

## Commerce in the Digital Age

by

Robert E. Litan<sup>1</sup>

Its proponents have proclaimed it to be one of the most important revolutionary forces to arrive on the economic landscape in generations. Its skeptics believe this claim to be vastly overstated. But judging by the enormous amount of energy and attention that private actors and the press are paying to “electronic commerce” or “e-commerce”, the subject is both highly topical and controversial.

Actually, much commercial activity already occurs “electronically” through other means. Businesses have been buying and selling to each for nearly two decades using Electronic Data Interchange (EDI). In the United States, banks transfer several trillions of dollars each day “over the wire” through the major large-dollar clearing systems, CHIPS and Fedwire. Similarly vast sums are sent electronically by European and Japanese banks over their countries’ payments systems.

The current excitement, however, is over the actual and potential use of the *Internet* to order and pay for goods and services “on-line”, both by businesses and consumers, and that is my focus in this paper. I begin by briefly summarizing the widely divergent projections of the growth of e-commerce. In the second section, I discuss the principal reason for the wide variation in these projections: differences in opinion regarding certain legal, technical and behavioral impediments to the faster growth of electronic commerce. The third section suggests how these problems are likely to be solved, at least in the United States. The last section attempts to describe some of the implications that the growth and diffusion of e-commerce are likely to have for consumers, producers and policy makers.

### Electronic Commerce: How Much And How Fast?

There are no official statistics on the amount of commerce conducted over the Internet, but there is wide agreement among knowledgeable observers that the *consumer* total is, at most, about \$1 billion annually *worldwide*, a proverbial drop in the ocean of economic activity. Moreover, e-commerce to date has been restricted to a small corner of the economic universe: sexual materials, gambling, travel services, books and CDS -- most likely in that order.

---

<sup>1</sup>Director, Economic Studies Program, The Brookings Institution. This paper draws on a forthcoming book, Going Digital!, co-authored with William Niskanen, to be co-published by the Brookings Institution and the Cato Institute in January 1998.

Yet even if the cyber-enthusiasts overstate their case in projecting wild growth in electronic commerce in the future, the arguments for significant growth are still compelling. The Internet dramatically reduces search and transactions costs, allowing purchasers to find products and services they want to buy without leaving the comfort of home. While many consumers will continue to enjoy the experience of shopping “first-hand”, others won’t, especially younger individuals who are growing up with the PC as an integral part of their lives. In addition, businesses accustomed to making repeat purchases of the same item and in need of completing their transactions quickly, will have no such attachment to personalized shopping and will find the Internet to be of increasing value. In fact, a recent *Economist* survey of electronic commerce reports that both Cisco Systems (a network equipment maker) is already selling more than \$1 billion annually from its Web site, while General Electric has used the Net to buy more than \$1 billion of goods from its suppliers. As a result, the same article reports that forecasters project much faster growth of e-commerce for business use than for use by consumers: from virtually 0 in both segments in 1995 to \$70-160 billion in annual business-to-business volume and \$4-10 billion in annual consumer purchases by the year 2000.<sup>2</sup>

While such volumes may seem minuscule when compared with annual GDP in industrialized countries, it should be remembered that e-commerce, as is the Internet itself, is still in its infancy. As depicted in Chart 1, at recent rates of growth (and since the introduction of the World Wide Web which has made browsing accessible to virtually anyone), the Internet is penetrating markets at astonishing speed, much faster than many earlier technologies, even personal computers. Analysts would be mistaken, therefore, to limit their time horizons to only the year 2000 when thinking about the Internet’s full potential impact on the commercial world. The long-run potential of the “digital revolution” -- of which the Internet is the most prominent symbol -- should be substantial.

In fact, even if the Internet is not used extensively to *complete* commercial transactions, it may have an even more powerful effect in reducing the costs of *searching* for products and services that consumers and businesses want to buy. In the words of Microsoft Chairman Bill Gates, a world of “frictionless capitalism” is one with far lower transactions costs and margins than the one we inhabit today.<sup>3</sup> Whether and how we will get to such a world is a topic taken up later in this paper.

### Obstacles To The Growth Of E-Commerce

Views about the future growth of e-commerce diverge largely because of differences in opinion over how rapidly the various legal, technological and behavioral impediments to this growth will be reduced, and eventually eliminated. Below, I briefly describe several of the most important impediments.

**Security:** Perhaps the most significant reason why there is not more business conducted

---

<sup>2</sup>“Electronic Commerce”, The Economist, May 10, 1997.

<sup>3</sup>Bill Gates, The Road Ahead (Viking Press, 1995).

electronically is that potential purchasers fear that their communications over the Internet -- in particular, their credit card or bank account numbers, medical information, personnel records, and trails of which websites they may have visited -- can be easily intercepted by those to whom the messages are not addressed. To be sure, some danger now exists when people order goods over the telephone and provide their credit card numbers to clerks they've never met, or even when people use their credit card to pay for goods and services in person (since the numbers on the card can easily be copied by one or more individuals who handle the processing of credit card slip as it proceeds from the retailer through the banking system).

The security problem on the Internet potentially is of a different order of magnitude, for at least two reasons: the range of information that might be available is much broader and so is the universe of people that can potentially access it (theoretically, the tens if not hundreds of millions of users of the Net).

The generally recognized solution to computer security problems is to encrypt message or data containing confidential information into a "cipher text" of numbers and letters, which can only be decoded by those who have the "keys", or the algorithms that created the ciphers. The strength of the encryption algorithm, or how easy it is to crack, depends on the length of the string of characters used in the key, measured in "bits". Currently, weaker encryption algorithms use 40-bit keys; stronger algorithms use 56-bit algorithms, which are more than 65,000 times more powerful, and 128 bit technologies are now on the market. As it is, encryption techniques are widely used by governments around the world to protect military secrets, by private companies to protect confidential information, and by financial institutions as they exchange payment and other sensitive data.

Digital skeptics can point to at least two problems with encryption, however. One difficulty arises out of the fact that encryption can be used for both good and evil purposes. In the right hands, encryption is a powerful tool for protecting the confidentiality of information and preventing it from being misused or stolen. But in the wrong hands, encryption can make it easier for criminals to conduct their activities without fear that law enforcement authorities will be able to successfully prosecute them; indeed the commercial availability of such encryption algorithms as PGP (an acronym for "pretty good privacy") has already made it easier for criminals to do business over the net. The tensions over encryption policy have led to a major policy dispute between the Clinton Administration and the high-technology community, especially as it relates to the exportation of encryption software, a topic which I spare the reader here.

The second problem is that even the best of encryption does not necessarily solve the problem of "trust", which is key to enlarged consumer use of the Internet for commercial transactions. Even if consumers had confidence in the technical capabilities of credit card companies to safeguard account numbers, they have no way of knowing for sure (other than by recognizing brand names) whether the companies from whom they may be ordering merchandise over the Net are legitimate enterprises or are fraudulent operators.

**Privacy:** Concerns about privacy on the Internet clearly are related to security: if communications are not secure, then by definition, users are exposed to the risk that information they believe to be confidential could be obtained by others without their consent. The Internet also has aroused concerns that even the parties with whom users intend to communicate can invade their privacy either by using the data they may supply over the Net for other purposes or by selling

the data to other parties without their knowledge (let alone consent). To make matters worse, personal data may be circulating on the Net could be wrong, damaging reputations in the process.

Security breaches contribute to privacy concerns on the Net. When the Social Security Administration announced during 1997 that it would make available individual-specific benefit information on the Internet, it was quickly forced to back down over concerns that the service would not be secure. Similarly, in August 1997 when Experian -- one of the nation's largest credit bureaus -- made available to individuals on the Net their credit information, so they could promptly correct it if was in error, it was forced to withdraw the service the *next day* when certain individuals mistakenly got access to the wrong credit histories and that fact was publicized by the media.

Although concerns about privacy in the United States extend well beyond the Internet -- reflected in a patchwork of state and federal laws dealing with the issue -- some observers have argued that because it so dramatically cuts the cost and time of accessing information, the Internet poses privacy problems to a much greater degree than was previously thought possible, and for this reason will stymie further growth of electronic commerce. Public opinion polls report that a large majority of Americans say they are concerned about threats to their personal privacy, while among those who haven't yet used the Internet, fear about privacy is the single most important reason reported why they haven't done so.<sup>4</sup> Even among users of the Internet, more people (over half) are more concerned about the confidentiality of their communications over e-mail than over any other form of communication. The subject of privacy in this "digital age" -- and fears that citizens are losing it -- has become so topical that it was featured as a cover story in the August 25, 1997 edition of *Time* magazine.

Looming on the horizon is a potentially far-reaching international dispute over privacy that could significantly impede the growth of electronic commerce, at least in Europe. The dispute grows out of the Privacy Directive that will become effective in the European Union in 1998. Under this Directive, the EU will decide whether the privacy protections offered by other nations are "adequate"; if not, then the EU will prohibit transfers of all personal information about their citizens to all countries that do not meet this test unless those who propose to send data qualify under certain exceptions (where the party seeking to transmit the data has signed a "contract" with the relevant EU country ensuring an adequate degree of privacy, where the transfer is required to complete a commercial transaction such as the ordering of a plane reservation, or where the data subject has given his or her consent to the transfer).

**Taxation:** In principle, electronic commerce could be nipped in the bud if jurisdictional entities within countries (state, county or city governments) or national governments see it as potential source of additional revenue and begin to place special taxes on transactions completed over the Net. In the strongest possible terms, the Clinton Administration has urged that no new taxes or cross-border tariffs be placed on electronic commerce and legislation that would implement this policy within the United States -- by prohibiting states and localities from imposing special electronic commerce taxes -- has been introduced in Congress by Senator Ron Wyden and Representative Chris Cox. Nonetheless, the Wyden-Cox proposal is opposed by state and local

---

<sup>4</sup> Wall Street Journal, June 19, 1997, p. B6.

governments, many of which have already have imposed sales and use taxes on Internet access charges and on sales of goods downloaded from the Internet.<sup>5</sup> Some countries may be tempted to do the same or recover even greater revenue, notwithstanding the Administration's urgings.

**Intellectual Property Protection:** Another commonly cited barrier to the growth of electronic commerce is the absence of clear intellectual property -- principally copyright -- protection for innovative content displayed on the Internet.

Through decades of court decisions, the application of copyright law to paper-based content -- books, newspapers, and magazines -- has become relatively clear. The law broadly protects creators and publishers of original content from unlicensed uses of their works so that they have strong economic incentives to produce them. At the same time, copyright gives users rights of "fair use" to make copies of copyrighted materials for private, noncommercial purposes. The copier machine, for example, could have not have existed without the fair use doctrine.

The arrival of the digital age has triggered a debate about how, if at all, to update copyright law to suit the unique characteristics of cyberspace. Advocates for stronger copyright protection argue that because electronic images can be easily and costlessly copied and retransmitted to millions of users around the world, paper-based copyright law must be updated by the Congress and other countries (through the World Intellectual Property Organization). A key suggestion is that content originators be given rights in the temporary reproduction in computer memories of original material transmitted in cyberspace, which would mean that every time users browse on the Internet, they must obtain a license to download material onto their hard disk. Another proposal that some have advanced is that Internet or on-line service providers be made liable for users who infringe copyrighted materials on the Net by retransmitting them to other users. Without these modifications of copyright, these skeptics argue, the Internet will never realize its full promise because the best content originators will avoid it.

**Customer Acceptance** -- Finally, even if the technical and legal problems just listed are resolved, some skeptics nevertheless might question the rate at which customers actually will use computer-based technologies to make purchases, pointing to the following facts: that despite all the hype about the computer revolution, only about 40 percent of American families have a PC and just 15 percent are hooked up to the Internet; and that, as of early 1997, of all Internet users, only about 15 percent (or just 2 percent of American households) reported that they made "heavy use" of the Internet.

Other evidence as well helps question the pace at which electronic commerce will grow. As long ago as 30 years ago, optimists were forecasting the end of the paper check, to be replaced by electronic communications. Today, even with credit cards, ATMs, telephone and computer banking, and all the talk about electronic bill payment, checks remain the workhouse of the payments system. This experience, skeptics will claim, should humble the digital optimists who only see rapid growth in electronic commerce ahead. And as for consumers actually buying things over the Net, skeptics will argue that all but hard-core technophiliacs will want to see and touch their merchandise before buying it, let alone enjoy for its own sake the experience of getting out of

---

<sup>5</sup>For a current listing of Internet-related taxes, see "Vertex" on the Net, at <http://www.vertexinc.com>.

the house and shopping in person.

### Likely Resolution of the Problems

The foregoing list of impediments appears, at least on first impression, as a rather formidable list of barriers. In the very short run, it may well be. But in the near to long term, I believe that most, if not all of the barriers, will be significantly reduced if not eliminated.

The major reason for my optimism is that U.S. government policy toward e-commerce, at least so far, is heavily market-oriented, replying on the private sector to come up with solutions to the various problems observers have mentioned. In addition, U.S. policy -- enshrined most specifically so far in "Framework For Global Electronic Commerce" released by the Clinton Administration in July 1997 -- has urged governments around the world to follow a "hands-off" policy toward e-commerce, with two notable exceptions: (1) where government involvement is necessary to support a "predictable, minimalist, consistent and simple legal environment" for e-commerce (such as providing uniform commercial rules for e-commerce) and (2) with respect to encryption policy, where the United States and certain other countries have pushed for certain restrictions in the interest of limiting criminal and terrorist activity.

The American faith in the market reflects an optimism toward technology which I share: namely, that if impediments to the further growth of e-commerce are sufficiently significant, then firms will have strong market incentives to develop technologies to remove them. To be sure, governments may help provide the impetus for such innovations, threatening to take action if the private sector won't (as the U.S. has gently done in the case of privacy on the Internet). But the constantly changing nature of digital technologies means that government intervention in the digital field runs high risks not only of being premature -- a technological solution may be quickly developed that is far more effective than any regulatory edict -- but also of frustrating further innovation if the intervention is misplaced or falls victim to the law of unintended consequences (as so many government interventions do). Indeed, government intervention is often sought or supported by particular interests who may not be representative of the broader social interest. The decades of government regulation of prices and entry in all facets of the transportation industry in the United States -- few of which are characterized by natural monopoly -- are but one illustration of this tendency. Moreover, government action is typically responsive to particular "crisis" or set of problems and thus inherently backward-looking. This mindset is not well-suited to the digital marketplace, where constant change is perhaps the only constant.

A related feature of the digital age is that the same technologies that are shrinking time and space -- the microprocessor, the Internet, satellites and fiber optic cables, to name a few -- also are rendering it increasingly difficult for governments to enforce their regulations or other interventions because the subjects can increasingly flee to other jurisdictions. If governments attempt to regulate unwelcome content (pornography and gambling) on the Internet, for example, by controlling what servers may transmit, for example, they are likely to find that, like mercury, those who seek to make such content available slip their wares onto servers elsewhere. As discussed further below, similar problems confront any government intent on placing special taxes on transactions completed on the Net.

In short, the presumption favoring market -- rather than governmental solutions -- to “digital problems” arguably is stronger than in other spheres of economic or social activity. Indeed, the march of digital technology poses a strong challenge to many existing rules written for the older “analog age”, when regulations were more easily enforced -- a subject discussed in the concluding section.

But first I briefly consider below how markets already are addressing or may be likely to tackle two of the impediments or drawbacks to growing Internet-based activity: security and privacy. I then suggest why the fears that e-commerce will be slowed by unwise tax or intellectual property policies are misplaced.

**Security:** Because hackers who steal vital secrets and even money can cause significant damage to any enterprise, all organizations that store or transmit data have a strong interest in having the best data security systems available. The market, therefore, provides strong incentives for firms to meet this demand. In fact, firms now routinely employ strong encryption techniques that are available on the market or that have been developed in-house to safeguard their own data. Government agencies use similar techniques to protect sensitive information.

From a commercial perspective, however, the issue is not how secure the Internet may be *objectively*, but how secure consumers *believe it to be*. Various security breaches reported in the media -- *even if they have nothing to do with Internet commerce* -- nonetheless contribute to public anxiety over the security of the Net: hackers who have penetrated various government data bases, the Russian hacker who successfully (although only temporarily) diverted funds from Citicorp, and the computer technician who used the Internet to organize 14,000 computers to crack the Data Encryption Standard (DES) that is widely used by financial institutions and other companies to protect their sensitive information.

Still, the fact remains that there has yet (to my knowledge) to be a reported incident of a consumer having his or her credit card stolen from the Net; much more likely is theft of the number by a waiter in a restaurant or a clerk in a department store. Over time, this reality should sink in and customers should grow more comfortable using their credit cards, especially as newer, secure direct payment systems come on line.<sup>6</sup>

More problematic is for consumers to be able to trust that the site they are visiting on the Net they are what they purport to be. In the United States, certification services or firms have already come into existence to attest the validity of Web sites. Law enforcement authorities also are turning their attention to this problem.

I suspect that the security problem -- or actually the perception of security problems -- on the Net will gradually ease as more consumers grow comfortable conducting business on-line and as they realize that it is the *banks* rather than consumers who stand to lose most from hackers on the Net. This is because, by law, the federal government has limited the liability of credit card holders to \$50 if their cards are stolen, meaning that issuers bear most of the potential liability.

---

<sup>6</sup>One such system is the Secure Electronic Transaction (SET) protocol, which a number of major American banks and computer companies (IBM and First Data Resources) have been pilot testing in 1997 and are reportedly ready to roll out some time later this year (1997).

Although this same protection applies to credit card transactions used over the Net, it may be necessary for merchants, individually or collectively to cover even this \$50 deductible in order to ease consumer fears (however unjustified) of losses they could suffer if their card numbers could be stolen off the Net.

**Privacy:** Very different approaches to assuring consumers' privacy on the Net are so far being taken in the European Union and the United States, which as noted earlier, could contribute to the first major international "cyber-policy" dispute.

Europeans, understandably scarred from the massive invasions of privacy (and personal freedom) conducted by the Nazi regime, have established a "top-down", government-centered approach that relies on rules and privacy enforcement agencies to ensure their citizens' privacy. In particular, European data protection laws generally require organizations involved in the collection, storage, use, and dissemination of personal information to register with national privacy authorities. Moreover, European countries generally prohibit a wide range of data uses (such as collection of data for direct marketing or credit reporting) that are routine in the United States.

In contrast, the United States does not have a single, comprehensive privacy law, nor a bureaucracy devoted to administering it. The American approach is much more selective as a matter of law, and also contains a sizable element of industry self-regulation -- which so far the Europeans do not seem willing to accept as "adequate" for purposes of their Privacy Directive. Moreover, the legal privacy protections extended so far are unrelated to electronic commerce: credit files, videocassette rentals, storage of personal information by the government (and most recently, the Administration's proposed privacy protections for medical records).

With respect to e-commerce, the Clinton Administration's White Paper has announced two broad principles: (1) that data gatherers should inform consumers what information they are collecting and how they intend to use the data; and (2) data gatherers should provide consumers with a meaningful way to limit use and re-use of personal information. So far, the Administration has been willing to let the private sector develop mechanisms for implementing these principles, without explicit government regulation or coercion.

In fact, there is evidence that private firms and organizations are already meeting this challenge. For example, the Open Profiling Standard, developed by a group of software companies and proposed to the World Wide Web consortium that develops standards for the Web, would allow users to specify what information they want to reveal to any particular Web site and have stored on their hard drives (so, for example, a user could permit his or her name and e-mail address to be provided but no other personal information). OPS stands in stark contrast to the current "cookies" that many Web sites now routinely plant in users' computers, generally without users' knowledge, to greet them the next time they visit and to enable the originating Web sites to track other sites users may visit (information which can be sold to advertisers and other interested parties). OPS will enable users effectively to disable their "cookies", a task that can be done already by using software that can be downloaded for no cost from the Internet.

Consumers also may want to know what merchants do with the data they collect. To satisfy this concern, an industry consortium named "TRUSTe" has been formed to provide the electronic equivalent of the "Good Housekeeping Seal of Approval" to Web sites that maintain confidentiality of their data. TRUSTe will audit the licensees of its logo to ensure that they are



adhering to their announced privacy policies.<sup>7</sup> The auditing requirement may be costly, however, and therefore could limit TRUSTe only to well-recognized sites operated by larger businesses.

These are still only the first examples of what are likely to be a continuing stream of technologies that will be developed to empower users to choose how much privacy protection they actually want. Privacy itself will then become a commodity, with each user deciding how much privacy he or she may want be willing to pay for: those who value it highly will refuse to do business with merchants who do not follow a scrupulous policy of protecting confidential information, while those who have lesser concern for privacy will do business with other merchants, at perhaps some cost saving. Moreover, systems such as OPS also will help shield those computer users who provide only limited information about themselves to other sites from junk e-mail (inhibiting direct marketers and other data base companies from targeting them as potential consumers of particular products and services).

And then there is the weight of public opinion, which in an electronic age, can easily and promptly manifest itself on literally any subject, including privacy. Thus, when America On Line (AOL) announced in July 1997 that it was planning to sell its members' telephone numbers to third parties, it was so deluged with objections by e-mail that it withdrew the policy the next day. The Experian episode discussed earlier produced a similar outcome. These events demonstrate how in yet another fashion technology makes it possible for markets to meet concerns about the Internet.

There are two possible areas in which government intervention nonetheless may be appropriate, although not without problems. One is narrowly crafted legislation that would require entities offering personal information on the Internet to afford the subjects opportunities to examine and correct their entries. It is difficult, however, to see how such a requirement can be effectively enforced (the off-shore problem again) or how consumers can be made aware of the myriad data bases that may be storing information them. Another possibility is for the government to require Internet merchants to allow consumers to make purchases anonymously (by giving "aliases" rather than real names), as Germany has done. Here, too, enforcement would be difficult. A fallback position would be for the government to encourage Internet consumers to complete their purchases anonymously.

Finally, any legislation aimed at bolstering privacy runs other dangers. Data bases and those who "mine" them provide useful services: enabling law enforcement authorities to locate criminal suspects and witnesses, locate abducted children, and find parents delinquent in paying child support; permitting financial institutions and merchants to reduce fraud losses, which are passed on to consumers in higher prices of products and services; facilitating the verification of information on mortgage and other credit applications; and enabling companies to market products and services selectively to the most likely prospects, reducing the volume of "junk mail". Overly intrusive requirements meant to stop privacy abuses can unwittingly deprive many others of the

---

<sup>7</sup>TRUSTe will provide three "trustmarks" to help inform consumers about the privacy practices of Web sites: "No exchange" (indicating that no personal information is used); "One-to-One Exchange" (indicating that the data collected is only for the use of the site owner); and "Third Party Exchange" (indicating that the site is provided to third parties, but only with the consumer's knowledge).

benefits a now open Internet provides.

To return to the impending dispute over privacy with the European Union, U.S. policy makers will no doubt argue that this private sector approach provides broad “functional similarity” to the privacy protections afforded in Europe and thus should qualify as “adequate” protection for purposes of the EU’s Privacy Directive. As a fallback position, they are likely to argue that regulatory protections in specific sectors, such as the Fair Credit Reporting Act requirements imposed on private credit bureaus, should qualify banking and perhaps other financial businesses as having “adequate” privacy protection for European purposes. At this writing, however, it appears the EU will be unwilling to accept these arguments. To avoid a major showdown over this issue, the EU either will have to restrict its findings of inadequacy to a few sectors, and even then, be willing to construe broadly the exceptions to its policy.

**Internet Taxation:** Despite the fears that countries and local jurisdictions will be tempted to impose increasing taxes on Internet transactions, I am sanguine on this subject, at least over the long-run. Whether special Internet-based taxes are assessed on sellers or buyers, they are not likely raise much revenue and for that reason, many jurisdictions are unlikely either to implement them or, if they do, set them at onerous levels. Sellers of goods and services over the Net, for example, are highly mobile. If subject to special taxes, they are likely simply to move the location from which they offer their wares. Although buyers are not so mobile, putting taxes at their end of the electronic pipeline almost certainly would encourage them to continue using more conventional means ( the phone, the mail, or in person visits) to complete their transactions.

While the skeptics almost surely will be wrong about Internet taxes, the growth of electronic commerce has significant implications for the assessment and collection of current conventional taxes, such as those on income or sales, regardless of how generated. This subject is explored further below.

**Intellectual Property:** Here, too, I am an optimist. The absence of stronger copyright protection that some have advocated for the digital age has not prevented a growing number of web-based publications (such as Slate and HotWired) from offering their content on the Internet, nor has it inhibited an even more rapidly growing number of firms from offering their products and services the same way. Indeed, adopting the tougher copyright measures described earlier could severely damage the growth in electronic commerce and the use of the Internet that has already occurred. Assuming it could enforced, a requirement that users obtain licenses simply to download information from the myriad web pages now available would be inconsistent with the free-flowing ethic of web-surfing that has made the Internet so popular. Meanwhile, imposing liability for infringement on Internet service providers would turn them into private “Internet police”, a function that many do not have resources to perform.

This isn’t to say that the existing paper-based copyright system is adequate to protect many forms of entertainment, such as movies or sound recordings, that may be transmitted over the Internet. It isn’t. But then again most users currently do not yet have sufficient bandwidth in their Internet connections to download such data-intensive transmissions, which affords some time for policy makers and industry to address the problem. The solution here may not lie in the realm of the law but in technology. Just as movies on rental videocassettes cannot be copied, I suspect ways will be found of encrypting copyrighted forms of entertainment to prevent users who lease them for limited viewing or listening over the Net from retransmitting the works to other parties.

Standards and Interoperability: One of the hallmarks of the information age is the importance of standards to ensure that different software and technologies are “interoperable”. Standards are vital for reducing uncertainty and promoting the diffusion of technology. It is also vital that the private sector, and not the government, take the lead in developing standards for e-commerce -- for security, communications, and so forth -- a principle recognized in the Administration’s White Paper. While the market process for setting standards is often messy and sometimes leads to false starts, it generally works. Good examples of standards set by the market include those for videocassettes, cellular telephones, direct broadcast satellites, fax machines, and e-mail -- all without government intervention.

In contrast, governments do not have a good track record in selecting network standards - - witness the abortive attempt by the European Union and Japan to set an analog standard for HDTV -- and they generally impose some regulatory conditions as the price of access to such government network services as the Federal Reserve check-clearing system. In the United States, the FCC wisely decided not to mandate a standard for HDTV, allowing manufactures to offer competing technologies.<sup>8</sup>

In some cases, however, a joint venture may be the most efficient type of institution to select a network standard or provide a network service. The government would be wise to immunize such joint ventures from antitrust attention, *as long as the network standards and services themselves are open to competition* from other existing or potential networks. Starting in the 1980s, Congress approved a similar policy affecting joint ventures for export promotion, for R&D, and for production. The European Union has adopted a similar policy affecting joint ventures of several types.

The one exception where government action may be necessary is to harmonize, or at the very least mutually accept, standards in different jurisdictions that impede commerce across them. This issue is especially vexing for legal and professional services, and is explored further below.

### Implications of the Growth of E-Commerce

Electronic commerce should gradually have important implications for users, producers, and policy makers. No doubt many of these implications cannot be foretold today; that is the inherent nature of technological advance. Benjamin Franklin could hardly have predicted how society would be revolutionized by the application of electricity. Alexander Graham Bell could hardly have envisioned the giant telecommunications industry that was spawned by the invention of the telephone. The list goes on. Nonetheless, I believe certain broad outcomes are now at least roughly definable and below I attempt to outline some of them.

**For Consumers and Business Users of E-Commerce:** Users of e-commerce -- initially business and then consumers (in order of likely volumes) -- should benefit in two ways. First, they may save on the costs of completing their transactions. Second, and potentially far more important,

---

<sup>8</sup>It is not clear even now whether HDTV will ever be commercially successful, at least in the United States.

all users should benefit from the lower search costs that the Internet allows and the resulting opportunities it affords users to buy products and services from the cheapest sources.

The payments benefits of the Internet are likely to be slow in coming, in large part because many, if not most, e-transactions are likely to be paid for by credit cards, a payments mechanism already in use. Significant payments savings should be realized only if and when secure ways are found of allowing purchasers to pay for goods and services over the Net by directly debiting their bank accounts, thereby saving on the costs of writing a check. As it is now, the full costs of checking -- not just for the clearinghouse, but for all of the costs of recording, handling, verifying and processing checks internally within the paying and receiving banks -- are upwards of 50 cents a check (which, given the more than 60 billion checks written each year in the United States, translates into economy-wide costs in excess of \$30 billion). In contrast, direct payment over the Internet, at least in principle, should be far cheaper. widespread. Of course, whether consumers actually benefit from these lower costs depends on whether their banks pass the savings on, and whether merchants provide incentives (such as discounts) for making payments this way.<sup>9</sup>

Nonetheless, regardless of how rapidly direct payment services penetrate the Internet, merchants may separately use the Net to invoice their customers. The savings here potentially could be even larger than the cost reductions in the banking system. As it is now, a typical merchant probably spends \$1 or more in printing and sending a bill through the mail. In contrast, E-mailed invoices would cost pennies. Microsoft and First Data Corporation have formed a joint venture to help realize these savings by offering billing services to merchants; if this service (or something like it) takes off, the aggregate savings could prove substantial as Internet usage increases. Consumers should also save to the extent the Internet permits merchants to save on advertising, marketing and distribution costs.

Perhaps the largest potential savings to consumers from e-commerce, at least in principle, are likely to flow from the lower "search costs" and associated reduced margins that the Internet makes possible. These are the savings from the "frictionless capitalism" that Bill Gates has suggested will be the result of widespread Internet use. In this world, consumers and businesses will be able to look at electronic bulletin boards that will compare the prices and other information about various products and services, and if they wish, simply click to order the cheapest ones. It doesn't take much imagination to realize the enormity of the savings that could be realized in the process. In just the financial industry alone (one that I know best), recently published evidence suggests inefficiencies ranging from 20 to 50 percent.<sup>10</sup> While the Internet would not eliminate all

---

<sup>9</sup>If secure, direct Internet payments systems are developed, merchants would have room to provide such discounts because they now pay discounts and other fees to credit cards of 2% or more of the value of the transaction.

<sup>10</sup>For evidence relating to inefficiency in the banking industry, see Alan N. Berger, Lorreta J. Meste, "Inside the Black Box: What Explains Differences in the Efficiencies of Financial Institutions", Federal Reserve Board, Finance and Economics Discussion Series # 1997-10, January, 1997. For similar estimates of inefficiency in the insurance industry, see Lisa A. Gardner and Martin F. Grace. "X-Efficiency in the U.S. Life Insurance Industry", Journal of Banking and Finance, Vol. 17, April, 1993, pp. 497-510.

of this inefficiency, it certainly would help over time to reduce it, with tens of billions of dollars of savings as the result. Generalized to the rest of the economy, the total savings could be orders of magnitude higher.

There is only one problem, however, with the frictionless capitalism scenario: it isn't clear how it will come to pass, at least for *standardized* products and services (such as loans, deposits, many insurance policies and securities commissions) where price is the most important (if not the only) thing that matters to consumers. The major reason is that no individual provider of such a product or service has an incentive to have its prices listed on a bulletin board that compiles such information, since volunteering it would be tantamount to committing economic suicide. By the same token, builders of such bulletin boards would have little incentive to construct them from publicly available information unless they were assured of a substantial volume of repeat business from users for which they could charge.<sup>11</sup> This means that bulletin boards for single standardized products and services are unlikely to be created; only a service which offers price comparisons for many different products and services has a chance of attracting a steady flow of business and thus a subscription base from customers to support the costs of constructing and maintaining the data base. Microsoft appears intent on following the latter strategy with its Microsoft Network, but whether this business model becomes successful remains to be seen.

Price comparison services already exist, however, for *differentiated products*, such as real estate, automobiles, and travel (where different routes and equipment add a quality dimension to the service). Such bulletin services seem to be financed in various ways, but consistently by the providers of the services rather than consumers (although such charges may eventually get built into consumer prices). Various airline price comparisons are already on the Net and charge the airlines a percentage of the bookings made over their services. Similar comparisons are available for residential real estate offerings, and appear to be supported by real estate agents who offer their listings to the services.

These new electronic bulletin boards may eventually help realize Gates' vision of frictionless capitalism for a potentially significant part of the economic landscape, since most goods and services sold in modern economies *are* differentiated and providers therefore have incentives to find ways to attract potential customers to at least notice their offerings. At the same time, except perhaps in the case of the travel and a few other services for which transactions can be completed on-line, customers still will tend to complete purchases in person after inspecting the merchandise -- such as a house or a car (although cars can now be reserved over the Net, too, with the purchaser coming in to the show-room to pick them up). Nonetheless, the Net will make it possible for an increasing number of Internet-savvy users to reduce their search costs and thus locate the best products and services suited for them. This inevitably will drive down prices and

---

<sup>11</sup>In principle, operators of bulletin boards could support them from advertising revenues; but for reasons already noted, even the opportunity to advertise a standardized product would do a producer little good if the ad appeared on a bulletin board showing competitive products more cheaply priced.

help realize savings, which should grow over time as more users become comfortable with doing business on the Net.

**For Providers of Services:** The benefits of lower search costs just described for non-standardized products inevitably over time will drive down margins in the affected business, which will not be good for inefficient firms. Some will be taken over by more efficient firms, some will fail, but the competitive pressure for many will increase.

This will be the case even for industries which do not succumb to the “bulletin board” price comparison model central to the “frictionless capitalism” vision because the Internet is already leading to new models of business which are threatening the old. The arrival just two years ago of *Amazon.com*, which sells books exclusively through the Internet and has no retail outlets, already has revolutionized book distribution in the United States, forcing the leading old-line book distribution company, Barnes & Noble, to form its own on-line book ordering business. Similarly, the formation of various on-line securities brokerage firms, beginning with *E-trade*, has in very short order turned that business upside down, driving down securities commissions dramatically for those who trade on-line -- recently estimated in the *Wall Street Journal* (September 5, 1997) to account for 30% of all discount brokerage business -- as well as pressuring rates of traditional brokerages, which are being forced by competition to form on-line brokerages services of their own.

It is safe to say that the Internet will spawn many more such examples of new business delivery systems, which will in their own ways force traditional competitors to change their methods of operation. As one small example, it has been reported that 80% of the Fortune 500 companies in the United States now have Web sites; that percentage should become 100% shortly. Expect each of these companies to find ways of using those Web sites to offer their services; in many cases, they will be forced to by start-up companies operating exclusively on the Net.

In short, Joseph Schumpeter’s description of capitalism as a process of “creative destruction” could not be a more apt depiction of what the Internet will do to capitalism in this country -- where or not Bill Gates’ precise vision of a “bulletin board” based “frictionless economy” comes to pass.

**For Policy Makers:** Finally, the information revolution will have important ramifications for policy making, many of which cannot be discerned at this point. Rather than attempt to make forecasts of the effects of this revolution, as it may be broadly defined, in many different policy arenas, I will conclude with a few observations of its potential effects on three areas of policy making: financial regulation; the regulation of standards (mostly for professionals); and for tax enforcement.

### Financial Regulation

The growth of the Internet and the continuing development of more powerful computer processing capability should eventually have major ramifications for the way financial institutions are regulated.

Consider the way banks and other financial institutions are now regulated. Supervisors

generally audit their books every 12-24 months, while the institutions themselves publish statements of their financial condition every quarter.

In the future, technology can do better: the day may be coming when the financial equivalent of a heart monitor can be placed on banks and other financial institutions, alerting regulators and the market on a real-time basis to their financial condition and their vulnerability to market swings. In reality, of course, that sort of future has not arrived. But given the rapid pace of advances in information technology, it is not as far off as may be thought. In Britain, the Securities and Futures Authority is already at work designing an automated monitoring system ("Business Envelope Alert Monitoring"), in which a computer program would examine several hundred thousand securities transactions each day (virtually all the important ones), collate them with other information on firms' health and activities, and kick out reports of odd behavior patterns. Certainly now is not too soon for policy makers to begin thinking about how to harness information technology to make finance safer.

A related way in which technology may be used, and even required, to enhance disclosure is for mutual funds. Currently, mutual funds are compared in the media and by various statistical services (such as Morningstar) on the basis of their average market performance. But, of course, investors' returns from any fund typically differ from the average reported for that fund. The reason is that an individual investors' return depends not just on *what* fund he or she may buy, but also *when* it was bought (and in what amounts). Technology already allows mutual funds to take these investment patterns into account and to determine the annualized rate of return each investor has actually earned in a particular fund. The day is probably coming when regulators require the funds to report this information to their customers.

Yet another regulatory challenge is likely to arise out of the likely growing use of the Internet to distribute securities. In just the past year, a number of firms have "gone public" by offering their shares on the Net rather than using a securities underwriter. As more firms find this to be a cheaper way to distribute shares (or debt) than using an underwriter, the regulators may be confronted with challenges in the information they require the offerers to make available on the Net.

### Professional Licensing and Standards

The growth of the Internet should place increasing pressure on lawmakers to revisit licensing rules that were developed in the pre-digital age. This will be difficult, since those who now benefit from these rules will fight hard to protect them. Nonetheless, the full promise of the Internet in reducing the cost of services and products will not be realized unless and until this issue is addressed.

For example, individual states within the United States now have the authority to license occupations, and hundreds of occupations—from practicing medicine to braiding hair—are licensed somewhere in the United States. These licenses have long restricted the supply of labor

in these occupations and have limited the innovation and division of labor in relevant these licenses to restrict state markets. Until recently, there was not much of an issue about the potential for the division of labor across state borders. Services by the local licensed practitioner were provided and there was little opportunity to make use of specialists in other states.

The Internet, however, creates opportunities for a wide range of teleservices, such as telelegal services and telemedicine, but these opportunities are seriously restricted by state licensing laws. For example, these laws allow the sale of legal programs prepared in another state but ban legal services on the Internet. Activities now legal, such as the use of mail or the telephone, to consult with a specialist in another state, are illegal on the Internet. Information about almost every medical test can be communicated over the Internet, but this opportunity is caught in a legal web whether the patient or the doctor has “moved” to make these tests possible.

Some states allow free telemedicine services but ban such services for a fee. And so on.

The potential for mutual recognition of those licensed in other states to practice law is restricted by the significant differences among some types of state law. In this case, there may still be an opportunity for reciprocal licensing among a group of states or for the separation of a general license to practice law from a certificate identifying a specialty in the laws of a specific state or body of law.

Most state laws that license physicians date from the 1870s, predating both the automobile and the telephone. It is clearly the time to bring these laws up to date as well. All new physicians now take the same national exam of over 2,000 questions. That should be a sufficient basis for a mutual recognition of the medical licenses granted in another state or the replacement of state licenses with a national license. The federal government has the clear authority regulate interstate commerce, and this may be a case whether a federal rule is superior to the combination of state rules.

Finally, once inefficient licensing restrictions *within* countries are removed, there will be a need to turn to artificial restrictions that affect trade in services and goods *between* countries. The May 1977 “Mutual Recognition Agreement” by the U.S. government and the European Union to accept each other’s testing standards for a wide range of products (including appliances, pharmaceuticals, and telecommunications equipment) is a useful model for countries to apply in the future to products and services themselves, although admittedly mutual recognition may be more difficult to apply to some services (such as medicine) where strong cultural and technological differences between countries may remain.

### Taxation

The ease of conducting business over the Internet has prompted concerns in some quarters that the Net eventually will undermine the ability of governments to collect taxes. The problem is neatly spelled out by the following scenario outlined by The Economist [May 31, 1997, p. 22]:

Suppose a customer in California downloads software bought from a firm in Seattle. The company transmits it using the Internet from a computer in Texas. Which state should tax the profit? Or say a German consumer buys a software package from a local subsidiary of an American firm. If he goes into a shop, the profit is taxed in Germany. But if he downloads the software over the Internet, lower, American rates apply.



Courts within the United States and elsewhere will no doubt wrestle with the jurisdictional problems created by the Internet. In the meantime, companies doing business will surely do their best to find ways of arbitrating tax differentials across countries (and to a lesser extent across states within this country), ideally avoiding taxes altogether. Both income and sales tax revenues could fall victim to this process.

The United States and most other countries tax income both on the basis of where the income is earned (its “source”) and the residence of the person or entity earning the income. To avoid double taxation of foreign residents in particular, the United States currently has comprehensive tax treaties with 48 countries that generally give the residence country an unlimited right to tax income while restricting or even eliminating the source country’s right to tax. As Internet commerce grows, it will become increasingly difficult (as the above example demonstrates) to determine where income is actually earned. This has led the Treasury Department to conclude that taxation must increasingly be based on residence. Yet this should provide little comfort to governments since on-line businesses will then have strong incentives to reside in countries with low rates of income taxation.

The message is not that much different for countries (or states, for that matter) that rely heavily on sales based taxes, such as those in Europe with its value-added tax (VAT). Most states in this country, for example, exempt mail order firms from their sales taxes on sales to non-residents. As on-line sales grow, more commerce should slip through this exemption. In theory, European countries impose VAT taxes even on goods imported from abroad (and so differ from the way most of our states treat mail order sales). But for many smaller consumer items ordered over the Net and shipped into the country in small boxes, let alone software downloaded directly onto the hard disks of Europeans sitting in front of their computers, it is virtually impossible for European authorities to require collection of the tax.

Other features of digital commerce will compound tax collection difficulties. Various forms of “electronic money” are now under development or even on the market, including general purpose “stored value” or “smart” cards (for face-to-face transactions and eventually for Internet payment, when inserted into a computer port) and different means of transferring money directly over the Internet. For tax purposes, forms of electronic money that have some sort of paper record will allow transactions to be verified and thus pose no new collection problems. But versions of electronic money that allow anonymous transfers (such as the Mondex card that permits money to be transferred directly between cards without an intervening third party) make it easy to avoid taxes. This problem will grow if consumers use the Internet to open accounts and deposit monies in off-shore accounts where secrecy laws inhibit tax authorities from other countries from auditing transactions.

The coming pressures on tax collections due to electronic commerce reinforce trends already under way due to globalization, or the increasing integration of trade and investment across borders, facilitated by the enhanced communication capabilities of the digital age. Already, these developments have enabled multinational firms to reduce their tax liabilities by shifting operations and using artful transfer prices on transactions between affiliates in different countries to transfer profits to low-tax jurisdictions. As the recent Economist survey points out, this process has reduced the relative burden of taxation on highly mobile capital in industrialized countries, and

increased it on immobile labor.

Nonetheless, it is easy to get carried away with predictions about the imminent demise of countries' abilities to tax. There has yet to be a mass exodus, after all, of firms from high-tax countries in Europe to lower tax regions of the world, often where labor is much cheaper as well. This is because firms and individuals take account not only of tax burdens but a whole host of other factors -- including the attachment to their friends, their culture, the range of entertainment and business opportunities offered at home, and the amount and quality of public services their jurisdictions provide -- in deciding whether to move or stay put. Inertia also exerts a powerful bias toward remaining in the same location. If taxes were all that mattered, Bill Gates and Warren Buffet -- America's two richest individuals -- would have moved to the Cayman Islands or some other tax haven long ago.

Still, as costs of communication and transportation continue to fall, an increasing number of firms and highly mobile (and highly skilled) individuals will face rising incentives at the margin to move away from high tax jurisdictions that are *not* providing a compensating level of public services. For reasons already outlined, electronic commerce also will pose a growing and eventually significant threat to the tax bases of many countries as well. This will gradually intensify pressure on all governments intent on keeping expenditures in line with revenues to search for most cost effective ways of delivering services and to eliminate funding of unnecessary programs and subsidies. It is also likely to likely to shift the tax base from income to consumption, which although increasingly difficult to monitor in the digital age is not as easy to evade as an income tax.

## Chart 1

## Penetration Rates of Various Technologies

Years Taken to Reach 25%  
Of the U.S. Population

Automobile	55
Airplane	54
Household electricity	46
Telephone	35
VCR	34
Microwave Oven	30
TV	26
Radio	22
Personal computer	15
Cellular phone	13
Internet	6 years or less*

\*Assuming the Net is dated from the introduction of the World Wide Web (1994).

Source: Wall Street Journal, June 16, 1997, p. R4 and author's estimate (for the Internet).