

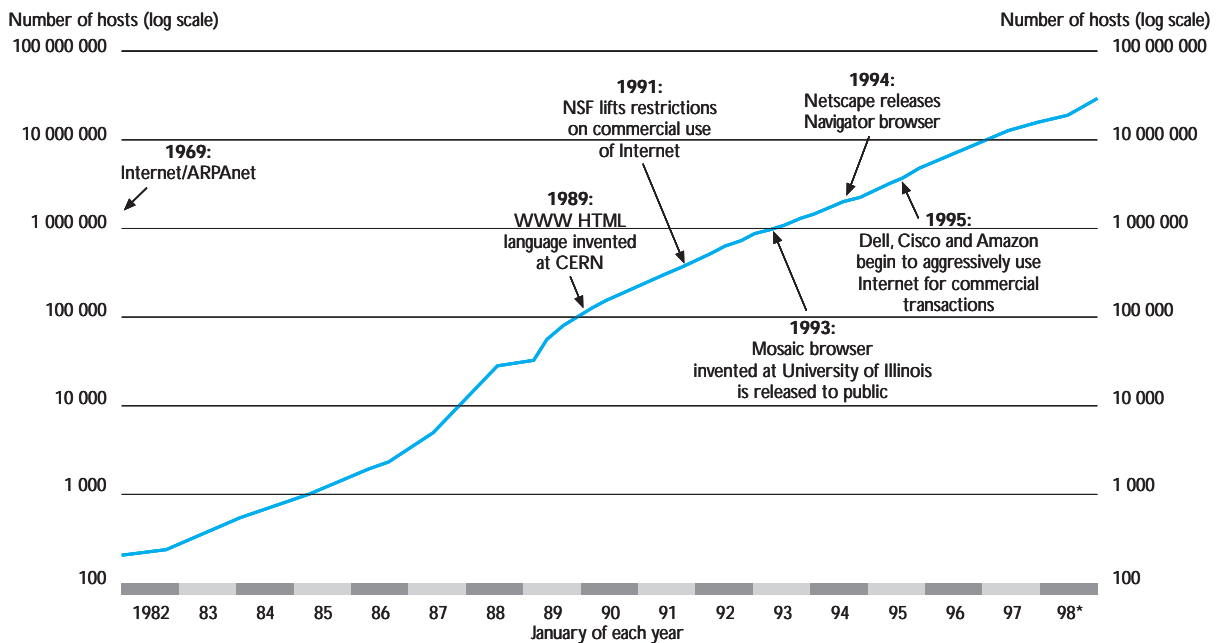
## EXECUTIVE SUMMARY

### Introduction

Electronic commerce over the Internet is a new way of conducting business. Though only three years old, it has the potential to radically alter economic activities and the social environment. Already, it affects such large sectors as communications, finance and retail trade (altogether, about 30 per cent of GDP). It holds promise in areas such as education, health and government (about 20 per cent of GDP). The largest effects may be associated not with many of the impacts that command the most attention (*e.g.* customised products, the elimination of middlemen) but with less visible, but potentially more pervasive, effects on routine business activities (*e.g.* ordering office supplies, paying bills, and estimating demand), that is, on the way businesses interact.<sup>1</sup>

*Electronic commerce has the potential to radically alter some economic activities and the surrounding social environment.*

Figure 1. **Growth in Internet host computers and major e-commerce developments**



\* New methodology used in January 1998.  
Source: Network Wizards.

*It emerged in the wake of regulatory reform and various technological innovations...*

A combination of regulatory reform and technological innovation enabled e-commerce to evolve as it has. Although the precursor of the Internet appeared in the late 1960s, Internet e-commerce took off with the arrival of the World Wide Web and browsers in the early 1990s and the liberalisation of the telecommunications sector and innovations that greatly expanded the volume and capacity of communications (optic fibre, digital subscriber line technologies, satellites).

*... and barriers to entry have fallen.*

As a result, barriers to engage in electronic commerce have progressively fallen for both buyers and sellers. Earlier forms of e-commerce were mostly custom-made, complex, expensive and the province of large firms. Today, for a few thousand dollars, anyone can become a merchant and reach millions of consumers world-wide. What used to be business-to-business transactions between known parties has become a complex web of commercial activities which can involve vast numbers of individuals who may never meet. In this sense, the Internet has done for electronic commerce what Henry Ford did for the automobile – converted a luxury for the few into a relatively simple and inexpensive device for the many.

*It is important to begin to explore these impacts and provide some analytical foundation for further work.*

This book begins to explore these impacts and provides a preliminary analytical foundation for further work. It does not present an exhaustive analysis – it is too early for that – but musters as much information as possible so as to provide policy makers with a quantitative picture, albeit blurry, of the current state and likely future direction of electronic commerce. On this basis, policy makers can begin to outline the parameters of its impact and identify areas in need of future research.

### **Economic drivers of e-commerce**

Five broad themes have emerged as important for understanding the economic and social impact of electronic commerce:

*The effect on the marketplace...*

*Electronic commerce transforms the marketplace.* E-commerce will change the way business is conducted: traditional intermediary functions will be replaced, new products and markets will be developed, new and far closer relationships will be created between business and consumers. It will change the organisation of work: new channels of knowledge diffusion and human interactivity in the workplace will be opened, more flexibility and adaptability will be needed, and workers' functions and skills will be redefined.

*... the catalytic role...*

*Electronic commerce has a catalytic effect.* E-commerce will serve to accelerate and diffuse more widely changes that are already under way in the economy, such as the reform of regulations, the establishment of electronic links between businesses (EDI), the globalisation of economic activity, and the demand for higher-skilled workers. Likewise, many sectoral trends already under way, such as electronic banking, direct booking of travel, and one-to-one marketing, will be accelerated because of electronic commerce.

*... the impact on interactivity...*

*E-commerce over the Internet vastly increases interactivity in the economy.* These linkages now extend down to small businesses and households and reach out to the world at large. Access will shift away from relatively

expensive personal computers to cheap and easy-to-use TVs and telephones to devices yet to be invented. People will increasingly have the ability to communicate and transact business anywhere, anytime. This will have a profound impact, not the least of which will be the erosion of economic and geographic boundaries.

*Openness is an underlying technical and philosophical tenet of the expansion of electronic commerce.* The widespread adoption of the Internet as a platform for business is due to its non-proprietary standards and open nature as well as to the huge industry that has evolved to support it. The economic power that stems from joining a large network will help to ensure that new standards remain open. More importantly, openness has emerged as a strategy, with many of the most successful e-commerce ventures granting business partners and consumers unparalleled access to their inner workings, databases, and personnel. This has led to a shift in the role of consumers, who are increasingly implicated as partners in product design and creation. An expectation of openness is building on the part of consumers/citizens, which will cause transformations, for better (*e.g.* increased transparency, competition) or for worse (*e.g.* potential invasion of privacy), in the economy and society.

*Electronic commerce alters the relative importance of time.* Many of the routines that help define the “look and feel” of the economy and society are a function of time: mass production is the fastest way of producing at the lowest cost; one’s community tends to be geographically determined because time is a determinant of proximity. E-commerce is reducing the importance of time by speeding up production cycles, allowing firms to operate in close co-ordination and enabling consumers to conduct transactions around the clock. As the role of time changes, so will the structure of business and social activities, causing potentially large impacts.

### **Main findings and future research agenda**

The force that drive e-commerce will require a re-examination of the framework for conducting business and a questioning both of the efficacy of government policies pertaining to commerce and of traditional commercial practices and procedures, most of which were formed with a much different image of commerce in mind. Beyond these narrower considerations, electronic commerce is seen by many as having important implications for consumer protection, tax collection and trade and competition policies. These changes have helped to elevate electronic commerce to a high position on many Member countries’ policy agendas and constitute the basis of much of the policy work, including the OECD’s, on e-commerce issues. To better understand the importance, interaction and nature of these policies, it is necessary to understand the economic and social implications of e-commerce.

*... and openness...*

*... and the relative importance of time are fundamental to understanding the economic and social impact of electronic commerce.*

*Changes brought about by e-commerce require new frameworks for conducting business and a re-examination of government policies relating to commerce.*

### The growth of electronic commerce

*Given the embryonic state of electronic commerce, policies should be crafted with care and with due recognition of its fragile and evolving nature.*

At present, electronic commerce over the Internet is relatively small (some \$26 billion) but is growing very rapidly and may approach a trillion dollars by 2003-05. Even at that level, it would be less than current sales by direct marketing in the United States using mail, telephone and newspapers (Table 1). Clearly, electronic commerce is in an embryonic stage, and technology and market dynamics are still casting its basic shape. This is especially true for the business-to-consumer segment (which is only a small fraction of the business-to-business segment), where concerns about security of payment, potentially fraudulent merchants, privacy of personal data, and difficulty and expense in accessing e-commerce merchants affect its growth potential. These issues represent significant policy challenges. While the appeal of convenience and mass customisation may promote business-to-consumer e-commerce, its success is not assured. It may become no more than another channel for retailers, like mail order, rather than a new dominant mode of commerce. Policy decisions will have a major impact on the kind of environment in which e-commerce will develop and should therefore be crafted with care and with due recognition of its fragile and evolving nature.

Table 1. **Estimates of e-commerce sales compared to various benchmarks**

|                    | Estimated revenue from e-commerce (US\$ billion) | As a percentage of US catalogue sales | As a percentage of US credit card purchases | As a percentage of direct marketing | As a percentage of OECD-7 total retail sales |
|--------------------|--|---------------------------------------|---|-------------------------------------|--|
| urrent (1996/97)   | 26   | 37                                    | 3   | 2                                   | 0.5  |
| ear-term (2001/02) | 330  | 309                                   | 24  | 18                                  | 5  |
| uture (2003/05)    | 1 000  | 780                                   | 54  | 42                                  | 15   |

ource: See notes to Table 1.3.

*The business-to-consumer segment is potentially very important...*

*... but further examination of business-to-business e-commerce is warranted, given that it dominates overall e-commerce activity.*

The near-term (2001/02) and future (2003/05) growth of e-commerce is much more likely to be determined by the business-to-business segment, which currently accounts for at least 80 per cent of total e-commerce activity. Three factors will contribute: *i)* a reduction in transaction costs and improvement of product quality/customer service; *ii)* a defensive reaction to competitors engaging in e-commerce; and *iii)* insistence by large businesses that all of their suppliers link into their e-commerce system as a condition of doing business. The first factor, reduced transaction costs, drives the second and third. It is likely that the largest impact of business-to-business e-commerce will be on small and medium-sized enterprises (SMEs), because many large businesses already have EDI systems in place. The accessibility of the Internet makes electronic commerce a realistic possibility for SMEs and is likely to lead to its widespread diffusion. The fierce competition that surrounds use of e-commerce among businesses means that information about its

impact is closely guarded; as a result, not enough is known about this important segment, making it a prime area for future research.

The United States accounts for about 80 per cent of the global total of electronic commerce. While its share will probably decrease, it does not face some of the constraints that confront Europe and Asia, such as high cost and the lack of sufficient bandwidth and the slow pace of planned liberalisation of the telecommunications sector. Experience with mail order sales suggests that European consumers are less inclined to use this mode of shopping than Americans, with per capita sales less than half of those in the United States. Although some Asian economies, especially Singapore and Hong Kong (China), have embraced electronic commerce, the impact has been uneven, especially across large countries like Japan and Korea. Countries will dismantle barriers to global electronic commerce at different speeds, and this may raise competitive concerns and pose possible risks to the efficient development of global electronic commerce.

E-commerce's most significant impact will be on sectors that primarily transmit information (postal service, communications, radio and TV) and those that produce it (finance, entertainment, travel agents or stock brokers). Electronically delivered products such as software, travel services, entertainment and finance are leading products in both the business-to-business and business-to-consumer markets. Because of the intangible nature of such products, existing rules and practices will have to be re-examined.

Statistics that measure the level, growth, and composition of e-commerce are lacking, as is a consistent definition of e-commerce. Both are needed to help focus the policy debate.

### ***E-commerce and economic efficiency***

A key reason why electronic commerce, especially the business-to-business segment, is growing so quickly is its significant impact on business costs and productivity. Because many of these applications are relatively simple, they may be expected to be widely adopted and have a large economic impact.

Even though some Web sites cost hundreds of millions of dollars, simpler sites can be designed and constructed for tens of thousands. In general, it is less expensive to maintain a cyber-storefront than a physical one because it is always "open", has a global market, and has fewer variable costs. For exclusively e-commerce merchants who maintain one "store" instead of many, duplicate inventory costs are eliminated.

A key factor in reducing inventory costs is adopting a "just-in-time" inventory system and improving the ability to forecast demand more accurately. Both of these can be accomplished through the adoption of electronic commerce, which strengthens the links between firms. Improved demand forecasting and replenishment of stocks is estimated to lead to a reduction in overall inventories of \$250-\$350 billion, or about a 20 to 25 per cent reduction in current US inventory levels. While this estimate is probably optimistic, pilot

*Countries will dismantle barriers to global electronic commerce at different speeds...*

*... and this may raise competitive concerns and pose possible risks to the efficient development of global electronic commerce.*

*Electronically delivered products in particular require a re-evaluation of existing rules and practices.*

*A better definition of e-commerce and better statistics are needed.*

*It is the impact on costs ranging from...*

*... the cost of owning and operating a physical establishment...*

*... to carrying an inventory...*

*... to conducting a sale...*

studies on the US auto market obtained a 20 per cent savings, and even a 5 per cent reduction would have a significant economic impact.

*... to placing an order...*

By placing the necessary information online in an accessible format, electronic commerce merchants greatly increase the efficiency of the sales process. As a result, even when customers complete a transaction in a traditional way (off-line), over the phone or in a showroom, they frequently arrive knowing which product they want and ready to buy. This can improve the productivity of sales people by a factor of ten (although in some cases it simply shifts the costs to consumers).

*... to customer support and after-sales service...*

The electronic interface allows e-commerce merchants to check that an order is internally consistent and that the order, receipt, and invoice match. While this simple process may seem trivial, both General Electric (GE) and Cisco report that one-quarter of their orders (1.25 million in the case of GE) had to be reworked because of errors. E-commerce has reduced Cisco's error rate to 2 per cent.

*... to simple purchase orders and...*

In what are increasingly knowledge-based economies dominated by sophisticated products, customer service and after-sales service are a major cost for many firms, accounting for more than 10 per cent of operating costs. Through electronic commerce, firms are able to move much of this support online so that customers can access databases or "smart" manuals directly; this significantly cuts costs while generally improving the quality of service.

*... product distribution that is expected to fuel strong growth in the business-to-business segment of e-commerce.*

Internet-based e-commerce procedures now make it possible to apply EDI-type systems to relatively small purchases, thereby drastically reducing errors, ensuring compliance with organisational norms, and speeding the process. Estimates of the savings gained range from 10 to 50 per cent, although in many cases the time reductions are as important as the monetary savings: firms report cutting the time needed to process purchase orders by 50 to 96 per cent.

Although shipping costs can increase the cost of many products purchased via electronic commerce and add substantially to the final price, distribution costs are significantly reduced (by 50 to 90 per cent) for electronically delivered products such as financial services, software, and travel (Table 2).

Table 2. **E-commerce impact on various distribution costs**

|                    | US\$ per transaction |         |              |                            |                       |
|--------------------|----------------------|---------|--------------|----------------------------|-----------------------|
|                    | Airline tickets      | Banking | Bill payment | Term life insurance policy | Software distribution |
| Traditional system | 8.0                  | 1.08    | 2.22 to 3.32 | 400-700                    | 15.00                 |
| Telephone-based    |                      | 0.54    |              |                            | 5.00                  |
| Internet-based     | 1.0                  | 0.13    | 0.65 to 1.10 | 200-350                    | 0.20 to 0.50          |
| Savings (%)        | 87                   | 89      | 71 to 67     | 50                         | 97 to 99              |

Source: See notes to Table 2.4.

E-commerce over the Internet exploits a group of technologies – information and communication technologies (ICTs), software that links ICTs into a network regardless of the brand of hardware or software (Internet protocol), and relatively easy to use, universal, graphical interfaces (WWW and browsers) – with an application with broad appeal, commerce. This combination has the potential to provide the productivity gains that “prove” the worth of ICTs and unravel the “productivity paradox”. An OECD estimate of the potential impact of cost reductions generated by retail (business-to-consumer) e-commerce in five OECD countries is of the order of one-half to two-thirds of a percentage point. This is a considerable gain, since a reduction in these costs is a rough proxy for productivity gains (total factor productivity – TFP) which has only averaged an annual increase of 0.8 per cent across the G7 economies in the recent past (1979-97). Given that the cost savings due to business-to-business e-commerce are significant and that the business-to-business segment represents a much larger portion of the overall total, these estimates can be considered conservative.

Achieving these gains is contingent on a number of factors, including access to e-commerce systems and the requisite skills. However, what is unique about e-commerce over the Internet and the efficiency gains it promises is the premium placed on openness. To reap the potential cost savings fully, firms must be willing to open up their internal systems to suppliers and customers. This raises policy issues concerning security and potential anti-competitive effects as firms integrate their operations more closely. Another source of efficiency associated with e-commerce is the opportunity for “boundary crossing” as new entrants, business models, and changes in technology erode the barriers that used to separate one industry from another. This leads to increased competition and innovation, which are likely to boost overall economic efficiency. More generally, e-commerce highlights differences and similarities that may exist between products and industries, and suggests the need for a consistent regulatory environment.

While e-commerce can dramatically reduce some production costs, it does not really offer a “friction-free” environment. Rather, owing to new costs associated with establishing trust and reducing the risks inherent in this type of activity, it requires new intermediaries. Widespread “disintermediation” (producers selling directly to consumers without the aid of intermediaries) is unlikely to be any more pronounced than what has already occurred through direct mail, telephone, newspapers, TV and radio. A potentially larger impact involves the ease of access to information that to date has been possessed by intermediaries such as travel agents, insurance agents, stockbrokers and real estate agents. Rather than eliminating intermediaries, it is more likely that their role will be restructured and redefined.

*E-commerce has the potential to be the application that ushers in large productivity gains that prove the worth of ICTs.*

*However, as this segment of e-commerce grows and firms integrate their operations more closely, policy issues arise concerning security and potential anti-competitive effects.*

*E-commerce is unlikely to eliminate intermediaries, although their role is likely to change.*



*To date, e-commerce has not caused widespread price reductions, but lower costs associated with e-commerce should lead to lower prices as competition is felt, especially in services.*

The translation of cost reductions into price reductions is not automatic. It is contingent on sufficient competition. Currently, price reductions attributable to e-commerce have only been evident in a few sectors (e.g. retail stock trading). However, the lower costs associated with e-commerce should lead to greater product, market and international competition, especially in services, and thus to greater price competition.

*However, various factors might have a negative impact on competition in electronic markets.*

Even if the growth of markets for services on electronic networks is increasing competition, it is not clear that there is a direct relation between the adoption of open links and open market structures. A number of factors could have a negative impact on competition in electronic markets, notably sector-specific transaction structures, first-mover advantages or differences in regulatory environments.

*Electronic commerce will change the structure, if not the level, of pricing...*

It is clear that electronic commerce will change the structure, if not the level, of pricing, as more and more products are subject to the differential pricing associated with customised products, fine market segmentation and auctions, and as the ease of changing prices increases. While these changes will generally improve economic efficiency, they may raise some consumer concerns. Consumers are accustomed to paying different prices for products such as cars, but they may be less comfortable with differentiated pricing for smaller, common purchases. In addition, the more widespread use of variable pricing, the advent of greater price competition, and the ability to change prices quickly may affect expectations about price movements. Changes in the structure of price setting will affect the ability to measure changes in prices and inflation accurately.

*... and this will affect the ability to measure accurately changes in prices and inflation.*

### **Business models, sectoral organisation and market structure**

*E-commerce is playing a catalytic role in transforming the marketplace.*

While cyber-traders may not yet be representative of a new commercial paradigm, electronic commerce is playing a catalytic role in organisational change by opening up the possibility of new models for organising production and transacting business, thereby forcing existing firms to re-examine their cost structure and competition strategies.

*E-commerce favours flatter organisational forms and a flexible work force.*

E-commerce encourages streamlined business processes, flatter organisational hierarchies, continuous training, and inter-firm collaboration. Firms' ability to reorganise in the new electronic environment will crucially depend on the flexibility and adaptability of workers and on firms' continuing efforts to innovate.

*E-commerce entails new ways of competing in domestic and international markets.*

The Internet opens up certain proprietary relationships, extends relations between sectors, makes the electronic market accessible to smaller businesses and allows them to address international markets. The nature of competition as well as firms' strategies and competitive advantages in domestic and international markets also change. Increasingly, new entrants compete in setting standards and providing the interface, and Web-based alliances will play a strategic role in the emerging standard. Online firms also compete to capture customer information, and virtual communities could play a role in striking the balance of market power among consumers and



suppliers. Work can be performed from a variety of locations and firms are increasingly being exposed to global competition.

Smaller firms may in fact benefit from the opportunities offered by electronic commerce as they are unencumbered by existing relationships with traditional retail outlets or a large sales force. They may adopt a business model that forces larger, established competitors to restructure their existing relationships or be seen as non-competitive. The Internet can level the competitive playing field by allowing small companies to extend their geographical reach and secure new customers in ways formerly restricted to much larger firms.

Nonetheless, it is also possible that conditions of access to networks and connectivity, technical standards, institutional arrangements and the market power of well-known brands could pose barriers to entry that might impede SME involvement. This means that both governments and the business community must remain attentive to developments in the electronic marketplace in order to prevent or remove barriers to full SME participation.

### **Jobs and skills**

There is concern that some of the efficiencies associated with electronic commerce will result in widespread dislocation of jobs. The preliminary analysis contained in this book, studies conducted by other researchers, and an examination of somewhat analogous activities (such as France's Minitel) do not support this concern at this stage. It seems more likely that, in the short term, there may be net employment creation as firms experiment with both modes of commerce, that, in the medium term, there may be some losses, especially in certain sectors, but that, in the longer term, the combination of new products, extended market reach, and income gains and lower prices derived from productivity increases will lead to net employment gains as increased sales of software, online services, audio-visual, music, publishing and yet-to-be invented products offset losses due to displacement of other products. These effects are likely to differ across countries, depending on the size and structure of e-commerce. These observations are necessarily speculative because, as a share of all economic activity, e-commerce is currently very small and its potential has not been fully realised.

*Smaller companies can benefit disproportionately from the opportunities offered by information technologies and electronic commerce.*

*Indirect, long-term employment effects due to demand for new or existing products are likely to offset shorter-term adjustments, although effects are likely to differ across countries.*

Table 3. **IT jobs unfilled owing to skill shortages**

|                | Current estimate of unfilled jobs |
|----------------|-----------------------------------|
| World          | 600 000                           |
| United States  | 346 000                           |
| Germany        | 60 000                            |
| Canada         | 20 000/30 000                     |
| United Kingdom | 20 000                            |

Source: See notes to Annex Table 4.13.

*E-commerce is likely to accelerate upskilling/multi-skilling trends in the OECD area work force.*

What is clearer is the fact that electronic commerce will cause changes in the mix of skills required, driving demand for information technology (IT) professionals. This may exacerbate a supply shortage, which has received great attention in the United States, although it is not peculiar to that country (Table 3). For electronic commerce, IT expertise also needs to be coupled with strong business applications skills, and therefore requires a flexible, multi-skilled work force. Apart from contingent skills needed to support electronic commerce transactions and applications, there will be a more structural and long-term shift in the skills required to perform economic activities on line. In general, e-commerce is likely to accelerate existing upskilling/multi-skilling trends in the OECD work force.

*These skill requirements place new demands on schools and vocational training facilities.*

These skill requirements place new demands on schools and vocational training facilities. Becoming computer-literate can be a significant additional cost, one which is likely to vary as a function of age and educational background. A system of education that familiarises young students with the technology of the Internet can greatly reduce skills acquisition costs and decrease differences in participation rates in electronic commerce in the various segments of a society's population.

*Changes in the labour force caused by e-commerce underscore the need for flexible labour markets and active labour policies that help workers adjust.*

These changes in the labour force caused by e-commerce underscore the need for flexible labour markets and active labour policies that help workers adjust to changes in these markets. This will be particularly important for those service sector jobs, such as those in retailing, that have not yet been exposed to significant technological change or international competition.

### **Social implications**

*Societal factors merit policy attention in order to establish the social conditions that will allow electronic commerce to reach its full economic potential and to ensure that its benefits are realised by society as a whole.*

Although primarily an economic phenomenon, electronic commerce is part of a broader process of social change, characterised by the globalisation of markets, the shift towards an economy based on knowledge and information, and the growing prominence of all forms of technology in everyday life. These major societal transformations are now under way and will probably continue far into the foreseeable future. As both a product and manifestation of such transformations, electronic commerce is being shaped by, and increasingly will help to shape, modern society as a whole especially in the areas of education, health and government services. Societal factors will merit attention from a public policy standpoint, both to establish the social conditions that allow electronic commerce to reach its full economic potential and to ensure that its benefits are realised by society as a whole. Two such elements are first, access and its determinants (*e.g.* income) and constraints (*e.g.* time) and, second, confidence and trust.

*Policies that promote the development and availability of information technologies and access to advanced networks may be required.*

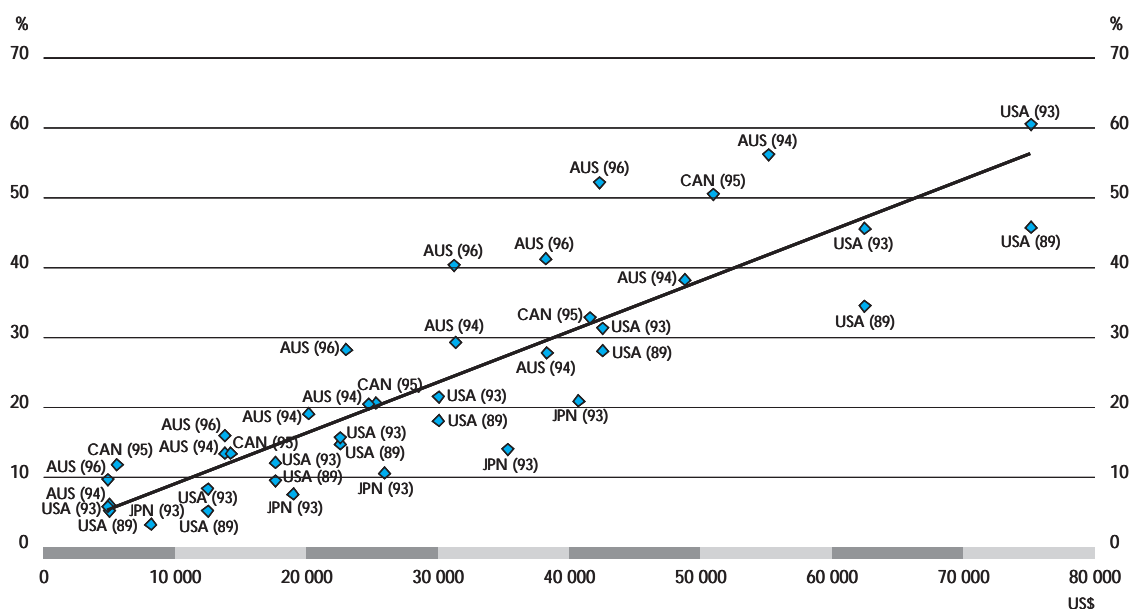
Access to the physical network will affect the adoption of e-commerce, particularly among consumers and SMEs located outside the urban centres of the developed world. One consistent finding across many countries is that there is a strong positive correlation between the use of information technology (PC ownership, access to the Internet) and household income: for every

\$10 000 increase in household income, the percentage of homes owning a computer increases by seven points (Figure 2). Governments might well look at ways to promote the development and availability of information technologies and access to advanced networks, either by means of conventional telecommunications policy measures or through other appropriate policy instruments.

Internet penetration rates show a similar pattern. As a consequence, households with higher incomes have more opportunity to benefit from electronic commerce than those with lower incomes. While this phenomenon is common to the introduction of most new technologies (e.g. electricity, telephone, TV), it may warrant the attention of policy makers since e-commerce could provide access to a market with special properties, such as lower prices, that could particularly benefit the disadvantaged. This fuels concerns about greater inequality due to information “haves” and “have nots”. There is reason to believe that the correlation between income levels and Internet usage may weaken, as lower-cost and simpler alternatives to the traditional personal computer become available, although recent work carried out in the United States between 1994 and 1997 reveals a widening gap in PC ownership between upper and lower income groups. Governments may wish to consider what policies, if any, might encourage the trend towards lower prices and thus accelerate connectivity.

*The correlation between income and access to the Internet means that policies to ensure access for lower income groups may be needed.*

Figure 2. **Computer penetration rates, by household income, in Australia, Canada, Japan and the United States**



1. Household incomes were converted to US\$ using PPPs. Income values were obtained by taking the midpoint of each income bracket except for the upper open-ended ranges where the lower bounds were used.

Source: OECD, 1997c.

*Where teledensities are low, public access sites located in schools, post offices, community centres, public libraries or even franchised shops are likely to be a potential alternative.*

*A better understanding of the impact of e-commerce on time use is needed because availability of free time is a driver of demand for e-commerce, since many of its products are interactive.*

*More generally, it is necessary to better understand the impact of faster and more interlinked exchanges on individuals, organisations, governments and communities.*

*A fuller understanding of what is needed to foster confidence in electronic markets, particularly among consumers, must be sought.*

Visions of a global knowledge-based economy and universal electronic commerce characterised by the “death of distance” must be tempered by the reality that half the world’s population has never made a telephone call, much less accessed the Internet. In countries with extremely low teledensities, universal access must be defined in some way other than access from every home; the alternative is access at the level of community or institutions. Public access sites located in schools, post offices, community centres, public libraries or even franchised shops are potential alternatives to home-based access.

E-commerce and other information and communication technologies reduce the importance of time as a factor that dictates the structure of economic and social activity. It raises the potential for saving time as consumers shop more efficiently, but could also reduce leisure, as the technology can provide a continuous electronic link to work. A better understanding of the impact of e-commerce and ICTs on time use is needed because the availability of free time is an essential factor in driving demand for e-commerce, since many e-commerce products (*e.g.* entertainment) are interactive and require immediate consumption.

Whereas technological development is taking place at an astounding and accelerating speed, reaching understanding and consensus, especially on social issues, is typically time-consuming. The nature of the Internet forces a reconsideration of the most effective way to govern and of whether centralised decision making can keep up with the speed and fluidity of the Internet. This suggests the need to consider decentralised modes of decision making, such as self-regulatory mechanisms. Another option may be to consider methods of controlling speed by “throwing sand into the wheels”. This points to the need to develop a deeper understanding of the impact of faster and more interlinked exchanges on individuals, organisations, governments and communities.

One of the hallmarks of electronic commerce is that, by drastically reducing transaction and search costs, it reduces the distance between buyer and seller, enabling businesses to target very small niches, develop individual customer profiles, and essentially provide a means of marketing on a one-to-one basis. The ability to realise this goal will largely hinge on the climate of confidence and trust that businesses are able to create in their relations with their business partners and customers. Assurances about protection of privacy and personal information play an important role in building that confidence. Both the public and private sectors need a fuller understanding of the requirements for fostering confidence in electronic markets, particularly among consumers.

### **Broad policy implications**

These findings have many implications for policy. While the intent of this book is to establish a preliminary analytical foundation on which further work can be developed and to suggest a research agenda, the potential policy implications have a direct bearing on this agenda. Many of the narrower policy implications have been identified, while

others (e.g. privacy, consumer protection, access to the infrastructure, taxation) are analysed in depth elsewhere by the OECD and other organisations (e.g. WTO on trade issues). Nevertheless, the horizontal, potentially pervasive impact of electronic commerce has implications for broader economic and social policies as well.

### **Technology policy**

One of the key features of electronic commerce is the potential system-wide gains in efficiency to be reaped when firms are linked across industries. Fostering such system-wide improvements requires rethinking technology and innovation policies, such as technology diffusion programmes, which tend to focus on one industry, such as manufacturing, while in fact the largest contributions to system-wide gains may come from services, such as wholesale trade, transportation and retail trade. This suggests the need to widen the notion of “innovation” from a focus on high technology in manufacturing to include consumer goods and services and to adopt a more systemic perspective.

*The focus of technology policy should be broadened to give greater attention to consumer goods and services and systemic objectives.*

### **Trade policy**

Issues of how to accommodate products bought and sold by electronic commerce in existing trade rules are being analysed at the WTO. E-commerce will increase international trade, particularly in electronically delivered products, many of which are services which have not yet been exposed to significant international trade but have been “traded” through foreign direct investment or have operated on a global level only for large corporate clients. This change may come as a shock to sectors that have been sheltered by logistical or regulatory barriers. In addition, it will generate pressures to reduce differences in regulatory standards – accreditation, licensing, restrictions on activity – for newly tradable products.

*E-commerce will generate pressures to reduce differences in regulatory standards for newly tradable products.*

### **Competition policies**

As the ease of forming business networks increases, as traditional market boundaries blur, and as technology undermines the rationale for the monopoly privileges granted to many service activities, competition policy will have to address new types of anti-competitive practices. Many e-commerce products benefit from non-rivalry (one person’s consumption does not limit or reduce the value of the product to other consumers), network externalities (each additional user of a product increases its value to other users), and increasing returns to scale (unit costs decrease as sales increase). These factors create an environment where producers may seek to engage in practices that permit them to establish themselves as the, or part of the, de facto standard. This can hinder innovation and competition.

*Competition policy will have to address new types of anti-competitive practices.*

### **Regulatory reform**

*Current policies pertaining to commercial transactions should be looked at in terms of their applicability to electronic commerce.*

Electronic commerce raises many issues regarding the application of existing regulations and issues such as tax law, commercial codes and consumer protection which have received a lot of attention. However, it also calls into question the applicability of retail regulations designed for a “bricks and mortar” world, such as restrictions on the size of stores and opening hours, limitations on pricing and promotions, granting of monopolies for the sale of certain products (e.g. liquor) and permit and licensing requirements. In many cases, these regulations need to be re-examined in light of the realities of electronic commerce. In addition to these regulations are those that continue to apply to communications. For e-commerce to function properly, cheap and easy access to information and communication technologies is needed; conditions that increase their cost will slow the diffusion of e-commerce and place industries that use information technologies at a disadvantage.

### **Social policies**

*Social policies need to support an entrepreneurial culture that promotes cross-fertilisation, risk taking and boundary crossing.*

While small, e-commerce has the potential to grow quickly and may be symptomatic of other applications that have been enabled by advances in information and communication technologies that create demand for new skills, new organisational structures, and new businesses models and generally increase the speed and geographic reach of economic and social activity. To many, these changes appear to be occurring more quickly than in the past and this may create a sense of insecurity. While it is unclear whether the pace of change is faster than in the past, insecurity may be lessened by social policies that match the fluidity of the economy: e.g. pensions that are portable between employers, education that occurs over a lifetime, health services that are not tied to a particular job.

### **Business-government policies**

*The experience of the last three decades suggests that governments should not intervene unduly in e-commerce, nor should they simply be spectators.*

Nearly all parties agree that the Internet and e-commerce will be led by business, with government playing a minimalist role. The dynamism of the e-commerce market as described in this book would support this view. Nonetheless, it is important to recall that governments have played, and continue to play, a critical role in developing technology for these activities, and that they have an obligation to pursue broad societal goals. Conventional economic theory would suggest that governments should only subsidise basic research into ICT technologies. However, the experience of the past three decades shows that most of the major ICT innovations [e.g. timesharing, networking, routers, workstations, optic fibres, semiconductors (RISC, VLSI), parallel computing], many of which are more applied or developmental in nature, are the result of government-funded research or government programmes. This is also true of e-commerce. The Internet’s forerunner (ARPAnet), the World Wide Web (CERN), and the browser (government centre at the University of Illinois) were developed with government support. Government procurement and demonstration projects also play an important part. While governments should not intervene excessively in this

area, neither should they simply be spectators. Governments will need to work closely with business to maximise the potential of this activity.

### ***Productivity and growth***

A key economic impact of e-commerce today is its beneficial impact on reducing firms' production costs. This is identified as a factor that will spur the use of e-commerce within and between businesses. Although there are measurement problems associated with capturing the quality changes inherent in many of these activities, it is assumed that e-commerce will result in productivity gains. Given that e-commerce is more a way of doing business than a sector, these gains could be distributed widely across OECD economies – including in the services sector, which has not enjoyed significant, measurable productivity gains in the past – and could help to enable long-term growth. As e-commerce evolves, it is likely to follow the “reverse product cycle”, in which process efficiency gains are followed by quality improvements to existing products and then the creation of new products. Typically, it is in this final stage that significant economic growth occurs. E-commerce has the potential to be a platform from which significant new products emerge, many of which will be digital and delivered online. New products have a tendency to beget more new products and processes in a virtuous spiral, just as Edison's electric lamp led to the development of power generation and delivery, which led to other electrical products.

*E-commerce is expected to result in productivity gains and growth and to be a source of many new products as well.*



## CONCLUSION

Still small in economic terms, e-commerce has the potential to accelerate existing trends and introduce new ways of conducting business, organising work and interacting in society. As with the advent of any new technology that may be widely diffused, there are overly optimistic and pessimistic predictions, which are generally inaccurate (mail order has not displaced traditional retail trade and the VCR has not displaced teachers). Nor is this the first time that our societies have been exposed to the broad diffusion of information and communication technologies: over the 20-year period from 1874 to 1895, the typewriter, telephone, phonograph, electric light, punch card, hydro-electric plant, automated switchboard, cinema and radio were all invented. At this point, research is needed in order to see more clearly the problems and the potential.

These preliminary findings and broad policy implications constitute an initial analytical basis for identifying areas of future research. The following conclusions are offered for discussion with the aim of establishing research priorities concerning the economic and social impact of electronic commerce.

Fundamental to any analytical work on electronic commerce is the ability to measure it accurately. To focus the policy debate, statistics that measure the level, growth, and composition of e-commerce are badly needed. Today, while nearly all sources indicate that business-to-business e-commerce dominates the market, most existing analysis and available data focus on the business-to-consumer segment.

- *A statistical methodology and apparatus for measuring electronic commerce should be developed. Key areas for future research are the business-to-business segment; electronically delivered products such as software, travel services, entertainment and finance; and country-specific differences in the size and growth potential of electronic transactions.*

A main reason for the rapid growth of electronic commerce, especially the business-to-business segment, is its significant impact on costs associated with inventories, sales execution, procurement and distribution, and with intangibles like banking. To reap the potential cost savings fully, firms must be willing to open up their internal systems to suppliers and customers. As firms integrate their operations more closely, issues of security and potential anti-competitive effects arise. More generally, e-commerce illuminates differences that may exist between products, industries and countries, thereby highlighting the need to reform inconsistent regulations.

- *The economy-wide and sector-specific impact of e-commerce on productivity should be assessed, and the notion that this application may lead to a sustained higher level of economic efficiency should be explored.*

E-commerce can dramatically reduce some production costs, but it does not offer a “friction-free” environment. Rather, owing to new costs associated with establishing trust and reducing inherent risks, it requires new intermediaries. Widespread “disintermediation” (producers selling directly to consumers without aid of intermediaries) is unlikely, but the nature of intermediary functions is likely to change.

- *Monitoring of the restructuring of intermediary functions is needed.*

Cost reductions are not automatically translated into price reductions. They are contingent on sufficient competition. Electronic commerce will certainly change the structure, if not the level, of pricing as more products are subject to the differential pricing associated with customised products, fine market segmentation and auctions, and as the ease of changing prices increases.

- *While a general assessment of the impact of e-commerce on prices may be premature, sectoral studies on a variety of consumer and business products should be undertaken to measure the impact and identify factors that encourage and inhibit price competition, including the use of intelligent agents. The impact of the structure of price setting and of the frequency of price changes on markets and on measurement also requires study.*

Electronic commerce is transforming the marketplace by changing firms’ business models, by shaping relations among market actors, and by contributing to changes in market structure. Electronic commerce also changes firms’ competitive advantages and the nature of firms’ competition. Given the dynamic nature of these processes, the impact of electronic commerce will be firm-, sector-, and time-specific.

- *The electronic marketplace needs to be continuously monitored. Case studies should address the sectoral and market specificity of organisational impacts. Ongoing assessment of potential new barriers to market entry is also needed.*

*Research on the evolving nature of the commercial environment will help policy makers address issues of commercial governance, which are critical to the development of electronic commerce. Asymmetries in firms' ability to control access to the electronic marketplace should also be investigated. This research will help policy makers to address competition issues, as well as to formulate policies targeted to SMEs.*

The overall impact of electronic commerce on employment is the net result of the countervailing forces of job displacement in one industry and job creation in another. Electronic commerce will also create new markets or extend market reach beyond traditional borders. The final effect on jobs will depend crucially on development of demand for electronic activities.

- *Case studies can help to better understand impacts on sectoral employment. As the employment potential of electronic commerce differs among countries, differences in their production of Web-related hardware and software content, which seems to be driving employment gains from electronic commerce, should be explored. Also, the impact on employment in the distribution sector, which will depend on countries' regulatory and organisational differences, should be investigated. Given the crucial role played by demand, trends in demand for new activities should be monitored and policy makers should be made aware of the factors underlying country-specific differences.*

Electronic commerce generates demand for a flexible, multi-skilled work force and is likely to accelerate existing upskilling trends in the OECD labour force.

- *It is important to identify specific skill needs for e-commerce and opportunities for worker requalification. Policies to cope with skill mismatches will have to be reinforced as the volume of electronic transactions increases. Better methodologies and data are needed for tracking rapidly changing skill requirements and monitoring labour market responses and adjustment mechanisms given the swiftly changing demand for different categories of ICT workers.*

Fundamental changes are taking place at virtually every level of society, prompted by the growth of the Internet, electronic commerce and other applications of information networks.

- *Since gaining access to the network is crucial for participating in the "Information Society", the factors that help and hinder access to the Internet, such as cost, language and skills, should be analysed to learn whether they can explain differences observed across countries.*

Many efficiency gains in the electronic marketplace will hinge on the climate of confidence businesses can create in their relations with their business partners and customers. Assurances of protection of privacy and personal information play an important role in building that confidence. Both the public and private sectors need a fuller understanding of the requirements for fostering confidence in electronic markets, particularly among consumers.

- *It is necessary to better understand the economics associated with the use and protection of private information, and the means to evaluate the costs and benefits of various proposals to protect or reveal private information. These may include firm- and industry-level benefits, and costs of assuring the confidentiality and integrity of personal data; the relative impact of firm-based, sectoral-based and economy-wide standards for safeguarding personal information; and the effects on trade and investment of divergent levels of privacy protection across economies and jurisdictions.*

### NOTE

1. The analysis focuses disproportionately on the United States, owing to the availability of material. Because of the size of that country and its cultural and regulatory characteristics, the relevance of its experience to other countries may be limited. However, information and communication technologies (ICTs) are closely linked to the emergence of electronic commerce, and as ICT diffusion rates in other countries begin to approach those of the United States (or of countries such as Finland), their experience may be similar. If so, the demographic and industrial diversity of the United States may provide a useful indication of what can be expected in other countries that openly embrace ICTs. Lastly, the Internet is less country-specific and more international in nature than earlier ICTs, so that its impact in any given country is likely to be more generalisable than that of earlier ICTs (*i.e.* France's Minitel). While this book tries to rely on scholarly work and solid statistical data as much as possible, to gain insight into the macroeconomic impact of a phenomenon that is changing as quickly as e-commerce requires relying on private data sources, expert opinion, the popular press and anecdotal statistics as well.