Electronic Commerce

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Abstract

Electronic commerce is the exchange, distribution, or marketing of goods or services over the internet. This entry first reviews electronic commerce adoption across U.S. industries. While the internet is used in most industries, it has only had a profound impact on a small number. Businesses that rely heavily on electronic commerce can be divided into four groups: retail, media, B2B, and other intermediaries. Each of these are discussed. The entry concludes with a discussion of some features of electronic commerce that are of special interest to economists: lower economic frictions, lower communication costs, lower marginal costs, and rich data.

JEL Classification: L81, L86

Electronic commerce

In this article, electronic commerce is the exchange, distribution, or marketing of goods or services over the internet.

There is, unfortunately, no standard definition used in the academic literature or the popular press. A broader definition would include all business facilitated by telephones, fax machines, televisions, and other technologies that are 'electronic'. This broad definition, however, becomes so large that it encompasses a substantial fraction of all economic activity over the past 50 years. A narrower definition would focus only on items sold over the World Wide Web, the browser enabled portion of the internet. This definition omits much of the important business-to-business segment of electronic commerce and the numerous advertising-supported websites.

The definition used here encompasses a variety of ways businesses have used the internet. The internet is a worldwide network of computers that connect to each other using the communication protocols defined by TCP/IP. Electronic commerce includes businesses that have used the internet to reach other businesses and to reach consumers directly. It includes businesses that sell products directly to their customers and businesses that function as intermediaries. This definition also includes both businesses that operate only online, the online business of those that operate both online and offline, and businesses that use the internet but it is not their primary business function.

While most attention has focused on those few businesses where the internet is a fundamental part of their strategy, electronic commerce is just one aspect of business processes for most businesses. As of 2000, nearly 90% of large U.S. establishments used the internet (Forman, Goldfarb, and Greenstein, 2002). Nearly all industries and cities had adoption rates well over 70%. For the vast majority of these establishments, the internet was used to send and receive email, to help automate some basic processes like inventory management, and/or for web browsing. This basic level of use was particularly important to establishments in rural areas (Forman, Goldfarb, and Greenstein, 2005). Overall, the impact on most industries from nursing homes to construction to furniture manufacturing to gasoline stations has been limited. The internet is used in day-to-day business activities, but it is a small piece in a much larger puzzle. Even in retail, the US Census reported that internet sales (totalling $26.3 billion) were just 2.7% of total US retail sales in the second quarter of 2006.

Still, a small portion of businesses have used the internet to enhance business processes at a deep level. While little research has examined why some industries adopted quickly and others did not, it is the businesses that adopted quickly that get the majority of the attention. The internet has had a profound effect on publishing, securities trading, some wholesaling, and some retailing (e.g. books and computers). In particular, businesses that rely heavily on electronic commerce can be divided into four (not necessarily mutually exclusive) groups: retail, media, business-to-business (B2B), and other intermediaries.

Retail: Electronic commerce represents the introduction of a new sales channel. While the size of the online channel is still small relative to the entire retail sector, electronic commerce has had a large effect on some retail markets. According to the US Census, internet sales made up over 10% of 2004 retail sales in two broad categories if online-only stores are included: electronics and appliance stores (NAICS 443) and sporting goods, hobby, book, and music stores (NAICS 451). Much of the literature on electronic commerce has focused on these categories plus motor vehicles and travel.

A new channel has the potential to create channel conflict. There is considerable evidence that consumers compare prices and options across channels (Prince, 2006; Ellison and Ellison, 2006). Forman, Ghose, Goldfarb (2006) show that use of the online channel depends on local offline retail options. Also, Hendershott and Zhang (2006) argue that manufacturers may face resistence from their retailers to setting up a direct online channel. They show that the benefits of selling directly to consumers (rather than though a retailer) depend on the relative online-offline search costs. The benefits of the online channel are largest for goods that are not widely available in

retail stores (i.e. high offline search costs) and for goods that do not need to be touched to assess quality (i.e. low online search costs).

Media websites: In addition to a new retail channel, the internet has provided a new media outlet. This outlet has developed a market structure similar to the magazine industry (Goldfarb, 2004). Media websites provide information to visitors and earn money (mostly) through advertising. In particular, entry is easy but distribution is difficult to achieve; concentration is largely determined by market size and distribution costs; large media conglomerates coexist with small niche players; and there is a high mortality rate. Online media appear to be particularly important to overcome local isolation (Sinai and Waldfogel, 2004). The two-sided nature of the media market and the digital nature of the product mean that competition between media websites is different in nature than competition between online retailers.

Intermediaries: According to Alexa.com, six of the top seven most popular websites in October 2006 had roles as intermediaries: Yahoo, MSN, Google, MySpace, YouTube, and eBay. While these intermediaries may share features of media websites (Google) or retailers (eBay), their primary business is to facilitate online interactions. Without physical storefronts or displays, intermediaries help individuals (and firms) find each other online. Intermediaries allow people with heterogeneous tastes to find better matches in terms of media, products, and people (Scott Morton, 2006).

B2B: Business-to-business electronic commerce is a relatively under-researched area, perhaps because of the difficulties in obtaining data. Still, B2B transactions are many times the size of

business-to-consumer transactions. Lucking-Reiley and Spulber (2001) summarize many of the key questions and opportunities in B2B electronic commerce including B2B exchanges, automatic ordering, and outsourcing. Some aspects of the internet, such as asynchronous communication, may be particularly important for international B2B interactions. Many of B2B applications can also be done on electronic data interchange (EDI) rather than the internet.

Key features of electronic commerce for general economic research

In addition to its widespread usage across industries and its profound impact on a small set of them, there are a number of features of electronic commerce that make it a particularly interesting area of study for economists.

Lower economic frictions: The internet reduces a number of economic frictions that are often cited as key contributors to observed imperfections in markets. To the consumer, search and switching costs are reduced substantially. To the firm, menu and distribution costs may fall.

For consumers, the internet makes it relatively easy to search through several retail options. Instead of having to walk store to store, consumers can simply click from one company to another without leaving their desks. Furthermore, a number of intermediaries exist that reduce search costs even further. These ‘shopbots’ allows consumers to compare prices and features from several websites during a single keyword search. In addition to lower search costs, switching costs are also lower online than offline. It is not difficult to switch from one competitor to another. Much of the earliest research examining electronic commerce focused on why price dispersion persisted in this environment. Broadly speaking, this literature concluded

that, all else equal, search and switching costs are lower online; however, firms created search and switching costs to overcome this challenge (Ellison and Ellison, 2004). Consequently there is still substantial price dispersion online. Still, low search costs do not mean zero search costs. Visibility matters to the long-term prospects of any business-to-consumer company. Many early internet companies struggled because they misinterpreted low search costs as zero search costs, mistakenly assuming customers would arrive once they set up the website.

Firms also benefit from lower frictions online. In particular, the menu costs of changing prices and updating product offerings are much lower online than offline. In addition to the reduction in menu costs, some firms benefit from lower distribution costs: for digital goods (i.e. music, news, and images) online distribution costs are near zero. Low menu costs combined with the digital nature of many online products allow for mass customization of products (Murthi and Sarkar, 2003) and creative bundling, licensing, versioning, and pricing strategies. Shapiro and Varian (1999) and Bakos and Brynjolfsson (1999) provide examples of a number of situations in which online firms are better able to match customers needs and therefore are better able to price discriminate.

Lower communication costs: The internet reduces communication costs considerably. It provides an additional means of communication that creates new potential to interact with customers, suppliers, and with other branches of the same firm. Internet communication differs from telephone communication in two primary ways. First, the marginal cost of communication is effectively zero, even over long distances. While establishing a connection is costly, each additional email, web page viewed, and instant messaging interaction has no monetary cost to the

communicator. Second, internet communication is often asynchronous. Unlike telephone communications, the people communicating do not necessarily have to be available at the same time. This has many important applications. For example, it facilitates communication across time zones. Together, these features of internet communication mean that geography may be less important online. Given access, people can communicate with any other person who has access, irrespective of location. Still, despite the substantial fall in long distance communications costs, most online communication is local because social networks are local (Wellman, 2001).

Lower marginal costs: Many goods sold over the Internet are digital in nature (e.g. newspaper content, music, information). The marginal cost of replication for digital goods is near zero. Depending on the particular good, fixed costs may be high (software) or low (blogs). Shapiro and Varian (1999) discuss the economics of goods with high fixed and low marginal costs in detail. If fixed costs are high enough, this cost structure allows monopolists with broad flexibility in pricing, versioning, and bundling policies. It also leads to substantial economies of scale and incentives to sell a broad scope of products. In markets with more than one player, this cost structure can lead to fierce competition and little profit. If fixed costs are low and entry is easy then prices should approach zero.

One misunderstood aspect of electronic commerce is that many internet business models did not benefit from low marginal costs, and therefore had no cost advantage over offline competition. Low marginal costs only apply to digital goods and services. In the late 1990s, many companies failed because their business models shipped heavy items to consumers. For example, taking orders for pet food and shipping it to customers involves very high marginal costs per item sold.

Rich data: By definition, all online activity is digital. This means that it is relatively easy to record and store information on the behavior of consumers and firms online. In contrast, it is extremely expensive to track all of a shopper's activity in a typical offline store. Online, however, every item browsed and the time spent looking is easily recorded. This presents an opportunity for both firms and researchers. Firms can use this data to better understand their customers leading to more effective customization. Researchers can use this data to answer many questions that previously could not be answered due to data constraints. Online data has greatly enhanced of our understanding of a number of economic concepts including auctions (e.g. Bajari and Hortacsu, 2004), the economics of information (e.g. Jin and Kato, 2005), and social interactions (e.g. Mayzlin and Chevalier, 2006).

In summary, this entry has identified some important features of electronic commerce and the some of the main areas of related economic research. Useful surveys of electronic commerce and related subjects include Scott Morton (2006), Hendershott (2007), and Ellison and Ellison (2005).

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Suggested cross-references: price dispersion, computer industry, economics of the internet, information technology and economic growth

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