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★ 21 世纪高等学校系列教材

# 电子商务英语教程

English for Electronic Commerce

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## 内 容 简 介

本书是为电子商务专业本科生和研究生进行专业英语学习而编写的。其目的在于使学生通过英语原文的学习,了解其语言特色和写作风格,为阅读信息科学和相关专业英文原版资料做准备,同时通过学习本书所选时文,读者不仅可以掌握电子商务的基本面貌,还有助于翻译、撰写英语科技论文。

本书共分 20 个单元,主要包括电子商务的基本理论、基本应用、实用技术和与电子商务相关的法律问题等四大方面。

本书除适用于电子商务专业之外,还可作为管理信息系统、信息应用、经济与管理类专业学生和其他英语爱好者从英语角度学习和了解电子商务的参考书。

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# Unit I

## Electronic Commerce(EC) Theory

The term electronic commerce is heard frequently in modern society. It is one of the most common business terms in use as we embark on the 21 century. So what exactly is electronic commerce or will it be just another overused and discarded buzzword? This section is intended to clear the ground and examines the definition of electronic commerce and introduces its framework and classification

### Section A

#### Definition of Electronic Commerce

One only has to pick up virtually any newspaper or business-related magazine to see a story about some facet of electronic commerce. Businesses are incorporating electronic commerce into strategic plans, business schools are incorporating it into their curriculum, and consulting and software firms are marketing electronic commerce “solutions.” So what exactly is electronic commerce? Different people define this term in different ways or from different perspectives. Electronic commerce is an emerging concept that describes the process of buying and selling or exchanging of products, services, and information via computer networks including the Internet. Kalakota and Whinston define EC from these perspectives:

From a communications perspective, EC is the delivery of information, products/services, or payments over telephone lines, computer networks, or any other electronic means.

From a business process perspective, EC is the application of technology toward the automation of business transactions and work flow.

From a service perspective, EC is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.

From an online perspective, EC provides the capability of buying and selling products and information on the Internet and other online services.

The term commerce is viewed by some as transactions conducted between business partners. Therefore, the term electronic commerce seems to be fairly narrow to some people. Thus, many

use the term e-business. It refers to a broader definition of EC, not just buying and selling but also servicing customers and collaborating with business partners, and conducting electronic transactions within an organization. According to Lou Gerstner, IBM's CEO: "E-business is all about cycle time, speed, globalization, enhanced productivity, reaching new customers and sharing knowledge across institutions for competitive advantage."

Some define electronic commerce as: The use of electronic transmission mediums (telecommunications) to engage in the exchange, including buying and selling, of products and services requiring transportation, either physically or digitally, from location to location.

Electronic commerce involves all size of transaction bases. As one would expect, electronic commerce requires the digital transmission of transaction information. While transactions are conducted via electronic devices, they may be transported using either traditional physical shipping channels, such as a ground delivery service, or digital mechanisms, such as the download of a product from the Internet.

Liqi, a professor and expert in this field defines EC from the perspective of productive force. He thinks there should be two kinds of definitions. The broader definition is that electronic commerce is the employment of electronic tools in commercial activities. These electronic tools range from telegram, telephone of early times to NII, GII and INTERNET of modern times. The commercial activities here refer to all lawful activities of demand and consumption except for typical production process. The narrower definition is that electronic commerce is the whole process in which people, who master information technology and business regulations and rules, systematically use electronic tools and efficiently and low-costly engage in all kinds of activities centering on the exchange of commodities and services in a highly technically and economically advanced society. The first definition can be simplified as commercial electronization, the second can be shortened as electronically commercial system.

## Electronic Business

The term electronic commerce is restricting, however, and does not fully encompass the true nature of the many types of information exchanges occurring via telecommunication devices. The term electronic business also includes the exchange of information not directly related to the actual buying and selling of goods. Increasingly, businesses are using electronic mechanisms to distribute information and provide customer support. These activities are not "commerce" activities, but "business" activities. Thus, the term electronic business is broader and may eventually replace the term electronic commerce. Although the term electronic commerce is used throughout this book, many of the activities described are more accurately classified as electronic business.

Those readers familiar with traditional electronic data interchange systems (EDI) may be questioning what makes electronic commerce different from the EDI systems that have been in place for the past 20-30 years. EDI is a subset of electronic commerce. A primary difference

between the two is that electronic commerce encompasses a broader commerce environment than EDI. Traditional EDI systems allow pre-established trading partners to electronically exchange business data. The vast majority of traditional EDI systems are centered around the purchasing function. These EDI systems are generally costly to implement. The high entry cost precluded many small and mid-sized businesses from engaging in EDI. Electronic commerce allows a marketplace to exist where buyers and sellers can “meet” and transact with one another. Chapter four more clearly traces the evolution of traditional EDI to electronic commerce.

The Internet and the WWW provide the enabling mechanisms to foster the growth of electronic commerce. The actual and projected growth rates and uses of the Internet indicate that electronic commerce is no passing fad, but rather a fundamental change in the way in which businesses interact with one another and then-consumers one only needs to look at Boeing and General Electric. Prior to its web-based site, only 10 percent of Boeing’s customers used its EDI system to order replacement parts. In 1998, Boeing reported that it received \$100 million in orders of spare parts through its web site. General Electric Company’s 1997 Internet activity clearly demonstrates that electronic commerce can provide substantial, tangible benefits to a firm when implemented properly. In 1997, General Electric purchased approximately \$1 billion worth of supplies using the Internet. Some benefits that General Electric has realized due to its Internet procurement system are a 50 percent reduction in the purchasing cycle and a 30 percent reduction in processing costs.

## The Framework of EC

Many people think EC is just having a Web site, but EC is more than that. There are a dozens of applications of EC such as home banking, shopping in online stores and malls, buying stocks, finding a job, conducting an auction, and collaborating electronically on research and development projects. To execute these application, it is necessary to have supporting information and organization infrastructure and systems. The EC applications are supported by infrastructures, and its implementation is dependent on four major areas: people, policy, technical standards and protocols, and other organizations.

### Classification of the EC Field by the Nature of the Transactions

A common classification of EC is by the nature of transaction. The following types are distinguished:

**Business-to-business (B2B).** Most of EC today is of this type. It includes the IOS transactions and electronic market transactions between organizations.

**Business-to-consumer (B2C).** These are retailing transactions with individual shoppers. The typical shopper at Amazon. com is a consumer, or customer.

**Consumer-to-consumer (C2C).** In this category consumer sells directly to consumers.

Examples are individuals selling in classified ads (e.g. [www.classified2000.com](http://www.classified2000.com)) and selling residential property, cars, and so on. Advertising personal services on the Internet and selling the knowledge and expertise is another example of C2C. Several auction sites allow individuals to put items up for auctions. Finally, many individuals are using intranets and other organizational internal networks to advertise items for sale or services.

**Consumer-to-business (C2B).** This category includes individuals who sell products or services to organizations, as well as individuals who seek sellers, interact with them, and conclude a transaction.

**Nonbusiness EC.** An increased number of nonbusiness institutions such as academic institutions, not-for-profit organizations, religious organizations, social organizations, and government agencies are using various types of EC to reduce their expenses (e.g., improve purchasing) or to improve their operations and customer service.

**Intrabusiness (organizational) EC.** This category includes all internal organizational activities, usually performed on intranets, that involve exchange of goods, services or information. Activities can range from selling corporate products to employees to online training and cost-reduction activities.

Note that what we described as IOS is a part of B2B. Electronic markets, on the other hand, can be associated either with B2B or with B2C.

## Vocabulary & Phrases

perspectives	n.	视角, 角度	encompass	v.	包括
incorporate	v.	体现, 收编, 编入, 放进	mall	n.	林荫道
discard	v.	放弃, 抛弃	infrastructure	n.	基础设施
buzzword	n.	被在一时间广泛传播的词	protocol	n.	协议
solution	n.	解决方案	auction	n.v.	拍卖
automation	n.	自动化	intranet	n.	内部网, 企业网
enhance	v.	增加	internal	adj.	内部的
substantial	adj.	大量的	interact	v.	互动
tangible	adj.	具体的	corporate	adj.	公司的
via	prep.	经过, 通过	intrabusiness	adj.	企业内部的
expertise	n.	专门的知识或经验	nonbusiness	adj.	非企业的
digital	adj.	数字的	curriculum	n.	课程
transmission	n.	传输	framework	n.	框架, 架构
mechanism	n.	机制, 方式	retail	v.	零售
subset	n.	部分	residential	adj.	居民的

## Notes

1. IBM

一家美国大型电脑公司

2. CEO

(chief executive officer) 首席执行官

3. EDI	(electronic data exchange) 电子资料/数据交换
4. IOS	(internetworking operation system) 互联网络操作系统
5. WWW	(world wide web) 万维网
6. Boeing	一家美国大型公司, 主要生产飞机
7. General Electric Company	一家主要生产汽车的美国公司
8. NII	(national information infrastructure) 美国信息高速公路; 美国国家信息基础设施; 全美信息基础设施
9. GII	(global information infrastructure) 全球信息高速公路, 全球信息基础设施
10. INTERNET	国际互联网

## Exercises

### I. Put the following English expression into Chinese.

1. incorporate electronic commerce into strategic plans
2. electronic commerce "solutions"
3. reaching new customers
4. competitive advantage
5. traditional physical shipping channels
6. cost-reduction activities

### II. Give the English equivalents of the following.

- |               |                  |
|---------------|------------------|
| 1. 电子商务基础设施   | 2. 基于内部网的组织的内部活动 |
| 3. 组织间电子市场交易  | 4. 增加生产力         |
| 5. 利用电子手段分配信息 | 6. 买和卖的过程        |

### III. Translate the following passage into Chinese.

Many people think EC is just having a Web site, but EC is more than that. There are a dozens of applications of EC such as home banking, shopping in online stores and malls, buying stocks, finding a job, conducting an auction, and collaborating electronically on research and development projects. To execute these application, it is necessary to have supporting information and organization infrastructure and systems. The EC applications are supported by infrastructures, and its implementation is dependent on four major areas: people, policy, technical standards and protocols, and other organizations.

### IV. Translate the following sentences into English.

1. 有些人认为电子商务只不过又是一个被滥用而后被丢弃的时髦词。
2. 电子商务这个词有些局限, 不能充分涵盖许多通过远程通信设施所进行的信息交流的性质。



3. 更多的非企业机构，比如学术机构，非赢利组织，宗教组织，社会组织和政府机构采用种种电子商务形式降低成本或改善运作。

4. 电子事务比电子商务更宽泛，它包含所有的通过电子手段进行的信息交流活动。

## Section B

### Potential Benefits of Electronic Commerce

In order for businesses to invest resources to engage in electronic commerce, the benefits must exceed the costs. So what benefits can businesses potentially gain from engaging in electronic commerce?

- ◆ Internet and web-based electronic commerce is more affordable than traditional EDI;
- ◆ Internet and web-based electronic commerce allows more business partners to be reached than with traditional EDI;
- ◆ Internet and web-based electronic commerce can reach a more geographically dispersed customer base;
- ◆ procurement processing costs can be lowered;
- ◆ cost of purchases can be lowered;
- ◆ reductions in inventories;
- ◆ lower cycle times;
- ◆ better customer service; and
- ◆ lower sales and marketing costs

The first three benefits are relative benefits of Internet and web-based electronic commerce over traditional EDI methods. The cost and installation of EDI systems is generally quite high, and it has typically only been beneficial to larger firms that have enough sales volume to justify the costs of developing their own networks or subscribing to a value-added network. A value-added network (VAN) is a service to which a firm can subscribe. VANs provide many services, including data transmission, EDI translation, and store and forward messaging of transaction data. VANs and the other services they provide are discussed in greater detail in chapter four. Because of the low cost of connecting to the Internet, medium and small businesses can now afford the connection cost. Further, because of software developments that allow web-based EDI systems to interface with traditional EDI systems, businesses of all sizes can now transact with one another. This vastly expands the number of potential electronic business partners, some of which may be a substantial, geographical distance away. The Internet offers a greater choice of global partners with which to conduct electronic commerce.

Procurement costs can be lowered by traditional EDI systems by consolidating purchases, developing relationships with key suppliers, negotiating volume discounts, and greater integration

of the manufacturing process. Internet electronic commerce offers additional benefits and potential for cost reductions over traditional EDI. Procurement costs can be lowered for all companies, regardless of size, due to the increased ability to transact electronically with one another. Data transmission costs can be lowered. A wider net can be cast when searching for suppliers. Options for partnering with other firms increase. For example, small and mid-sized companies benefit because they are now able to conduct business with the larger firms that are casting the wider nets. The smaller firms also have the opportunity to reduce their processing costs by using integrated electronic processing systems. As mentioned earlier, General Electric realized a 30 percent reduction in the processing costs of its procurement cycle. The cost of the items purchased can also be lowered due to the ability to seek out and negotiate with a greater number of suppliers. Because of this, General Electric was able to reduce its cost of purchases by 20 percent. By 2000, General Electric estimates that the potential savings from its Internet procurement system will reach \$500 - \$700 million.

A reduction in inventory is desirable because of the associated reductions in storage, handling, insurance, and administrative costs. Internet electronic commerce can help firms to more optimally order the inventories by electronically linking suppliers and purchasers together and allowing them to share updated production forecasts and projected inventory levels in order to allow both parties to collaboratively “fine-tune” their production and delivery schedules. Businesses can also use the Internet to “unload” unwanted inventory or sell excess capacity very quickly and with extremely low marketing costs. Both American Airlines and US Air determine on a weekly basis which flights have excess capacity and offer “last-minute” (actually two to three days notice) deals to Internet subscribers of this service via e-mail. This strategy allows these airlines to reduce the excess capacity on these flights and generate additional revenues.

The production cycle time is the time it takes a business to build a product beginning with the design phase and ending with the completed product. Internet electronic commerce is enabling the reduction of the cycle time by allowing engineers and production teams to electronically share design specifications for initial approval and refinement processes. In addition to reducing the design and production phases, lower cycle times also reduce the amount of fixed overhead that needs to be allocated to each unit produced, thus positively affecting the ability to pass cost savings on to the customer or to achieve higher net earnings.

Customer service can be enhanced using Internet electronic commerce by helping the customer to access information before, during, and after the sale. Before the sale is made, customers can electronically retrieve product specifications, quantity, and pricing information. During the product/service fulfillment cycle, customers can electronically check on the status of the order. Support services for custom's are also enhanced by electronic services, such as electronic notification of returned items and the ability to download and print the necessary documentation and shipping labels to return an item for servicing. Convenience and reduced processing costs result for both the buyer and seller.

The omnipresent nature of the Internet allows firms to reach many customers in a very

low-cost fashion. Some firms are able to shift some of their sales and marketing functions to electronic processes. This shift in communication mediums allows the firm to either reduce their overhead costs or better utilize their human resources to engage in building customer relations rather than performing tedious sales processing tasks.

Businesses are not the only benefactors of Internet electronic commerce; consumers may also reap benefits from using the Internet. Some benefits that consumers may expect to receive are:

- ◆ increased choice of vendors and products;
- ◆ convenience from shopping at home or office;
- ◆ greater amounts of information that can be accessed on demand;
- ◆ more competitive prices and increased price comparison capabilities; and
- ◆ greater customization in the delivery of services.

Customers have an increased choice of vendors because they are no longer geographically constrained by a reasonable walking or driving distance. Customers have a greater choice of services they can receive from global Internet companies. For example, a foreign-born resident of the U.S. may subscribe to an electronic news service from his/her home country and receive an electronic “newspaper” on a daily basis that is sent directly from his/her home country’s news service. Regarding product selection, virtual stores such as Amazon.com offer consumers with a choice of over 2.5 million titles; physical stores do not have the physical retail space, nor is it feasible, to stock that many titles in each physical retail establishment.

The convenience of shopping at home allows consumers to shop when it is convenient for them and not during the store hours. For handicapped or ill consumers, the ability to shop from home opens up new shopping opportunities and offers greater convenience. The capability of employees to shop on-line from their office is viewed as a benefit by some and as a detriment by others, and both sides have valid points. Whether the availability to access the Internet for personal use is abused or misused by an employee depends on the employee’s personal characteristics and work ethic. For busy employees that work long-hours, the ability to take care of some errands may ease their tension and allow them to actually devote more time that is of better quality to their tasks. For example, busy workers facing overtime may need to complete some personal errands, including grocery shopping, buying and mailing a birthday present, and retrieving some income tax forms to complete their tax return. While these errands may require a total time of two hours if done physically, they may all be conducted on the Internet in 15-20 minutes total. Thus, if employees can perform these tasks during their lunch hour, they may still have time to eat, reduce stress regarding their personal life, and feel better prepared to face the rest of the day’s workload.

Consumers now have greater access to information that is provided on line, and this translates into greater buying power.

Search engines and intelligent agents are making the process of sorting through information and conducting price comparisons increasingly easier. Information is buying power to consumers,

and the Internet is unleashing access to vast amounts of information. How will Internet vendors compete if price comparison is so easy ? They are quickly learning that service and reliability are also important. Amazon.com does not just sell books and music, it provides book and music reviews, suggests other books that may be of interest based on the books being examined, and provides sound clips for many of the music titles. It also provides inventory status and expected shipping time.

Internet electronic commerce also offers customers the chance to customize many of the products/services offered by merchants. For example, many on-line news services allow their customers to “design” the look of their daily newspaper. The Morning Paper ([www.boutell.com/morning](http://www.boutell.com/morning)) allows on-line users to pre-specify their favorite web sites. Each morning, a “morning paper” is delivered electronically to the user with updates that have occurred on their favorite web sites.

I . Answering the following questions based on what you have heard in the recording.

1. Compared with EDI, what are the benefits of Internet and web-based electronic commerce ?

2. Can you simply list 3 or 4 benefits that EC brings to business ?

3. Can you simply list 3 or 4 benefits that EC brings to customers ?

II . State your own opinion and discuss with your partner(s).

1. What other benefits do you think is not mentioned in this article?

2. In what way do you think small and mid-sized companies can benefit from EC ?

## Section C

### Projecting the Economic Impact of the Internet

In just a few years, the Internet has had a visible impact on the daily lives of many Americans—at work, at home, and how they communicate with one another. But a key policy question for the future is: How will the Internet affect the performance of the economy and the standard of living of average Americans? In particular, is the Internet just a different way to communicate (an alternative to phone, fax, or mail) and thus not likely to have a fundamental impact on the functioning of the economy, as some skeptics have claimed? Or will it be a significant factor in sustaining the remarkable increase in productivity recorded since the mid-1990's, as many executives and venture capitalists in the industry, and some economists, seem to believe?

The answer to these questions cannot be resolved any time soon with standard econometric

techniques because e-commerce is too recent a phenomenon (and still too small in relation to standard economic activity) to be modeled in any defensible way. A different approach, therefore, seems called for, one that attempts to extrapolate judgmental estimates of the likely impact of the Internet at the industry level based on estimates by individual firms and analysts, suitably adjusted where appropriate, and then adds up the results to see what they imply for the overall economy.

That is the approach we have pursued over the past year with a team of researchers, primarily but not exclusively from some of the nation's leading business schools. Our research team focused on eight sectors, which collectively account for about 70 percent of the nation's GDP on a value-added basis: automobile manufacturing and sales, non-auto manufacturing, higher education and private-sector training, financial services, government, health care.

Our findings are necessarily speculative but, we believe, not unduly so. Indeed, some of those in the high-tech community with whom we have discussed our results believe we may be too conservative, especially given the relative infancy of the Internet, its growing penetration rate, and steadily increasing speed of access. Our quantifiable estimates refer only to projected cost savings from the networking of computers, either through the Internet or company intranets (which, for convenience, we lump under the single term, "Internet"). Thus, they do not count the unmeasured and often important gains to consumers from added convenience, wider product mix, and customization that the Internet makes possible. Nor do the estimates include the already significant savings that have been generated by large productivity increases in the computer and software industries.

The cost savings are largely projected to be one-time savings for each firm that achieves them, although in practice, such savings may be spread over time in individual firms, while at the sector level a process of diffusion from first-adopters to followers should generate the pattern of annual productivity savings we estimate. We were not able to collect data on investment expenditures required to achieve these savings. However, the limited available evidence suggests that successful implementation of Internet-based cost-savings strategies requires far more in the way of organizational commitment than actual investment spending. Accordingly, the absence of investment data is not, in our view, a serious drawback, and in any event, there is not likely to be a large difference between labor and multi-factor productivity improvement based on these savings. Finally, our estimates refer to the potential gains available in the sectors of the economy that use the Internet, or the vast portion of the economy, rather than the relatively much smaller Internet-producing sector (where stock prices have fallen sharply since the "Internet bubble" burst in the spring of 2000). Whether, and at what pace, the potential cost savings and thus productivity improvements will be fully realized depend on a series of factors that are discussed toward the end of this paper.

## I. Sources of Potential Cost Savings

In principle, the Internet has the potential to increase productivity growth in a variety of distinct, but mutually reinforcing ways:

(i) by significantly reducing the cost of many transactions necessary to produce and distribute goods and services;

(ii) by increasing management efficiency, especially by enabling firms to manage their supply chains more effectively and to communicate more easily both within the firm and with customers and partners; and

(iii) by increasing competition, making prices more transparent, and broadening markets for buyers and sellers, which puts pressure on suppliers to adopt techniques that translate, into cost savings.

Our research team found evidence of these effects in many, if not most, of the sectors examined.

### A. Transactions-Cost Savings

Patricia Danzon and Michael Furekaw found in their study that the potential for transactions-cost savings from transition to the Internet is especially high in the health-care sector, because it is so large (14 percent of GDP), so information-intensive, and so dependent on paper records. Moving health-insurance claims processing to the Internet would require aggressive efforts to standardize claims formats, but savings could be large. One of the providers of the current system. Electronic Data Interchange (EDI), alleges that it can reduce the cost of processing from \$10-15 per paper claim to \$2-4 per EDI claim. Web-based processors may be able to deliver the same service for 2-4 cents per claim. Only about 40 percent of doctors' claims are now processed electronically, leaving much to be improved through the Internet.

The Internet also offers great potential in the area of managing medical records, not only for cutting costs, but also for improving the quality and effectiveness of care. Assuming that privacy concerns can be adequately addressed, patients and providers would benefit enormously from conversion of current, mostly paper, medical records into electronic medical records in a standard format. Providers would then be able to access the patient's full medical history quickly and enter their own observations and treatments.

Transactions are the bread and butter of the financial-services industry, and so it is not surprising that Eric Demons and Loren Hitt find ways that the Internet already is leading to lower transactions in this sector. While securities trades are cheaper to process on-line (hence the bargain-basement commissions), some of the cost reduction is being offset by increased advertising and marketing costs of the new entrants. In the mortgage lending industry, customers are using the Internet to shop for information and compare rates, although only a tiny fraction of mortgages now originate on-line, where it is cheaper to process them. This should change over the next few years as consumers grow more comfortable using "digital signatures", now legal under a law signed by President Bill Clinton in June 2000. There also are savings from lower costs of electronic bill presentment and payment, which are significantly cheaper than paper-based methods (although the progress toward electronic banking and bill payment in particular so far has been slower than many expected).

Perhaps surprisingly, Jane Fountain finds that the Internet can reduce transactions costs at all levels of government. In particular, the Internet has enormous potential, now only beginning to be realized, for dispensing information to citizens less expensively and more accurately than telephone inquiries. Filing tax returns or applications for permits and licenses on-line, for example, cuts costs both to the government and to taxpayers.

### **B. The Internet and Efficient Management**

The use of the Internet as a management tool may have considerable potential for improving efficiency in many sectors of the economy and may cause significant restructuring of those sectors in the process, especially in the manufacturing sector. Many of the potential efficiency gains come from use of Web-based technology to manage supply chains more effectively, reduce inventory, and cut customer-service costs. These savings should show up within the firm and arise from better scheduling for information-sharing across the company, more efficient interaction with other firms in the supply chain, and elimination of some intermediaries altogether. Cisco Systems, for example, has been a leader in dealing with suppliers on the Web to enhance efficiency of its procurement and in monitoring the company's extensive outsourcing of its manufacturing operations.

The Internet is also being used effectively in a number of industries to link partners in joint enterprises across large distances, enabling them to share production schedules and integrate their operations. Charles Fine and Daniel Raff find numerous potential opportunities in the auto industry for Internet-aided increases in efficiency, product development, procurement, and supply, and in various aspects of the manufacturing process itself. They suggest the applicability to automobiles of the "Dell model", under which customers specify exactly what features they want and buy a product that is built to suit their tastes. The Internet-driven automobile sector of the future could thus involve far fewer dealers and salesmen than it does now (especially if state franchise laws are changed).

### **C. Translating Enhanced Competition into Cost Savings**

One of the major features of the Internet revolution is its potential to make the whole economic system, nationally and internationally, more competitive by bringing many markets closer to the economists' textbook model of perfect competition, characterized by large numbers of buyers and sellers bidding in a market with perfect information. The results should be lower profit margins, more efficient production, and greater consumer satisfaction-findings reached by virtually all of our sector analysts. In particular, added competition in supplier and product markets should place increased pressure on firms to use the Internet to introduce the cost-savings techniques already mentioned.

## **II. Nonmeasured Benefits**

It is vital not to overlook the variety of benefits to end-users of the Internet, including

added convenience, wider choice, and customization, that are not and probably will never show up in the productivity statistics. For example, given the prominence of a few Internet retailers, such as Amazon.com and buy.com, and the exponential growth of retail Internet sales from a tiny base, one might have expected our analysts to project significant increases in retail competition and productivity. Joseph Bailey, however, finds retail Internet sales insignificant (about 1 percent of retail sales at the beginning of 2000) and unlikely to surpass 10 percent of the total in the foreseeable future. He points out that Internet and conventional retailers are becoming more like each other and that the “hybrid” retailer will become the dominant type, but he does not foresee a significant impact on productivity. At the same time, Bailey notes that the Internet will continue to provide customers with wider choices among customized products and services (ordering Dell computers on-line is a perfect demonstration).

In fact, the Internet is leading to increased convenience by end-users in virtually every sector examined in our study. As Austan Goolsbee documents, distance learning, while perhaps not adding much in the way to productivity, is being used by firms and an increasing number of colleges to deliver education at times convenient to students, without having them physically attend the courses. An increasingly Internet-based medical system will save lives by, among other things, cutting down on errors in transmitting prescriptions to pharmacies. However, new federal privacy regulations may slow down (or even halt) further development of centralized health-data repositories that doctors and hospitals can use to cut the time of gaining such information and to reduce diagnostic errors because of a lack of full information about a patient’s medical history. Meanwhile, as citizens gradually will come to learn, doing business with the government over the Internet will be far easier and certainly less time-consuming than having to show up in person.

### III. Adding It Up

What is the bottom line—the expected magnitude of the potential productivity benefits of the Internet? Recognizing that our results generally rest on extrapolations from limited numbers of firms or entities in each sector and, moreover, that there is much about the Internet that has been and will continue to be difficult to predict, we nonetheless reach a rough estimate: a total annual cost saving on the order of \$100-230 billion. The range reflects the uncertainty about the ultimate impact. Nonetheless, the range implies that in a roughly \$10 trillion economy, the total cost saving will be about 1-2 percent, which over five years translates into an annual contribution to productivity growth of 0.2-0.4 percent. This does not mean that productivity will actually increase by this amount from its remarkable trend growth of roughly 3 percent between 1995 and 2000, but simply that, whatever the baseline turns out to be, the Internet could add 0.2-0.4 percent to that number.

How does our total estimate break down? In some cases, it is a mistake to look to the benefits within a particular sector, for example, the trucking industry. For this sector, a team of researchers from the University of Michigan has found that while the Internet is radically improving the efficiency of road transportation (through improved scheduling and higher load



factors), the benefits of better transportation, perhaps as much as \$75 billion, overwhelmingly should show up in sectors that use trucking services (with modest additional cost savings of perhaps \$5 billion realized within trucking).

In other sectors, however, the estimated benefits are likely to be realized almost entirely within the sector. Danzon and Furekawa estimate potential savings of \$20 billion in the medical industry from improvements in the processing of health-insurance claims alone, Clemons and Hitt (2001) reach a similar figure for potential transactions-costs savings throughout the financial-services industry. Jane Fountain conservatively estimates annual savings in the government sector of \$12 billion. Meanwhile, on the assumption that the typical manufacturing firm is considerably less successful than industry leader Cisco in achieving Internet-based savings, Andrew McAfee projects total savings in manufacturing over the next five years of \$50-100 billion, or 1-2 percent of total costs. Within manufacturing, Fine and Raff are more optimistic about automobiles, where the estimated savings reach 13 percent.

To what extent and how rapidly these estimated gains might be realized will depend on a number of factors. Since the cost savings result from activities internal to firms, the pace of change will depend on how cooperative and often bureaucratic cultures (especially in the case of government) adjust to the Internet. Presently (January 2001) U.S. economic growth is slowing markedly, and some have speculated that the downturn in investment in software and hardware will slow the rate at which the Internet is likely to improve productivity growth. However, it is just as likely that any downturn would have the opposite impact: speeding up the desire of firms facing a profits squeeze to cut costs by making more intensive use of Internet-related technologies.

Of course, other factors also will be important. The penetration rate of Internet access, especially broadband, will affect the extent to which firms face intense competitive pressure to change existing management methods, among other practices. In addition, policy will play a role. In particular, measures to improve privacy protection for Internet users generally would increase the volume of e-commerce and thus reinforce competitive pressures on firms to adopt cost-saving technologies, while delivering nonmeasured gains in convenience and customization at a faster pace.

Will the demise of so many dot.com's reduce pressure on traditional firms to change their practices? This is not likely. To the contrary, the innovations introduced by many of the dot.com's, especially those specializing in business-to-business (B2B) commerce, have been seeping rapidly into what were once thought of as "old economy" enterprises. General Electric, for example, is restructuring all of its business units to take advantage of the Internet in all dimensions, form relationships with suppliers and design of products. To interact with consumers, other firms are certain to follow.

#### IV. Conclusion

The accumulating evidence in the eight sectors examined in the Brookings Internet study