world, especially Western Europe and Japan, followed by the rest of Asia, Latin America, and then Africa—are expected to see even faster growth. In China, for example, e-commerce revenues are expected to grow from \$11.7 million in 1998 to \$1.9 billion in 2002 (ITU 1999, 47). In Latin America, revenues could grow from \$167 million in 1998 to \$8 billion in 2003 (*Latin Trade*, March 2000). (See figure 1.4.) And in South Africa, electronic commerce was forecast to generate \$1.1 billion in 1999.⁵

Perhaps because US businesses are the first to adopt electronic commerce, and because many US companies produce globally, electronic commerce by countries outside the United States tends to be more export-oriented. In the United States, the share of export sales in total electronic commerce revenues is only 10 percent, but in Canada it is 83 percent, in Latin America it averages 79 percent, and in Asia/Pacific, 38 percent (ITU 1999, 45, figure 3.2). The nature of the production process (comprising both manufacturing and services) is becoming increasingly fragmented

5. See <http://www.nua.ie/surveys/>.

and globalized.⁶ Firms communicate, get price quotes, submit bids, transfer data, produce product designs, and basically *do business* in an international arena. Countries that do not have an environment conducive to Internet usage and electronic commerce will be marginalized from the globalized production process and global economy, at increasingly greater cost to their citizens.

Diffusion and Income

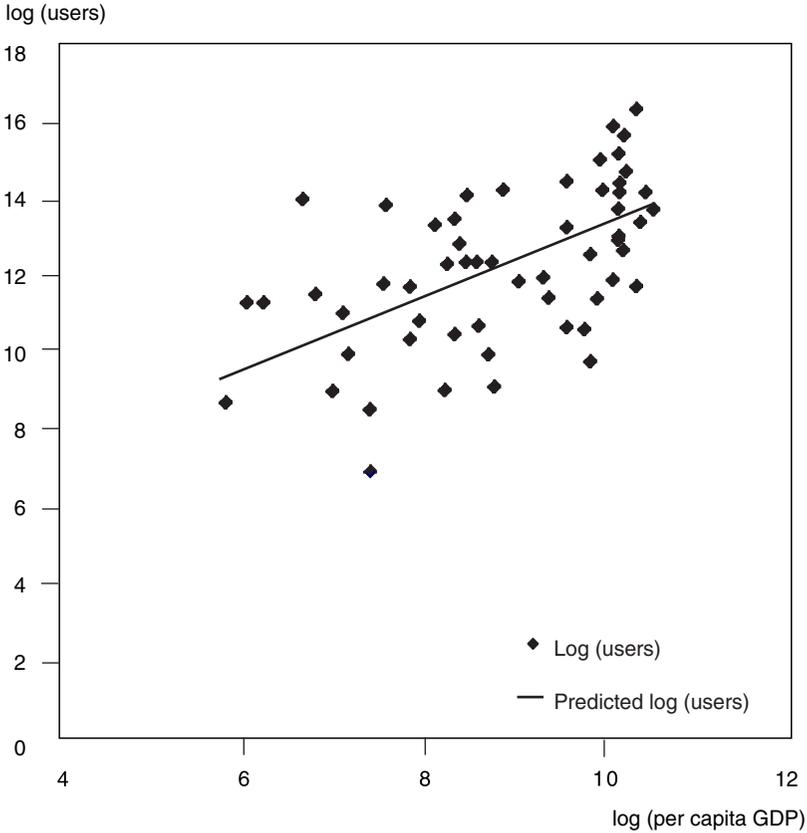
Diffusion and usage of the Internet and electronic commerce—both within individual countries and between developed and developing countries—is a function of a number of factors, including age, income, and education. Research shows a positive relationship, for example, between per capita GDP and the density of Internet hosts (which is one measure of access) (see UNCTAD 2000, 75, figure 12). Similarly, higher income per capita is associated with a higher share of those using the Internet. (See figure 1.5.) Finally, broader measures of development like the Human Development Index show that as human development indicators increase, Internet penetration increases even faster, suggesting important synergies among education, life expectancy, income, and Internet activity (ITU 2000, 22, figure 2.2).

Looking at this issue more narrowly within a country and over time, it is clear that even as access increases for a country as a whole, Internet usage does not increase proportionately for all groups. This is apparent in the United States, which has had relatively cheap and widespread Internet availability for some time. While the relationship between individual income and education is key in raising the likelihood of getting connected to and enjoying the benefits of the Internet, clearly this is not the only issue (US Department of Commerce 1999, 5). As important is the need to have information, products, and entertainment of value to the potential users.

For both rich and poor countries, policies directed at creating a facilitating infrastructure and basic development needs, particularly education, are key to reaping the benefits of the Internet and electronic commerce, for both countries and individual citizens. Similarly, transforming the disinterested or disenfranchised into new entrepreneurs to serve their communities is a key aspect of bringing the Internet to everyone. The last section of the book examines more closely these international and national digital divides, and considers how to use the technology itself to start a virtuous cycle of technology, human development, and economic growth.

6. For a discussion of the fragmentation and globalization of production in the context of US trade, see Mann (1999, 39-40).

Figure 1.5 Income and Internet penetration



Note: Per Capita GDP in US dollars. Sample excludes Africa.

Source: United Nations Statistics Division and UNCTAD Trade and Development Commission on Enterprise, Business Facilitation and Development, Geneva, November 1998.

One point is clear: There is no conflict between policies directed toward development generally and policies that specifically enhance Internet access and usage.

Final Remarks

Some have said that the Internet is as important to the marketplace as the printing press or electric power. Others say it increases efficiency and extends market reach but is not revolutionary.

An analogy might be appropriate here: Everyone now agrees that the invention of electricity was revolutionary. But at the time, people spoke

of electricity in terms relevant to the era: horsepower for kinetic energy or candlepower for lighting energy. We still use the word horsepower, but clearly 1,000 horses or one million candles can deliver very different services from those resulting from 10 horses or 100 candles. Electricity revolutionized economic activity by powering new markets that could not initially be imagined. Moreover, the vastly greater capability of electricity had tremendous impact on human geography and society, the educational system, and the workplace. It not only restructured existing economic activities, but also revolutionized human interaction with the environment. The Internet and electronic commerce will have a similar impact.

Looking forward, the *growth of Internet usage probably will slow* in the medium-to-long term, given that saturation will inevitably take place, especially in the United States, Western Europe, and Japan. No doubt there will always be some people in every country who, even without additional obstacles, will not want to connect to the Internet. But this should not be because it is too expensive; they feel insecure, or they find little available in their language or meeting their interests.

Once the infrastructures are in place, it is in the private sector's interest to ensure that the percentage of unconnected users continues to decline by creating content and electronic commerce offerings that attract their interest. *Electronic commerce will therefore continue to grow rapidly.* America Online's (AOL) recent media campaign targeted toward senior citizens in the United States is a good example of an existing Internet company broadening its consumer base. Other companies are being created solely for underserved audiences. For example, Everymail.com generates a "virtual keyboard" in a dozen languages so that a bilingual immigrant can write e-mail back home to parents who do not speak English, and penpals can learn the languages of their global friends (Kornblum, *USA Today*, 19 November 1999).

There are countless examples of these opportunities; the frontier of electronic commerce is moving the marketplace beyond our current understanding. Most of the future opportunities will be created by companies in the developing countries, or will be targeted to audiences there. Consequently, policymakers should and can take steps to prepare a facilitating environment, unleash incentives for the private sector, and start the virtuous cycle between technology and human development, so as to encourage the growth of the Internet and electronic commerce, and, in particular, to aid its pervasive diffusion across individuals of different income and education levels.