

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/314408412>

# History of E-Commerce

Chapter · January 2007

DOI: 10.4018/9781599049434.ch001

---

CITATIONS

18

---

READS

10,174

2 authors, including:



Yan Tian

University of Missouri - St. Louis

36 PUBLICATIONS 872 CITATIONS

SEE PROFILE

# Chapter 1.1

## History of E-Commerce

**Yan Tian**

*University of Missouri – St. Louis, USA*

**Concetta Stewart**

*Temple University, USA*

### INTRODUCTION

E-commerce or electronic commerce, also known as e-business, refers to the transaction of goods and services through electronic communications. Although the general public has become familiar with e-commerce only in the last decade or so, e-commerce has actually been around for over 30 years. There are two basic types of e-commerce: business-to-business (B2B) and business-to-consumer (B2C). In B2B, companies conduct business with their suppliers, distributors, and other partners through electronic networks. In B2C, companies sell products and services to consumers. Although B2C is the better known to the general public, B2B is the form that actually dominates e-commerce in terms of revenue.<sup>1</sup>

The concept of e-commerce is related to notions of Internet economy and digital economy. All these concepts relate to the use of new information and communication technologies for economic activities, but with different focuses. Internet economy refers to the economic activities that generate revenue from the Internet or

Internet-related products or services (Costa, 2001). Therefore, pre-Internet e-commerce, as will be detailed in the following section, cannot be called Internet economy. On the other hand, some activities, such as building Internet connections for commercial purposes, are a part of Internet economy, but they are not necessarily e-commerce. Digital economy is based on digital technologies such as computer, software, and digital networks. In most cases, digital economy is the same as e-commerce. However, not all activities in the digital economy are e-commerce activities. For example, purchasing computer gear from a storefront retailer is not an activity of e-commerce, although it certainly is a key component of the digital economy. Hence, e-commerce, Internet economy, and digital economy are closely related but have different concepts.

E-commerce has been perhaps one of the most prevalent terms in this digital era. Although e-commerce was once looked upon simply as an expressway to wealth, it has actually transformed the way people conduct business. An historical analysis of e-commerce will provide insights into

the evolution of the application of information and communication technologies in the commercial arena. Furthermore, an analysis of the evolution of e-commerce in the past as well as its present state will enable us to project future trends in e-commerce.

## THE INFANCY OF E-COMMERCE: BEFORE 1995

E-commerce was made possible by the development of electronic data interchange (EDI), the exchange of business documents from one computer to another in a standard format. EDI originated in the mid-1960s, when companies in transportation and some retail industries were attempting to create "paperless" offices. In the mid-1970s, EDI was formalized by the Accredited Standards Committee of industry representatives, and more varied companies began to adopt EDI through the 1970s and 1980s. As the first generation of e-commerce, EDI allowed companies to exchange information, place orders, and conduct electronic funds transfer through computers (Sawanibi, 2001). However, the diffusion of EDI was slow. By the late 1990s, less than one percent of companies in Europe and in the United States had adopted EDI (Timmers, 1999). The huge expense for getting connected to an EDI network and some technical problems limited the diffusion of EDI.

The second generation of e-commerce is characterized by the transaction of goods and services through the Internet, which started as a research tool, but has generally evolved into a commercial tool. The inception of the Internet can be traced back to the 1960s, when the Advanced Research Projects Agency Computer Network (ARPANET), the precursor to the Internet, was established for research in high technology areas. The nodes of ARPANET increased from 4 in 1969 to 15 in 1971. The term *Internet* actually did not come into use until 1982, when the number of hosts on the ARPANET rose to 213. Then, in

1983, the Internet Protocol (IP) became the only approved way to transmit data on the Net, enabling all computers to exchange information equally. In 1986, the National Science Foundation (NSF), a government agency, launched the NSFNET, with the purpose of providing high-speed communication links between major supercomputer centers across the United States. The backbone of the NSFNET then became the cornerstone of the TCP/IP-based Internet (Anthes, 1994).

By the end of the 1980s, the Internet had still maintained its noncommercial nature, and all of its networks were based on the free use of the NSFNET backbone, directly or indirectly. The primary users were still scientists and engineers working for the government or for universities. As a matter of fact, academics or researchers were the only ones capable of using the Internet, because a sophisticated understanding of computer science and a high level of computer skills were necessary for Internet use at that time (Eccleson, 1999).

It was the development of a graphical user interface (GUI) and the navigability of the World Wide Web (WWW) that changed the nature of Internet use. In the early 1990s, the creation of the hypertext markup language (HTML), with specifications for uniform resource locators (URLs) enabled the Web to evolve into the environment that we know today. The Internet was therefore taken "out of the realm of technical mystique and into common usage" as it became usable for ordinary people without sophisticated understanding of computer science and techniques (Eccleson, 1999, p. 70). Hence, with the increasing number of Internet users, the Internet became attractive to the business world.

Perhaps the most significant milestone, however, came in 1991, when NSFNET decided to lift commercial restrictions on the use of the network, and thereby opened up opportunities for e-commerce. Advanced Network & Services (ANS), established by IBM, MCI Communications Corp., and Merit Network, Inc., provided Internet connection to commercial users without govern-

ment restrictions on commercial traffic online. In addition, a portion of the money from these commercial applications was used to upgrade the network infrastructure. In 1993, Mosaic, one of the first Internet browsers, was released, and with Mosaic's graphical interface and rapid proliferation, the Internet became more user-friendly and visually appealing. One year later, Netscape released its Navigator browser, hand in so doing ushered in the golden age of e-commerce.

### **THE "GOLDEN AGE" OF E-COMMERCE: FROM 1995 TO 1999**

In 1995, ANS was sold to America Online, which marked "a transition of backbone infrastructure from federal funding to full private commercialization operation of the Internet" (Kim, 1998, p. 283). With NSF's subsidy removed, private companies took a leading role on the Internet (Kim, 1998). Commercial use of the Internet gradually became the dominant pattern of Internet use in the mid-1990s. The term *e-commerce* came into popular use in 1995, signifying the rapid development of commercial applications of the Internet.

Also in 1995, Amazon.com, the world's largest online bookstore, was launched. Just 1 year later, it became a multimillion dollar business with a database of 1.1 million books searchable by title, author, subject, or keyword, and favored by both publishers and customers. Two months after Amazon's debut, eBay, the world's first online auction site, was launched. In 1996, Dell began to sell personal computers directly to consumers on the Internet and, in 1997, the commercial domain (.com) replaced the educational domain (.edu) as the largest in use (Kim, 1998). The Internet became the fastest growing technology in economic history. Investors, businesses, and consumers alike were attracted by e-commerce during that period.

From 1995 to 1999, many companies built their Web presence and began to conduct transactions online. In 1996, e-commerce transactions in the United States resulted in \$707 million in revenue, which increased to \$2.6 billion in 1997, and \$5.8 billion in 1998 (Fellenstein & Wood, pp. 9-10). From October 1998 to April 2000, more than 300 Internet companies made initial public offerings (IPOs; Cassidy, 2002, p. 192). There were approximately 600,000 e-commerce sites in the United States by the end of 2000 (Dholakia et al., 2002, p. 5). Advertising on the Internet also increased from \$267 million in 1996 to \$907 million in 1997 and to \$3 billion in 1999. The sales of Amazon increased from less than \$16 million in 1996 to \$1.6 billion in 1999, and the daily sales of Dell increased from under \$1 million to \$40 million in less than 3 years (Costa, 2001, p. 34).

The growth of e-commerce coincided with the changes in the regulation of the Internet. Throughout the mid-1980s to 1995, the Internet's main backbone was comprised by the NSFnet, a wide-area network developed under the auspices of the National Science Foundation (NSF). NSFnet replaced ARPANET as the main government network linking universities and research facilities. In 1995, however, the NSF dismantled NSFnet and replaced it with a commercial Internet backbone. In that process, the National Science Foundation (NSF) decided to award a monopoly contract to a partnership between the Information Sciences Institute (ISI) and Network Solutions, Inc., to operate IP numbers and domain registration services from 1992 to 1997. At the same time, the NSF implemented a new backbone called very high-speed Backbone Network Service (vBNS), which served as a testing ground for the next generation of Internet technologies.

In 1996, a blue ribbon international panel formed by the Internet Society (ISOC) took over the root server, which is a domain name system (DNS) name server that points to all the top-level domains, and the International Ad Hoc Committee (IAHC) was chartered with a plan to form

a monopoly registry administration of the DNS on a nonprofit basis. While DNS was looked at as “public resource” by some researchers then (Par, 2003, p. 131), others believed that multiple, competing groups co-owned this resource (Mueller, 1999). In 1997, as the NSF decided to terminate its contract with Network Solutions, the IAHC collapsed.

With the increasing pressure of commercial interests over trademark “squatting,” (Par, 2003, p. 131), the U.S. Department of Commerce issued the White Paper in 1997 to transfer the management of the DNS to a new private, not-for-profit corporation. In 1998 the Internet Corporation for Assigned Names and Numbers (ICANN) was formed, which represented a “substantial shift in power to control the Internet from government to private industry” (Fuller, 2001). ICANN made decisions such as allowing more competition among registrars and instituting mandatory arbitration for trademark claims during its first two years of life, which had a significant impact on the development of e-commerce during that period.

### **THE BURST OF THE DOT-COM BUBBLE: 2000 AND 2001**

The “gold rush” of the late 1990s came to be known as the “dot-com bubble,” and 2000 and 2001 saw the bursting of that bubble. From March 10 to April 14, 2000, the NASDAQ, the high-tech stock exchange, dropped 34.2%, and the Dow Jones Composite Internet Index dropped 53.6%. The stock price for all the 20 leading Internet stocks dropped, including Amazon.com by 29.9%, eBay by 27.9%, Internet Capital by 72.1%, and VeriSign by 59.2% (Cassidy, 2002, pp. 292-293). This crash quickly cooled the e-commerce frenzy. Many Internet companies were forced to cancel their IPOs, and companies such as Boo.com and Value America had to file for bankruptcy (Cassidy, 2002). According to the *Fortune* magazine, 384 dot-coms “passed on” in 2001 (Adams, 2004,

p. 105). In the San Francisco Bay Area, 80% of dot-coms went out of business in 2000 and 2001, which led to a loss of 30,000 jobs directly related to the Internet (Nevaer, 2002, p. xii).

The dot-com crash in 2000 and 2001 has been attributed to the unrealistic expectations for e-commerce and Internet companies. The stocks for Internet companies were overvalued. Exaggerated projections by Silicon Valley, Wall Street, journalists, and government officers all contributed to the inflation of the dot-com bubble. The bubble finally burst, which meant decreases in investment, a slow-down in economic and productivity growth, and decreasing corporate revenues (Cassidy, 2002).

Ironically, despite the bankruptcy of many Internet companies, e-commerce sales actually increased in the year 2000 and 2001. According to the Department of Commerce (2001), estimated retail e-commerce sales in the fourth quarter of 1999 were \$5.27 billion, increasing to \$8.88 billion in the fourth quarter of 2000 and to \$10.04 billion in the fourth quarter of 2001. The estimated total e-commerce sales for 2001 were \$32.6 billion, a 19.3% increase compared with the total e-commerce sales for 2000. The increase of e-commerce sales during the dot-com crash suggests that although e-commerce and Internet companies may have been overvalued in the 1990s, e-commerce itself was still viable and growing.

### **THE RESURGENCE OF E-COMMERCE: 2002 TO THE PRESENT**

E-commerce continued to grow after the burst of the dot-com bubble. Some Internet companies that survived the 2000 and 2001 crash have become very successful. For example, Amazon.com has won some of highest customer satisfaction scores in the history of retail industry. eBay has significant sales in second-hand cars, which were once looked upon as inappropriate commodities for

online transactions. Wal-Mart, the world's largest store-front retailer, conducts all the business with suppliers through a B2B network (*The Economist*, 2004). Estimated total e-commerce sales reached \$45.6 billion for 2002 and \$54.9 billion for 2003 (Department of Commerce, 2002, 2003). This trend continued in 2004, with e-commerce sales for the third quarter of 2004 estimated to have increased 21.5% from the same period in 2003 (Department of Commerce, 2004).

However, e-commerce still does not represent a large proportion of the economy. E-commerce sales are less than 2% of the total sales in the United States (Department of Commerce, 2004). Although there is plenty of opportunity for growth, the development of e-commerce is limited by factors such as universal access, privacy and security concerns, and Internet fraud. These limitations must be adequately addressed to ensure strong growth in e-commerce.

With the resurgence of e-commerce, regulation of e-commerce deserves special attention. Consumer protection, user agreements, contracts, and privacy in e-commerce all present new concerns regarding regulation of commercial activities (Füstös & López, 2004), particularly as e-commerce contributes to the globalization of economic activity. For example, whereas the European Union emphasizes consumer's rights, the United States is more focused on protecting freedom of expression and intellectual property (Füstös & López, 2004). Nevertheless, laws such as the U.S. Anticybersquatting Consumer Protection Act (ACPA) and the Electronic Signature in Global and National Commerce Act have been passed to protect the flow of commerce in cyberspace (Füstös & López, 2004; Schneider, 2004). To protect intellectual property in e-commerce, the World Intellectual Property Association (WIPO) developed the Uniform Domain Name Dispute Resolution (UNDR) policy to help settle disputes regarding domain names. In addition, organizations such as the Secure Digital Music Initiative (SDMI), with members of companies

related to the information technology industry and music recording industry, are working on protecting intellectual property of digital products (Schneider, 2004).

Controversy has also emerged regarding the collection of sales-tax revenue in this new business environment. E-commerce is believed to contribute to the loss of revenue of state and local government, because states cannot effectively collect sales and use taxes on transactions through the Internet. Organizations such as the National Governors Association and National Conference of State Legislatures have been working under the Streamlined Sales and Use Tax Agreement to create a uniform system to administer and collect remote sales taxes (Government Finance Review, 2004). All of these examples illustrate the array of issues for the regulation of e-commerce. However, with the challenges e-commerce presents to traditional legal jurisdiction, privacy and security of transactions, tariffs, and taxation (Cordy, 2003), careful examination of laws and policies will be needed to assure the growth of e-commerce.

## **FUTURE TRENDS IN E-COMMERCE**

M-commerce, or mobile commerce, is an important growth area for e-commerce. M-commerce refers to the process of using mobile devices such as mobile phones or wireless PDAs to conduct business transactions. With 1.5 billion mobile users in the world, and 140 million in the United States (Cellular Online, 2004), m-commerce is becoming a significant aspect of e-commerce. With m-commerce, the nature of mobile devices changes from pure communication tools to transactional tools. M-commerce has already found important applications in industries such as financial management, travel services, and entertainment (Schone, 2004). M-commerce will be adopted by an increasing number of industries, given its capacity to facilitate interactions between

companies and consumers, create mobile virtual malls, and tailor products and services according to customers' purchasing habits in real time. It is estimated by ARC Group that approximately 546 million mobile device users will spend approximately \$40 billion on m-commerce by 2007 (Schone, 2004).

The globalizing economy presents additional opportunities for e-commerce. The global Internet population is more diversified than ever before. With the rapid increase of Internet population in countries other than the United States, e-commerce on a global scale becomes necessary as well as feasible. Leading companies in e-commerce have realized this. EBay, for example, built a Chinese service, which has become the biggest e-commerce site in China (*The Economist*, 2004). Another example is Amazon.com, which hired ThinkAmerican, a "cultural portal," to translate and customize its Japanese Web pages to comport with the Japanese culture. As leading e-commerce companies in the United States are extending their business to overseas markets, e-commerce is thriving in many countries around the world. According to Forrester Research, global e-commerce would reach \$6.8 trillion by 2004, with North America representing 50.9% (the United States, 47%), Asia/Pacific representing 24.3%, Europe representing 22.6%, and Latin America representing 1.2% (Global Reach, 2004). Forrester also predicted that, although the United States and North America are currently leading in online transactions, Asia and European nations would become more active in e-commerce in the coming years. With the Internet's inherent "globality," global e-commerce pushes e-commerce into its next phase.

As one of the most influential economic forms in our age, significant research will continue to focus on e-commerce. Historical and economic studies will examine the impact of the evolution of the infrastructures, technologies, strategies, and regulation of e-commerce. With the rapid development of m-commerce and global e-com-

merce, future research will consider implications of advancements in global telecommunications, mobile communications as well as the influence of cross-cultural content and practices.

## CONCLUSION

Despite the dramatic rise and fall of Internet companies, e-commerce has demonstrated continuous growth in sales. E-commerce has significant implications for the companies and customers involved as well as society at large. For companies, e-commerce can improve efficiency and productivity. Furthermore, e-commerce allows employees to have more access to information and services, which can help to maintain a healthy corporate culture. For customers, e-commerce provides a very convenient way to transact many kinds of business 24 hours a day, 7 days a week. For society, e-commerce can help to accelerate their economic growth and opportunities, but at the same time may pose challenges and concerns in terms of surveillance and privacy.

The burst of the dot-com bubble may actually have brought about a more rational and sustainable approach to e-commerce. However, as e-commerce grows, we will continue to witness changes in the way people conceive of organizations, transactions, and communications with a dramatic rethinking of time and space considerations in economic activities.

## REFERENCES

- Adams, F. G. (2004). *The e-business revolution & the new economy: E-economics after the dot-com crash*. Mason, OH: Thomson/South-Western.
- Anthes, G.H. (1994). Internet debates metered billing. *Computerworld*, 28(21), 1-2.
- Cassidy, J. (2002). *Dot.con: The greatest story ever sold*. New York: HarperCollins.

- Cellular Online. (2004). *Global mobile stats*. Retrieved February 1, 2005, from <http://www.cellular.co.za/>
- Cordy, E. D. (2003). The legal regulation of e-commerce transaction. *Journal of American Academy of Business*, 2(2), 400-407.
- Costa, E. (2001). *Global e-commerce strategies for small business*. Cambridge, MA: The MIT Press.
- Department of Commerce. (2001). *Historical retail trade and food services*. Retrieved February 1, 2005, from <http://www.census.gov/mrts/www/nmrts/hist.html>
- Department of Commerce. (2002, 2003). *Historical retail trade and food services*. Retrieved February 1, 2005, from <http://www.census.gov/mrts/www/nmrts/hist.html>
- Dholakia, N., Fritz, W., Dholakia, R. R., & Mundorf, N. (2002). Online marketing: An introduction to the e-commerce revolution. In N. Dholakia, W. Fritz, R. R. Dholakia, & N. Mundorf (Eds.), *Global e-commerce and online marketing: Watching the evolution* (pp. 1-13). Westport, CT: Quorum Books.
- Eccleson, P. (1999). New technology briefing: An overview of the Internet. *Interactive Marketing*, 1, 68-75.
- The Economist. (2004). Leaders: E-commerce takes off. *The Economist*, 3712(8375), 9.
- Fellenstein, C., & Wood, R. (2000). *Exploring e-commerce, global e-business, and e-societies*. Upper Saddle River, NJ: Prentice Hall PTR.
- Fuller, K. (2001). ICANN: *The debate over governing the Internet* (Duke Law and Technology Review. IBRIEF/Media and Communications. Rev. 0002). Retrieved April 10, 2005, from <http://www.law.duke.edu/journals/dltr/articles/2001dltr0002.html>
- Füstös, J. T., & López, L. M. (2004). Legal aspects of e-commerce practices in the United States and the European Union. *Competitiveness Review*, 14 (1/2), 96-101.
- Global Reach. (2004). *Forrester projects \$6.8 trillion for 2004*. Retrieved February 1, 2005, from <http://www.glreach.com/eng/ed/art/2004.ecommerce.php3>
- Government Finance Review. (2004). New e-commerce reports underscore need for simplified sales tax system. *Government Finance Review*, 20(5), 5.
- Kim, J. (1998). Universal service and Internet commercialization: Chasing two rabbits at the same time. *Telecommunication Policy*, 22, 281-288.
- Mueller, M. (1999). ICANN and Internet governance: Sorting through the debris of self-regulation. *Info*, 1(6), 497-520.
- Nevaer, L. E. V. (2002). *The dot-com debate and the return to reason*. Westport, CT: Quorum Books.
- Par, D. (2003). *Internet governance in transition: Who is the mater of this domain?* Lanham, MD: Bowman & Littlefield.
- Sawabini, S. (2001). EDI and the Internet: Can two generations of e-commerce coexist? *Journal of Business Strategy*, 22(1), 41-43.
- Schneider, G. P. (2004). *Electronic commerce: The second wave*. Boston: Course Technology.
- Schone, S. (2004). M-commerce. *Computer Technology Review*, 24(10), 1-2.
- Timmers, P. (1999). *Electronic commerce: Strategies and models for business-to-business trading*. Chichester, UK: Wiley.



## KEY TERMS

**Digital Economy:** Economy based on digital technologies such as computer, software, and digital networks.

**Dot-Com Bubble:** The exaggerated enthusiasm in Internet companies with the overvaluation of high-technology stocks in the late 1990s.

**Dot-Com Company:** A company that conducts its primary business on the Internet. It is called dot-com company because the company's URL ends with ".com."

**Dot-Com Crash:** The stock market crash of Internet companies in 2000 and 2001, many of which failed during the crash. Those companies were overvalued before the crash.

**E-Commerce (Electronic Commerce):** The transaction of goods and services through electronic communications. E-commerce has two primary forms: B2B (business to business) and B2C (business to consumer).

**EDI (Electronic Data Interchange):** Exchange of business documents through computer networks in a standard format. It was the first generation of e-commerce, applied in B2B transactions before the availability of the Internet in its present form.

**Internet Economy:** Economy with revenues from the Internet or Internet-related products or services.

**M-Commerce (Mobile Electronic Commerce):** Using mobile devices (e.g., cell phones and PDAs) to conduct business transactions.

## ENDNOTE

- 1 Most studies classify e-commerce into two categories: B2B and B2C. However, some researchers use a four-type categorization of e-commerce: B2B, B2C, C2B (e.g., guru.com), and C2C (e.g., eBay). See Dholakia, Fritz, Dholakia, and Mundorf (2002, p. 4).

*This work was previously published in Encyclopedia of E-Commerce, E-Government, and Mobile Commerce, edited by M. Khosrow-Pour, pp. 559-564, copyright 2006 by Information Science Reference, formerly known as Idea Group Reference (an imprint of IGI Global).*