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**The Internet and
Business Performance**

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FOREWORD

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A fifth Forum was organised on 25 September 2001 on *The Internet and Business Performance*. The purpose of the Forum was to draw major stakeholders from government, industry and trade unions together to examine: *i*) the gains that business could realise through the exploitation of Internet-based strategies; *ii*) the principal technological and organisational challenges that firms were facing in realising these gains; *iii*) the policy measures that needed to be taken in different countries to improve framework conditions; and *iv*) the respective roles that governments, the business community, trade unions and civil society could play in developing guidelines and policies for Internet development and use.

The Belgian Government hosted the meeting, in co-operation with officials from the Hainaut Province and the city of Mons. The session was co-chaired by Mr. Olli Rehn, Head of Commissioner Liikanen's Cabinet in the European Commission (Commissioner Liikanen oversees enterprise and information society issues) and Mr. Douglas Worth, Secretary General of the Business and Industry Advisory Committee to the OECD (BIAC) (see Annex 1 for a copy of the programme).

The information developed through the Forum will be used in the longer-term work that the Organisation is conducting on Internet development and use (see <http://www.oecd.org/ecommerce/>). This work currently comprises issues in four principal areas: building trust for users and consumers, establishing ground rules for the digital marketplace, enhancing the information infrastructure for electronic commerce, and maximising the societal benefits of electronic commerce.

TABLE OF CONTENTS

SUMMARY.....	7
IMPACT OF THE INTERNET ON BUSINESS PERFORMANCE.....	9
Marketing.....	12
Inter-firm and customer relations (B2B and B2C).....	13
Product development, manufacture and assembly.....	17
Organisational structure.....	18
Human resources.....	20
External relations.....	22
STRUCTURAL ASPECTS.....	23
Sectoral effects.....	23
Small and medium-sized enterprises.....	25
Country dimensions.....	26
POLICY ISSUES.....	29
Improving Internet access.....	30
Facilitating organisational change.....	30
Developing human resources.....	31
Addressing the needs of small firms.....	32
Balancing roles in policy making.....	32
Strengthening multilateral guidelines.....	33
Building security and trust.....	33
Strengthening competition.....	34
Addressing issues related to intellectual property.....	34
<i>Annex 1. The Internet and Business Performance</i>	
Programme of the OECD Business and Industry Policy Forum.....	37
<i>Annex 2. Tables.....</i>	39
<i>Annex 3. Ongoing OECD Work on Electronic Commerce.....</i>	45
References.....	49
Boxes	
Box 1. Summary of the Effects of the Internet on Business.....	11
Box 2. Covisint Goals.....	18
Box 3. Key Issues for Business and Industry.....	29

SUMMARY

The Internet is providing firms with new ways to conduct business and exchange and communicate information and ideas. In doing so, it is enabling companies to improve efficiency and develop novel ways to co-ordinate activities. Internal firm organisation and relations with employees and shareholders, for example, are being affected, as are the external relationships that firms have with suppliers, customers, competitors and other parties. Some of the changes that are occurring were explored in the report to OECD Ministers on *The New Economy: Beyond the Hype* (OECD, 2001a). The report concludes that the Internet and related advances in information and communication technology (ICT) are transforming economic activity, much as the steam engine, railways and electricity did in the past. They have done so by providing a catalyst for change in business – helping to spur improvements in work organisation through reductions in routine transaction costs and rationalisation of supply chains, while spawning value-generating networks.

The extent to which the Internet and related ICT advances are affecting business and industry is, however, unclear, as are the potential benefits that could be realised through further development of Internet-based strategies. There are also issues related to the different uptake rates of ICT among countries, some of which are examined in the OECD report on the role of information technology, innovation and entrepreneurship in spurring growth (OECD, 2001b). It was against this background that stakeholders convened, with a view to: *i*) clarifying the situation in different sectors; *ii*) identifying key issues that are affecting the development of Internet applications in different countries; and *iii*) examining the policy changes that are required at the national and international levels to maximise the contributions that the Internet can make to business performance .

The Forum discussion indicated that the development and integration of Web-based strategies by firms is in many instances in very early stages of development, and that considerable time will be required for the benefits to be fully realised. Governments could facilitate development by pursuing initiatives to expand Internet accessibility to broader populations of businesses (particularly small and medium-sized enterprises – SMEs) and consumers, by

promoting development of Internet-related knowledge and skills, and by continuing to work with business and civil society to develop effective regulatory frameworks and standards to facilitate Internet transactions. Close attention needs to be paid to ways to enhance security and trust. As most of the issues being addressed have an important multilateral dimension, international co-operation will be required to help identify optimal policy approaches, and to address increasingly difficult cross-border issues. Finally, the reactive, time-consuming approach that governments typically use in policy making is ill-suited to addressing many ICT issues, given the speed with which innovation is transforming the ways in which individuals, groups, business and governments interact. Supporting further innovation may require governments to explore more effective ways to respond, through, for example, expanded co-regulation with industry and/or increased industry self-regulation.

IMPACT OF THE INTERNET ON BUSINESS PERFORMANCE

The Internet is a technological tool whose effects on business – already clearly evident in some firms and sectors – are likely to grow significantly in the future. Development has been particularly dynamic since 1993, when the first Web browsers became generally available. The dynamism has been enhanced by a number of structural factors, including: continuous development of higher-speed, lower-cost computers; related increases in the power of virtually all electronic devices; rapid expansion of networks; and accelerated distribution of digital applications over a broadening range of economic sectors (Vergnes, 2001).

Development of common standards has also played a key role, helping to bridge differences in language and operating systems worldwide. Adoption of TCP/IP (transmission control protocol/Internet protocol) as a standard for connecting destinations and sources, and acceptance of HTML (hyper-text mark-up language) as a standard for Web-page presentations have been key in this regard. TCP/IP, for example, provides the framework required to support “e-mail”, which has dramatically changed the ways that most businesses communicate. HTML, initially created in 1989, has also been critical, providing a vehicle through which all Internet users can develop and share input.

Development of standards continues, with increased attention being paid to initiatives that will enable the Web to be “programmed”. One of the key areas involves the development of Web-tailored *extensible mark-up language* (XML), which offers Internet users a vehicle for sharing standardised data and for processing such data easily across different software applications. The W3C (World Wide Web Consortium) – an international industry consortium run jointly by the MIT Laboratory for Computer Science in the United States, the National Institute for Research in Computer Science and Control in France, and Keio University in Japan – is developing these standards, with a view to completing initial work by April 2002 (World Wide Web Consortium, 2001). On the programming side, considerable progress has already been made in a

number of areas. *Java*, for example, is a popular general-purpose programming language that can operate on various Web platforms.

Businesses have responded to the opportunities emerging from Internet development and expansion in various ways. Many functions related to ordering and paying for goods and services, for example, have been placed “on line”, creating new systems which either complement or replace existing systems. Moreover, the Internet has greatly enhanced the development and use of auctions to trade goods and services. In addition to the traditional selling of items to high bidders via auction, reverse auctions – where buyers award parties the right to supply goods or services to low bidders via auction – have become more common, particularly in the business community.

In addition, the Internet has prompted the development of new business models aimed at capitalising on the tremendous customer base that can be built for goods and services at relatively low cost. The models are based on the notion that increasing audience and sales can ultimately translate into sizeable profits, and that this longer-term potential should take precedence over shorter-term profitability. The models were supported by many investors, as reflected in the record levels of capital directed to Internet-related start-ups during the 1990s, despite the weak financial performance of the new firms. Rising share prices provided further momentum and reinforced these tendencies.

Amazon.com is a well-known example of a company that proceeded along these lines. Launched in 1995 as a venture to make book-buying faster and easier via the Internet, the company expanded audience and offerings, increasing sales almost 20-fold during a three-year period, to USD 2.8 billion in 2000 (Amazon.com, 2001). Losses grew even faster, however, rising more than 40-fold, to USD 1.4 billion. However, the lack of profitability did not dissuade investors. Share prices (adjusted for splits) surged from a low of USD 1.31 per share when the company made its initial public offering, to a high of USD 113 per share in late 1999, before easing in recent months to less than USD 10 per share.

Amazon’s experience has been shared by most other “New Economy” undertakings. With the recent economic slowdown, many promising initiatives have failed, while the share prices for remaining companies have slid precipitously. Over-investment and over-capacity in ICT sectors have contributed to much of the deterioration, as ICT consumers in the business community have been unable to absorb new technologies at the rate they have been developed. At the same time, the slowdown has revealed the weaknesses in those “dot.coms” which relied excessively on “audience-driven” business models.

While the slowdown may have tempered expectations, there is ample evidence that businesses will continue to work with, and refine, Web-based strategies, with significant implications for the way they operate, and for the way they are organised. Along the supply chain, there is potential to improve product and service development, as well as supply, manufacturing and assembly processes, internal administration, marketing, sales and distribution systems and customer service (see Box 1 and Annex 2, Table 1). At the same time, there are potentially important implications for the ways in which firms interact with their employees, shareholders and the public at large.

Box 1. Summary of the potential effects of the Internet on business

- Lowers search costs and improves search effectiveness.
- Speeds and improves communication within firms and with outside parties.
- Facilitates networking with suppliers and other business clients (B2B), consumers (B2C), specialists, research institutions, government, etc.
- Improves efficiency and/or effectiveness of key business operations (administrative functions, human resource management, product development, manufacture and assembly, marketing, after-sales service).
- Facilitates and expands direct sales potential.
- Expands potential markets.
- Provides a venue for new or modified products.

Source: OECD.

Evidence of the development of broad-ranging strategies is already emerging in a number of “traditional” industries and firms. At Czech-based Škoda Auto, for example, personal computers were first introduced in the firm relatively recently, in 1991 (Kroupa, 2001). From that point in time, the introduction and use of ICT technology has expanded rapidly, with the Internet now seen as a key tool, affecting procurement practices, customers and business administration (Table 1). Convinced of the importance of the Internet, the company has introduced a two-year training programme to ensure that all employees acquire and develop the Internet-related skills and competence required for their respective positions.

Table 1. Internet at Škoda Auto

B2B Supply chain	B2C Customer relations	B2E Administration
e-procurement	Customer e-marketplace	Intranet communication
Supply chain management	– Dealer location	e-recruitment
Auction - dynamic trading	– Car configurator	e-training
e-marketplace	– Accessories e-shop	e-learning
Catalogue management	Mobility	Catalogue management
	– Route planner	Office e-shop
	– Navigation	Facility management
	– Traffic information	
	– Hotel guide	
	– Remote diagnostics support	
	m-commerce (mobile Internet services)	

Source: Kroupa, 2001.

Marketing

One of the areas in which the Internet has enormous potential to improve business effectiveness and efficiency is in marketing. The posting of universally accessible compendia of information on the availability, price and range of goods and services at various locations worldwide represents a highly cost-effective means for firms to promote visibility and sales.

With the number of sites proliferating, however, firms will have to move beyond simply establishing a presence, in order to realise the full marketing potential of the Internet. In this context, they will need to develop strategies to promote their goods and services in imaginative ways, by linking or associating their offerings in a contextual manner (Vergnes, 2001; Worth, 2001). Doing so will provide a potential both to boost the volume and unit value of such offerings. A winery which associates its products with sites that promote regional cultural, tourism and/or a particular cuisine, for example, has a possibility to differentiate its offerings from thousands of related products. This sort of contextual marketing is particularly important and promising for smaller firms which do not have name or brand recognition.

In addition to expanding and improving on traditional forms of marketing, the interactive capabilities of the Internet add an important dimension by enabling consumers to browse and, in some instances, sample some digital-

intensive products prior to making a purchase. Trial versions of software, for example, can be downloaded and used for limited periods of time, as can music and passages from written works. Information from databanks can similarly be shared on a trial basis, as can a variety of financial and related digitally intensive services.

The Internet also provides a mechanism for sellers to diffuse considerable amounts of information to a vast audience, albeit in a highly personalised manner. In addition to collecting information that could be critical for further product development in general, the setting up of banks of personalised information can enable suppliers to match their goods and services more effectively with individual customers. “Smart” systems which use customer input to develop profiles on preferences are already being used by book retailers, for example, to suggest other titles that might interest customers. At the same time, use of broader socio-economic-demographic information could prove useful in exploring new interests with customers.

While there are clear benefits to firms in exploiting the Internet to develop and share information on users, doing so raises a number of important issues related to the protection of individual privacy. The ability of skilled Internet users to stalk and retrace the paths followed by “surfers”, and/or access information and files maintained by users on individual work stations, for example, could be done in obtrusive, abusive or even illegal ways that conflict with the wishes of users. While there are technological solutions being developed that will help to address some privacy concerns – by providing users with tools to manage the types of information that can be shared with other online parties – caution will need to be exercised. Whatever technologies are developed will require educated consumers and users who are able to understand how the protective schemes operate. Even with this knowledge, the threats to privacy will remain a concern in light of the rapid development and proliferation of new techniques and technology. As with anti-virus software, methods to protect privacy are often likely to be developed in response to abuses, after systems have already been compromised.

Inter-firm and customer relations (B2B and B2C)

The potential to network all parties involved with the design, finance, production, marketing, distribution, consumption and servicing of a firm’s offerings provides opportunities to significantly improve the co-ordination and efficiency of operations. Many of the efficiencies flow from improved handling of information. Time-consuming transcription of data can be reduced or eliminated, at the same time greatly diminishing the introduction of errors. In

terms of customer support, banks of information can be maintained to facilitate the handling of inquiries at low cost, while technical assistance, via e-mail or real-time interaction with a technician, can improve the effectiveness of customer support systems.

Full development of this potential, however, requires parties to trust one another sufficiently to share access to their internal Web systems. This is already the case with firms that permit customers to track the status of their orders via the Internet. More far-reaching changes are occurring on the supply side, where some companies are providing vendors with greater access to their systems to enable more efficient handling of orders. In the case of Microsoft, for example, pre-approved vendors of computer hardware were granted authority to interact directly with employees who, in turn, were empowered to purchase hardware, within prescribed budgetary and related constraints (Vergnes, 2001). These sorts of arrangements enabled the company to cut the cost of processing orders from USD 60 to USD 4.

In addition to cost savings, the time required to complete purchases can be reduced significantly, thereby improving operational efficiency (OECD, 2000a). MCI, a telecommunications firm, for example, reports that its purchase cycle for computers was reduced from four to six weeks to 24 hours through e-commerce (Margherio *et al.*, 1998). Bell South, another telecommunications firm, cut the approval time for expense reports from three weeks to two days (Davis, 1998), while the US General Services Administration reduced the time needed to complete a purchase by more than 50% (Girishankar, 1997). In the case of Microsoft, the time required to process an order fell from four days to ten minutes (Vergnes, 2001). Moreover, improved communication and responsiveness provide opportunities to reduce the level of inventories required to support production and sales.

In the field of competition, Internet-driven business-to-business (B2B) relationships can provide a vehicle through which competition can be strengthened. On the provider side, goods and services can be offered for sale to a global clientele on a highly cost-effective basis while the real-time interactivity of the Internet enables the suppliers to sell their merchandise more flexibly using, for example, auctions. On the procurement side, tenders can similarly be made on a global basis, enabling a much broader range of potential suppliers to compete. In this instance, reverse auctions can greatly expand competition.

One of the more interesting developments in B2B e-commerce involves the co-operative relationships that companies competing in the same markets have created. In the automotive sector, General Motors and Ford announced, in

1999, the formation of separate Internet networks for procuring goods and services on line. Rather than proceed with rival systems, a decision was made to develop a single global portal that would be open to all auto manufacturers and their suppliers, partners and dealers worldwide. The rationale for the joint effort was explained as follows (Wagoner, 2000):

As we continued to build our separate exchanges, we quickly realised traditional, individual stand-alone models weren't the winning strategy for us, our industry, our suppliers and, ultimately, our customers. By joining together we can further increase the pace of implementation, thereby accelerating the benefits for everyone involved.

The idea has since evolved into the Covisint partnership. Three of the companies now participating in the initiative – General Motors, Ford and DaimlerChrysler – currently purchase 10% to 20% of their parts and materials through the exchange (*Wall Street Journal*, 2001).

Similar exchanges involving the active collaboration of competitors are being developed in many other sectors, including steel, retail trade, agriculture, energy, tires and rubber, aerospace, health care and pulp and paper – to mention but a few. To date, however, these exchanges do not seem to have greatly influenced the ways in which most firms conduct business. Indeed, a number of initiatives have collapsed in recent months, while the future of the remaining exchanges is in question. In the case of automobiles, Volkswagen – citing limitations associated with a joint undertaking and the need to protect strategic information – elected to establish an independent exchange rather than become a partner in the Covisint consortium (Kroupa, 2001; Garsten, 2001; eBreviate, 2001).

In the case of steel, Korean producers, with the support of the government, have been collaborating on standards that could be used to facilitate the development of efficient B2B, Internet-driven marketplaces (Lee, 2001). Much of the focus has been on ways to harmonise product classification schemes and related documentation. While much progress has been made in the e-procurement area for products and services associated with maintenance, repairs and operations (MRO), companies have been reluctant to agree on the elements that would underlie the common platforms through which their steel would be sold. Work currently underway at the OECD on e-commerce suggests that these tendencies (*i.e.* more limited progress in the sales area than in MRO) are fairly common in other sectors.

In order to be successful, producers and consumers will of course ultimately have to “buy in” to the electronic marketplaces. This could require

considerable time and effort, as many firms are not convinced of their effectiveness. This scepticism is reflected, in part, in a recent survey of US companies participating in exchanges. On a scale of 1 to 10, the firms indicated that product searching (8.6), order status (8.6) and catalogues (8.3) were the most important features sought in an exchange, with auction capabilities assigned a relatively low score of 4.2 (Moozakis, 2000).

While interest may be high, the effects of Internet on purchasing practices in general appear to be relatively low, suggesting that business is still in the early stages of implementing e-procurement strategies. According to a US-based survey conducted in March 2001, only 6.3% of respondent firms indicated that the Internet had changed their procurement practices in a significant or dramatic way (NAPM and Forrester, 2001). A number of impediments, including difficulties associated with internal and external integration and the lack of data standards, were seen as providing obstacles to more vigorous Internet activities. As a result, more than half of the respondents had made less than 5% progress in adopting Internet purchasing, while only a small percentage (7.6%) had implemented more than 40% of their plans.

In addition to the sector-driven exchanges discussed above, the Internet is providing a venue for new types of collaboration across industries, as evidenced by the bundling of related goods and services at many sites. E-marketplaces focusing on real estate, for example, provide prospective homeowners with related information on home finance, insurance, removal services, community information and news, etc. Within industries, intermediaries are being created to collect basic information from potential customers which is then shared with potential providers of goods or services who, in turn, are in position to make competitive offers. This is evident in the field of finance, for example, where a single report filed by a potential borrower is distributed to a group of participating lending institutions which, in turn, can choose to make competing loan offers.

While intermediation has increased in some areas, dis-intermediation is also occurring in light of the diminished need for traditional distribution chains. Many goods and services, for example, can be ordered directly from producers via the Internet. The degree to which dis-intermediation occurs, however, is likely to vary widely among products. In the case of the auto industry, for example, the desire of most customers to “experience” a car physically prior to making a purchase limits the extent to which the Internet is likely to diminish the role of intermediaries (Kroupa, 2001). Visits will still be made to dealers, who are likely to continue to play a major role in delivering and servicing even those purchases which are made via the Internet.

Product development, manufacture and assembly

In a number of sectors, the Internet is changing the nature of the products marketed to consumers by enabling producers to move from mass production of standardised output to customised output tailored to meet the specific demands of consumers. The possibilities are particularly promising in information-intensive activities, where data can be manipulated and formatted according to individual templates or profiles. While still at an early stage, some signs of this trend are already evident. Some news organisations, for example, are supplementing standardised, mass-produced hard copy with customised, digitised editions containing articles that have been screened and organised according to criteria established by readers.

The “build-to-order” approach is not, however, necessarily limited to information-intensive industries. Dell Computer Corporation has been a pioneer in transforming mass-produced computers into a “built-to-order product”, and there are signs that other industries are moving in this direction. In the case of one of these industries – autos – the challenges are formidable in light of the complexity of production processes, the broad range of options that are proposed to consumers, and the long lead times required to produce a finished car (Fine and Raff, 2000). Pressures to reduce cycle times are, however, building as producers race to incorporate revenue-enhancing ICT-related features into their vehicles. Such features currently include enhanced safety, navigation and concierge services and e-mail/Web/telecom capability. Indeed, General Motors envisions that its products will evolve from transport vehicles to “... a rolling platform for a whole range of in-vehicle communications products and the subscription fees that go along with them” (General Motors, 1999).

To succeed, development cycles in the auto industry will have to be pared back from their current level of four to six years (Fine and Raff, 2000). The Internet is expected to play an important role in this regard. It appears that current technology could be used to shorten the cycle to 36-42 months (Kroupa, 2001). Participants in Covisint, the Internet-based exchange in which General Motors, Ford, DaimlerChrysler and Renault/Nissan participate, have, however, established a more ambitious goal of slashing the development cycles to 12-18 months over time (Box 2) (Covisint, 2001).

Box 2. Covisint goals

- Reduce development cycles to 12-18 months.
- Compress order-to-delivery cycles.
- Increase shareholder valuations within the automotive industry.
- Raise asset efficiency and utilisation.
- Increase profitability with direct impact on the bottom line.
- Enhance integrated supply chain planning.

Source: Covisint, 2001.

Manufacturing and assembly operations are also benefiting from the development and implementation of Internet-based applications. This is occurring largely through the ability of firms to synchronise internal and external business processes more efficiently. This can lead to more effective management of inventories (both inputs and finished products), for example, and a more integrated handling of order, processing and shipping information.

Organisational structure

The speed and efficiency with which large volumes of information can be shared between unrelated business units via Internet-driven networks has enhanced the ability to collaborate on a wide range of information-intensive activities. This has helped to overcome limitations related to the need for physical proximity, enabling firms to engage outside parties to take over, or contribute to, functions that were previously carried out internally. The sharp growth in outsourcing illustrates how firms are focusing resources on core competencies, relying on external, specialised firms to provide ancillary goods and services on a more cost-effective basis (OECD, 1999a).

These developments have implications for firm organisation. Traditional autonomous structures, for example, are giving way to more flexible configurations in which specialised firms enter into relationships with other entities on a project-oriented basis (McAfee, 2000). A computer firm previously engaged in developing, manufacturing and installing systems, for example, is now more likely to focus on one aspect and rely on third-party partners to supply software, equipment and/or system support.

In some instances, companies have moved far from their traditional businesses, eliminating major operations and functions entirely. Cisco Corporation is a case in point (McAfee, 2000). The company is known as a leading supplier of information and communications equipment, although it currently does little actual manufacturing itself. Instead, it has created a supply chain in which associated companies co-ordinate and share information through Internet-driven networks. In this, and a growing number of other cases, conventional linear manufacturing chains are being replaced by networks of specialised firms. A similar phenomenon occurred at UK-based ICL (International Computers Limited) (OECD, 2000*b*). Originally an ICT equipment manufacturer, ICL refocused its activities on the design and operation of information and communication systems, abandoning manufacturing altogether. As with Cisco, ICL oversees and works with partner firms to provide finished systems (including hardware) to clients.

There are indications that major manufacturing industries are undergoing similar transformations. In the automotive industry, for example, fast and flexible communication can facilitate co-ordination with suppliers in ways that increase outsourcing and promote the development and use of more standardised modules within the industry (Fine and Raff, 2000). Like the ICT firms cited above, auto-makers can “outsource” much of their manufacturing, engineering and design, with the firm’s ultimate value resting on its ability to co-ordinate and oversee the whole process (Helper and MacDuffie, 2000). Interest in proceeding along these lines is already being shown. The Porsche Boxster, for example, is designed by Porsche, with manufacturing and assembly operations contracted out to a variety of other networked firms (Savitz, 2001). Moreover, a company has recently been formed that “aims to deliver a portfolio of new vehicles leveraging a single modular platform by 2004 through the use of computer-aided industrial design, an end-to-end technology infrastructure solution, contract engineering, contract manufacturing and a direct distribution channel” (Build-to-Order, 2001). The Internet is seen as one of the key technologies that will enable this project to proceed.

The extent to which transformation will occur may, however, be limited as there seems to be a strong reluctance on the part of many companies to abandon existing, successful approaches to their businesses (European Commission, 2001). More profound changes are likely, and already evident, in information-intensive sectors, such as financial services, travel and tourism, training and education, and news and information services.

In financial services, for example, traditionally closed and rigidly controlled systems are giving way to new business models and competitive behaviour which is more open. As a result, financial markets are converging,

while the number of cross-cutting financial products is growing. Conventional regulatory models, including those that are self-regulatory or co-regulatory in nature, may therefore have to be adapted to address changes in the competitive environment. In this regard, differences in regulatory frameworks across jurisdictions can place constraints on the extent to which business can take full advantage of emerging opportunities. The effects on industry structure have been pronounced. Mega-mergers have served to consolidate financial services in certain respects, but competition has remained keen as low barriers to entry have enabled new players to emerge.

Human resources

Internet applications are being developed and introduced in ways that are improving the efficiency, effectiveness and productivity of human resource administration. *Recruitment*, for example, is being conducted by firms through the Internet, through open solicitations for applicants. In addition to reducing search costs and increasing the potential pool of applicants for open positions, these recruitment techniques can result in a more effective matching of employee and employer interests and needs. While most firms with an Internet presence provide information for prospective employees at their individual sites, there are also opportunities for broader exposure through more generic sites that consolidate employment solicitations from multiple employers. At Škoda Auto, for example, job vacancy notices provided to employment agencies in the Czech and Slovak Republics – at a cost of EUR 1 000 per month – have proven to be a highly effective means of recruiting employees for entry to mid-level positions (Kroupa, 2001).

There is also great potential for improving the accessibility, cost and effectiveness of *training* through online resources and courses. Development of “streaming” applications is enriching possibilities in this area, providing an enhanced means through which lectures, seminars and instruction can be accessed as needed, on a group or individual basis. Savings can be sizeable. Interactive Internet-training involving the introduction of a new customer relations management system at IBM, for example, cost the company a total of USD 30 000 for 29 000 employees (Worth, 2001). The cost of traditional training, which would have been conducted in stages and involved travel and related expenses, would have been on the order of USD 1 000 per person, or USD 29 million – almost 100 times the Internet cost.

At Škoda Auto, the importance of providing timely and effective training to workers has been assigned high priority, reflecting the company’s emphasis on education as a key competitive factor (Kroupa, 2001). The role of the

Internet in providing this education has evolved and Internet is currently being used for PC and language training, technical courses on standards, and courses focusing on skill development and managerial practices. The general benefits of using the Internet in lieu of more traditional classroom training has been the open access (everyone has access every day), the possibility for employees to establish their own pace for training, the ability to evaluate the efficiency of the training via e-tests, and the possibility to update course content rapidly. The impact of Internet use has been notable, as the time spent in classrooms and the cost of instruction has fallen while the effectiveness of training has increased (Table 2).

Table 2. **Beneficial effects of e-training at Škoda Auto**

Item	Effects
Time spent in classrooms	50-80% less
Learning time	40-60% shorter
Cost of education	15-35% lower
Level of acquired knowledge	35-65% higher
Need for repeating courses	25% lower

Source: Kroupa, 2001.

Human resource *administration* and *communication* are becoming more efficient as the Internet (or the more restricted internal Intranets that are being developed by firms) provides personnel departments with a far more effective, interactive means to deliver services to employees. In the field of programme administration, a recent survey of US firms indicates that Web-based applications are currently being used most widely to facilitate benefit enrolment (39%), personal data changes (31%), 401(k) changes (35%) and new hire enrolment (19%) (Towers Perrin, 2000). Users indicated notable increases in the timeliness and accuracy of human resource transactions, while service providers recorded a notable decrease in workload.

In the realm of *compensation*, the Internet is enhancing the ability of firms to introduce and administer cost-effective, global compensation schemes that include an equity component (NCEO, 2000; ECEO, 2001; GEO, 2001). This is of particular importance in light of the growing interest shown by firms in using equity-based compensation to improve performance by aligning the interests of employees more effectively with those of the firm. In this regard, the Internet serves as a key enabling technology to link firms (which administer and assign equity rights) with brokers and bankers (which provide financial and brokerage services) and other service providers, doing so in a way that provides employees with a single interface for exercising purchase rights and managing portfolios

on a 24-hour, seven-day per week basis, from anywhere in the world, through customised, language-sensitive portals.

External relations

The Internet provides business with a vehicle for engaging stakeholders and other interested parties in new types of relationships. In effect, it removes the filtering role that the media has traditionally played in distilling and analysing company and industry information, replacing it with direct interface with interested parties. In doing so, it enables business and outside communities to communicate on a scale heretofore unreachable, via e-mail, surveys and participation in interactive “conferences”. The Internet thus has potential as a powerful tool for informing the public about the conditions and issues facing a company and for soliciting feedback. Many firms have exploited this, posting a range of information-intensive products – including financial statements, annual reports and news releases.

This increased transparency and visibility can be advantageous to stakeholders. Investors, for example, are in a position to make more informed financial decisions. Those interested in public policy can improve their understanding of the issues facing particular firms and industries and the rationale underlying their positions. There may also be important implications for the way that firms make decisions and conduct their affairs. Interest in how companies respond to environmental, economic and social challenges, for example, appears to be rising, putting pressure on firms to articulate their positions and goals in key areas. The highly visible treatment that these positions and goals receive via the Internet is likely to heighten accountability, pressuring companies to become more conscious about the implications of their decisions for the communities in which they conduct business. Novel ways to reinforce the potential that this trend could have in improving corporate governance need to be explored more fully.

The empowerment that the Internet provides to individuals and groups can help to reinforce the pressures on firms to improve governance. At the same time, the enhanced ability to disseminate misleading or erroneous information can expose firms to misguided “campaigns” or “attacks” that can disrupt operations. This could prove increasingly problematic as Internet use develops and expands.

STRUCTURAL ASPECTS

The effects of the Internet are not uniform across firms, sectors or countries. Different industry characteristics and variation in Internet access and regulatory conditions among countries are key issues in this regard.

Sectoral effects

In general, information-intensive service industries have been the most affected by the Internet, along with manufacturing sectors which sell products that can be digitised and traded over the Internet (such as software, written literature, and the like). It appears, however, that there is also considerable potential for the effects to be significant in a wide range of “old-economy” arenas (Litan and Rivlin, 2000). In basic and intermediary industries, for example, e-business technologies are seen as having a significant effect on productivity, competitiveness and the level of service provided to consumers (European Commission, 2001). Changes are, however, viewed as more evolutionary than revolutionary in the case of large firms, reflecting their mature use of new technology to reinforce existing practice and tendencies. As indicated below, more significant impacts could occur with SMEs.

Quantifying the potential effects of the Internet on different sectors is difficult in light of the rapid changes that are occurring in Internet applications. One analysis – prepared by Goldman Sachs – indicates that efficiencies in B2B transactions could be on the order of 2% to 39% (see Annex 2, Table 2) (Goldman Sachs, 1999). The largest reductions were seen in electronic components, with a number of basic industries (chemicals, paper and steel) looking set to achieve savings on the order of 10%. Separate analysis of the auto industry suggests that total savings due to e-commerce are likely to exceed 13% (Fine and Raff, 2000).

One traditional sector that is being significantly affected by the Internet is health care. The Web provides the means to diffuse large volumes of information and knowledge that have heretofore been restricted in many countries to physicians and other health-care providers. This diffusion is

empowering patients in ways that will make them more effective partners in diagnosing and treating ailments (Bouchard, 2001). Moreover, it could prove to be a valuable tool in boosting overall well-being by providing individuals with an information resource that can be used to develop “healthier” life styles.

Much has already occurred on the “supply side” through the posting of substantial volumes of health-related information. Merck & Company, a major pharmaceutical concern, has, for example, provided free Internet access to a number of key products and services, including home and professional versions of *The Merck Manual*, a comprehensive general medical text that describes the diagnosis and treatment of numerous ailments. By doing so, the company hopes to enhance its long-term relationships with health-care providers and consumers/patients, and to improve the diagnosis and treatment of ailments. Other firms have proceeded along the same lines, as have some governments. The National Institutes of Health in the United States, for example, provide a considerable amount of medical information and information about their research on the Internet.

On the demand side, the public is showing interest in this information. In July 2001, for example, Merck Web sites alone registered over 2 million unique visits, including over 700 000 visits to the professional edition of *The Merck Manual* and over 500 000 visits to the home edition (Bouchard, 2001). As consumers and health professionals utilise these resources and act on the knowledge that they acquire, the potential to improve the quality and efficiency of health-care systems should rise. The extent to which it does will depend in large part on how four key issues are resolved:

- Right to privacy (for health-care data).
- Quality of available information (the Internet is indiscriminate).
- Absence of common standards among countries.
- Different regulatory approaches.

In the case of different regulatory approaches, the controls imposed by many countries on activities related to health care can be effectively undermined if users are simply able to access a source outside the regulated area. This sort of dilemma has already arisen in the case of the United States, where information flows are relatively liberal, and the European Union, which is more restrictive in this respect (Bouchard, 2001).

Small and medium-sized enterprises

The Internet has proven to be a powerful catalyst for promoting the growth of “start-ups”, including software firms that have developed Internet-related applications (utilities, games, systems, etc.) and newly established firms that use the Internet as the principal medium for buying and selling goods and services. In addition, the Internet is providing a broader range of SMEs with opportunities to expand their customer bases by providing a low-cost, global platform for promoting information and commerce. In a sense, the Internet is allowing many SMEs to become global players in ways that have heretofore been reserved primarily for large multinational companies.

While uptake of the Internet and related ICT by SMEs is increasing, it has lagged behind that of larger firms (European Commission, 2001). A lack of awareness, together with skill shortages and the relatively high costs associated with developing electronic commerce strategies, appear to be key factors in this regard. In the area of technical expertise, a survey conducted by the US-based National Association of Manufacturers (NAM) indicates that more than half of the small manufacturers surveyed did not have an internal information technology (IT) staff, whereas only 4% of large manufacturers were without such resources (NAM, 2000). In terms of cost, simple Web presence can be established at low cost with little required technical expertise. More sophisticated e-procurement systems, however, are more demanding and expensive, with system prices (including licensing fees, implementation and maintenance) averaging USD 1.09 million for stand-alone systems, with alternative, hosted systems available at 60% lower cost (Aberdeen Group, 2001).

Financial and technical issues aside, the need to increase awareness of the potential benefits that Internet-based strategies could provide to SMEs is a critical one. ICT-driven companies are helping to increase such awareness, to the extent that they pressure or require the SMEs with whom they do business to develop and implement Internet capabilities. Both government and the business community have important roles to play in this area by providing technical assistance and advice to smaller entities and forming networks to exchange information. More governments are now developing *e-government* and *e-procurement* services, thus helping to increase small-firm uptake of the Internet.

Another challenge that many SMEs have to address concerns their credibility. Little-known firms may have difficulty selling in global markets until such time as they have established a “reputation”. The process could be a lengthy one, depending on the nature of the good or service provided.

Recognised independent intermediaries could play an important role in this context, to the extent that they are able to ensure or certify that firms or products meet recognised standards. Market acceptance of products designed by independent software developers, for example, could be enhanced through third-party certification. Such certification could ensure the stability and functionality of a product, as well as its operational “safety”. SMEs especially need low-cost and reliable authentication and certification mechanisms to establish their online identity and trustworthiness as well as access to alternative dispute resolution mechanisms (OECD, 2001c).

Country dimensions

Framework conditions differ considerably within the OECD area, affecting the extent to which Internet use is developing. Availability of basic technology, such as computers, for example, varies widely. In eastern Europe, for example, per capita PC penetration is less than 10%, compared to more than 60% in the United States (Mikuš, 2001). Telecommunications infrastructure varies as well, influencing the extent to which users can access the Internet, and the speed and convenience of connections. The prevalence of Internet hosts (an indicator of the state of infrastructure development) is by far highest in the United States, where there were more than 234 hosts per 1 000 inhabitants in October 2000. In contrast, the average for the OECD area was 82, with ten countries having less than 20 hosts per 1 000 persons (see Annex 2, Figure 1). The extent to which high-speed access is available is also influencing Internet development. In this regard, commercial high-speed digital subscriber line services are growing rapidly, expanding from seven OECD countries in 1999 to 22 in 2000; at the same time, high-speed connections via cable were available in 21 countries.

In addition to infrastructure, the costs associated with accessing the Internet can be an important determinant of use. In some areas, such as the United States and New Zealand, unmetered access has provided users with a highly cost-effective means to explore the Web (Annex 2, Figure 2). Variations of this approach are becoming more common in other areas, particularly as Internet service providers join with telecommunications firms to offer hybrid products. With regard to price levels, costs, adjusted for purchasing power, are lowest in the United States, where the price for 40 hours of use was about USD 24 in September 2000, compared to USD 135-174 in three eastern European countries (*i.e.* the Czech Republic, Hungary and Poland) (Annex 2, Figure 3). Despite the higher cost, interest in the Internet is growing rapidly in these latter countries. In the Slovak Republic, some 17% of the mature population worked with the Internet in mid-2001, almost double the 9% share registered in August 2000 (Mikuš, 2001). Business use has been growing as

well, but lags behind other countries in a number of areas: of the 50 000 Slovak firms working with the Internet, only 4% were using leased lines in mid-2001, with the balance relying on dial-up connections.

Different framework conditions also have implications for the use of the Internet for e-commerce. The prevalence of “secure servers”, which is indicative of e-commerce activity, was highest in the OECD area (in July 2000) in Iceland and in the United States, where there were over 24 servers per 100 000 persons (Annex 2, Table 3). The average for the whole OECD area was only 8.4, indicating sharply lower development in most other countries. Annual growth rates, however, are robust in all countries, suggesting that firms are rapidly recognising the opportunities offered by e-commerce and are vigorously expanding their capabilities in this area.

Finally, cultural factors may also play an important role in Internet development and use. The EU report on the conference on *The e-Economy in Europe*, for example, concludes that entrepreneurship and risk-taking are the main factors which determine the success and extent to which ICT technologies are exploited (European Commission, 2001). In this context, the United States was seen as having an edge, given its deep capital markets and buoyant firm creation. The effects on the European Union were nonetheless seen as being relatively high as the internal market strengthened and deregulation advanced.

POLICY ISSUES

The Internet has the potential to influence the way in which firms operate at virtually every phase of the value chain and across most industry sectors. While the process is advanced in some firms and sectors, in most areas Internet-based strategies are being developed and implemented on an incremental basis. The full potential of the Internet will be realised gradually, over time and in step with continuing technological advances. However, there remain a number of important unresolved issues which encompass technical standards, regulatory frameworks, pricing, taxation, competition, infrastructure and cultural/societal norms (Box 3).

Box 3. Key issues for business and industry

- Improving Internet access.
- Facilitating organisational change.
- Developing human resources.
- Addressing the needs of small firms.
- Balancing roles in policy making.
- Strengthening multilateral guidelines.
- Building security and trust.
- Strengthening competition.
- Addressing issues related to intellectual property.

Countries differ with regard to the key Internet challenges to be addressed. Some need to focus on enhancing infrastructure and access, while others should give attention to regulatory and legal frameworks which are limiting use. Reaping the full benefits will require governments to work closely with business, unions and civil society. They will also need to work together since

many issues have an important multilateral dimension. The diversity in conditions and policy approaches across countries raises additional challenges which are being addressed in a number of international institutions, including, for example, the OECD and the WTO (see Annex 3).

Improving Internet access

There are wide variations across OECD countries in terms of Internet infrastructure, access and pricing, and these are reflected in differing levels of e-commerce uptake across nations, sectors and firms. The use of the Internet by business and industry depends on its cost effectiveness, reliability, speed and reach. The price and terms of access are critical, both on the business-to-consumer (B2C) side and in business-to-business (B2B) relationships. In this context, policy initiatives to open up the Internet to broader populations are needed, particularly with regard to telecommunications infrastructure for digital interchange (*e.g.* the basic telephone network and more sophisticated mobile telephony and broadband networks). On the business side, broadband and the priority of leased lines are crucial. Countries without adequate bandwidth technologies will be competitively disadvantaged and evidence a slower pace of e-commerce adoption.

Further liberalisation of telecommunications systems and price reductions and the advent of alternative access infrastructures are needed in many countries. “Unbundling” – the separation of the local network and infrastructure from the services that are provided over that network – is key to increasing competition. Unbundling of the local loop enables new entrants to offer services such as unmetered Internet access to their customers. Countries with unmetered access, where users pay a flat fee or no fee for Internet access, include Australia, Canada, Mexico, New Zealand and the United States. More time is spent on line in these countries and this supports higher levels of electronic commerce. Countries with unmetered access typically have more secure servers which also enable secure payment and thus online commercial transactions. Internet access pricing and metered charges are key issues to be addressed by governments who wish to maximise the benefits of ICT for business.

Facilitating organisational change

The structural changes that the Internet is facilitating and/or driving could result in significant adjustment challenges for some firms and industries. Evidence shows that productivity growth is highest in firms which combine organisational change with their ICT investments. Organisational change

encompasses production processes (quality management, lean production, business re-engineering), management approaches (teamwork, training, flexible work and compensation) and external relations (outsourcing, customer relations, networking). There may, however, be significant internal obstacles to change, reflecting managerial conservatism, lack of strategic vision, insufficient technical expertise, and limited financial resources to develop and implement new Internet-based strategies. At the same time, there may be risks associated with “dis-integration” as outsourcing and dependency on outside firms can rise to relatively high levels. Governments can help to overcome some of these obstacles by identifying and promoting the beneficial effects of organisational change, and by supporting the development of frameworks for labour/management relations that are receptive to examining and introducing modifications in work practices.

Developing human resources

The dynamic and continuous organisational changes that are being prompted by ICT advances result in a need for workers to adapt to new environments on a frequent basis. Skill shortages have been identified as a stumbling block to furthering Internet-related development and use. The role that public and private institutions should play in ICT-related training and educational programmes is being debated. Firm-level or work-related training is an area where significant market failures exist in most OECD countries. Because of the uncertainty and risks related to realising the benefits of such training, managers and employees tend to under-invest in job-specific training and upgrading of skills.

In most countries, the government finances a large share of public education expenditures, while the private sector is responsible for work-related training. The amount of training received by workers varies greatly by country. Career- or job-related training is higher in Finland, Sweden, the United Kingdom and France, and relatively low in Greece, Poland, Portugal, Italy, Canada and Spain. Governments should explore ways to boost industry initiatives for training staff in Internet-related skills, including through compulsory financing, training grants, training leave, fiscal incentives and labour/management agreements. In the Internet era, it is important to structure policies to support intangible investments and the development of human capital more effectively.

Addressing the needs of small firms

As discussed earlier, the Internet and electronic commerce present a number of opportunities for small and medium-sized enterprises. These include cost reductions, expansion of the customer base or geographical market, new product and service niches, and easier internal restructuring. SMEs in traditional sectors can use e-commerce to reach new customers and markets, more innovative small firms can find market niches in electronic-based goods and services, and SMEs in all sectors can improve efficiency and performance through joining electronic supply chains. Despite the many benefits of electronic commerce for SMEs, they are lagging behind larger firms in adopting both business-to-consumer (B2C) and business-to-business (B2B) e-commerce. An estimated 90% of large firms in the OECD area have Internet access, but less than 50% of SMEs are linked to the Internet and those that are tend to use it primarily for e-mail. It is estimated that about 20% of SMEs maintain a Web site, but less than 5% engage in online sales and purchases.

Because SMEs often do not have the resources or technical expertise to benefit from the Internet, direct and indirect assistance may be needed. OECD governments have implemented a range of e-commerce initiatives which benefit SMEs, including improving access to network infrastructure and providing frameworks for assuring privacy, consumer protection, etc. Small firms in the United States, the Nordic countries, Australia and Canada have the highest levels of Internet connectivity in the OECD (partly related to the cost of ICT goods and services, level of network access and number of secure servers). Some governments are developing schemes targeted to small firms, including diffusion of information and training on e-commerce, facilitating access to financing for e-commerce activities, and linking large and small firms in e-commerce networks and supply chains. Countries need to review their individual situations to identify where bottlenecks to greater SME use of e-commerce exist.

Balancing roles in policy making

While there is increasing consensus on the desirability and need for all stakeholders – business, unions, governments, consumers – to be involved in the formulation of policies that affect the development and use of the Internet, how this should be done is sometimes unclear. More consideration needs to be given to the ways that appropriate balances can be struck between industry self-regulation, co-regulation and more traditional government regulation. Key questions in this regard concern the approaches which can be used to include stakeholders in local, national and international contexts. The types of criteria

that can be applied to determine the roles of industry and public authorities in developing and administering regulations also need to be reviewed. While national approaches will differ, international co-operation is needed in developing rules and guidelines given the global nature of the Internet (OECD, 2001*d*).

Strengthening multilateral guidelines

The trade and/or delivery of goods and services via the Internet raise a series of issues related to customs treatment and taxation (OECD, 1998*a*). These include the rate of taxation, the venue, and the ability of tax authorities to monitor business transactions to assure that companies and individuals are adhering to tax laws (Annex 3). Progress has been made on a number of fronts. A framework of principles governing tax and e-commerce was established at the OECD's 1998 Ottawa Conference, for example, and a number of reports highlighting issues such as the treatment of business profits, characterisation of income, place of taxation for consumption taxes and tax administration were published by the OECD during 2001 (<http://www.oecd.org/daf/ctpa/tec>). The reports recognise that while progress is being made, much remains to be done. In particular, there is a need for a clearer understanding of how the implementation of taxation principles in the country of consumption (for taxes like VAT) can be achieved without imposing significant compliance burdens on vendors of digitised products.

The Internet is, by its nature, an instrument which tests the abilities of governments to control access, content and use. With the development of new technologies, these abilities may be weakened yet further. How governments will be able to enforce national standards governing e-commerce, intellectual property, competition, consumer protection, and the like, is unclear (Mansell, 2001). The challenges may be particularly daunting where business enterprises are "virtual" entities specialising in digitised products. Conflicts between national jurisdictions, already evident in some areas, may become more common. The urgency of these issues for business and industry needs to be clarified and multilateral discussions should be intensified.

Building security and trust

Reliance on technologies that are evolving and have occasionally been compromised has raised concerns among Internet users (OECD, 1998*c*, 1998*d*). *Strengthening security* is thus a major issue, to which much attention is being paid at national and international levels. How great a concern security issues are

for business and industry needs to be established, as do measures that can be taken to improve the situation. Similarly, *protection of privacy and personal data* from unauthorised parties or for unauthorised uses is a matter of concern, as is *consumer protection*, when existing national and international conventions prove inadequate. Finally, the need for effective *dispute resolution* guidelines is of high priority for business, which is generally concerned about the consequences of expanding sales to markets where the methods for resolving disputes are unknown and could be costly (Annex 3) (OECD, 2001c).

Strengthening competition

Co-operation and networking among firms prompted by the Internet has both pro- and anti-competitive aspects. In terms of promoting competition, the Internet can lower search and transaction costs in ways that broaden markets and render them more transparent and competitive. While efficiency is promoted, insufficient competition among e-marketplaces (or exchanges) is a concern, as are the terms that might apply to firms participating in Internet exchanges. Enhanced ability for competitors to collude or act to exclude rivals might also require attention. The increasing transnational scope of many of the issues may require greater co-operation among competition authorities.

At the same time, the open competition that Internet exchanges promote raises the importance of price, at the expense of the long-term partnerships that many firms have traditionally cultivated with suppliers. In this way, the Internet may act to enhance competition in many markets. However, with prices being driven to marginal costs, there is concern that areas such as research and development (particularly R&D conducted by suppliers) may be discouraged. The extent and areas in which Internet use by firms is affecting product market competition may require new approaches to antitrust and competition policy, particularly at the international level.

Addressing issues related to intellectual property

Growth in the importance and value of knowledge has raised increasingly complex and important issues concerning intellectual property rights. In the software sector, for example, open-source software – which is software whose source code is freely available to interested parties for evaluation, testing and further development – competes with commercially developed software in numerous areas. If released with a “General Purpose Licence”, users of the “free” software are obliged to accord “open-source” status to any products in which the GPL software is integrated (GNU, 2001). Commercial software

providers thus have to avoid GPL products in order to protect their proprietary offerings and their right to collect royalties and fees (Vergnes, 2001). Some governments have apparently been promoting use of GPL products, a practice that could have significant implications for future software development.

ANNEX 1

THE INTERNET AND BUSINESS PERFORMANCE

*OECD Business and Industry Policy Forum
held in Mons, Belgium
on 25 September 2001*

OPENING SESSION

- Mr. Claude **DURIEUX**, Député permanent de la Province de Hainaut
- Mr. Charles **PICQUE**, Ministre de l'économie et de la recherche scientifique, Belgium
- Mr. Seiichi **KONDO**, Deputy Secretary-General, OECD

MORNING SESSION

CHAIR - Mr. Douglas **WORTH**, Secretary General, Business and Industry Advisory Committee to the OECD (BIAC)

Internet and the firm

Mr. Bernard **VERGNES**, Chairman Emeritus and Senior Vice President, Microsoft Europe, Middle East and Africa (Belgium)

Where does traditional business stand with respect to its use of the Internet, the prospects and principal issues? What are the main country and sector differences in Internet uptake?

Relationships with suppliers, competitors and customers

Mr. Ladislav **MIKUŠ**, President and CEO, Slovenské telekomunikácie, a.s. (Slovak Republic)

What are the opportunities and issues associated with developing, running and expanding Internet-driven networks on a global basis?

Mr. Charles **BOUCHARD**, Executive Director for External Affairs, Merck & Co. Inc., and Director of the Merck Centre for European Government Affairs (United States, BIAC)

How has the Internet affected relationships with consumers, providers and other stakeholders in a service sector such as health care? What are the implications for public policies?

AFTERNOON SESSION

CHAIR - Mr. Olli **REHN**, Head of Cabinet of Commissioner Liikanen,
Enterprise Policy and Information Society, European Commission

Organisational change within firms and industries

Mr. Miroslav **KROUPA**, Head of Product Cost Reduction Department, Škoda-Auto
(Czech Republic)

What are the implications of the Internet for the quality, efficiency, and price of goods/services and sales? How is the Internet being used in recruitment, training, communication and business administration?

Mr. Youngkon **LEE**, B2B Development Team Leader, POSDATA Co., Ltd. (Korea)

What are the expectations/goals with regard to B2B e-commerce and what have been the results? What are the prospects? What public policy issues have arisen at the national and international levels?

Policy implications and conclusions

ANNEX 2

Table 1. **E-commerce opportunities along the supply chain**

Product/service development	Supply management	Manufacturing and assembly	Marketing	Sales and distribution	Customer service
E-commerce economic levers					
Improve product development by capturing customer input more effectively	Reduce sourcing costs through increased price transparency and competition	Lower transaction costs by reducing double handling of information	Strengthen customer relationships and improve cost effectiveness through targeting	Reduce sales and distribution costs through automation – e.g. sales tools, and printed material costs	Improve customer service
Enable collaborative development across companies and geographies	Reduce inventory costs through shorter procurement process and delivery times	Lower work in progress costs through improved forecasting	Research new user segments and geographies	Promote new products and services – e.g. cross-selling	Lower customer interaction costs

Source: McKinsey & Company, 2001.

Table 2. Potential cost savings from business-to-business e-commerce in the United States, by sector

Electronic components	29-39%
Machining (metals)	22%
Forest products	15-25%
Freight transport	15-20%
Life science	12-19%
Computing	11-20%
Media and advertising	10-15%
Aerospace and related parts	11%
Steel	11%
Chemicals	10%
Oil and gas	5-15%
Paper	10%
Health care	5%
Food ingredients	3-5%
Coal	2%

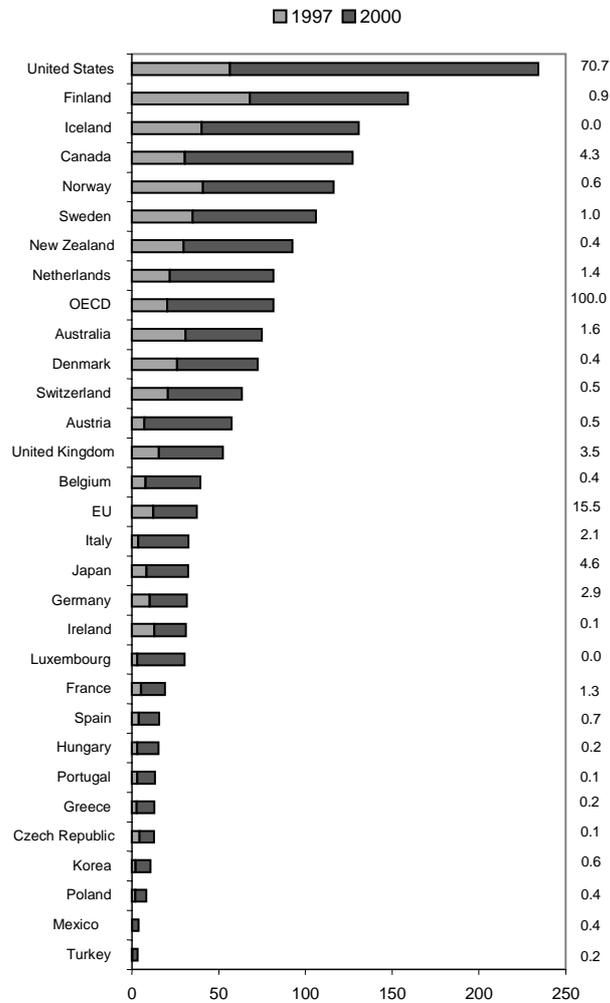
Source: Goldman Sachs, 1999, as cited in OECD (2000a).

Table 3. **Secure servers in OECD countries, July 2000**

Country	Secure servers per 100 000 persons	Average annual growth (%)
Iceland	24.5	208
United States	24.3	173
Australia	15.1	174
Canada	12.9	160
New Zealand	12.7	218
Switzerland	12.0	231
Luxembourg	10.3	150
Sweden	9.2	230
Total OECD	8.4	185
United Kingdom	7.4	258
Finland	6.7	202
Ireland	6.6	169
Norway	6.2	198
Austria	5.5	178
Denmark	5.5	278
Germany	4.6	332
Netherlands	3.5	163
Belgium	2.6	208
Japan	2.3	288
France	2.2	242
Spain	1.9	109
Czech Republic	1.9	461
Italy	1.4	188
Portugal	1.2	165
Hungary	0.9	200
Greece	0.8	494
Korea	0.5	270
Poland	0.5	359
Mexico	0.2	288
Turkey	0.2	779
EU total	4.3	226
World total	1.6	186

Source: OECD (2001e).

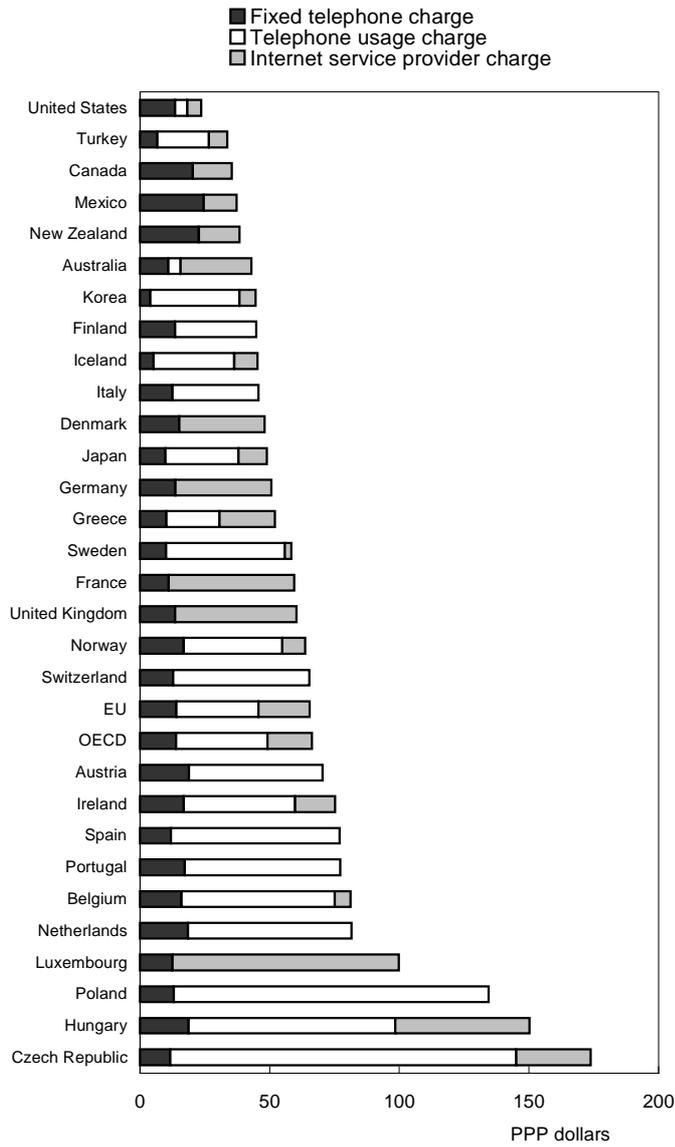
Figure 1. Number of Internet hosts per 1 000 inhabitants
gTLDs¹, July 1997-October 2000



1. Generic Top Level Domains (gTLDs) are distributed to country of location.
Source: OECD (2001e).

Figure 2. Price of 40 hours of Internet use at peak times, September 2000, in PPP USD

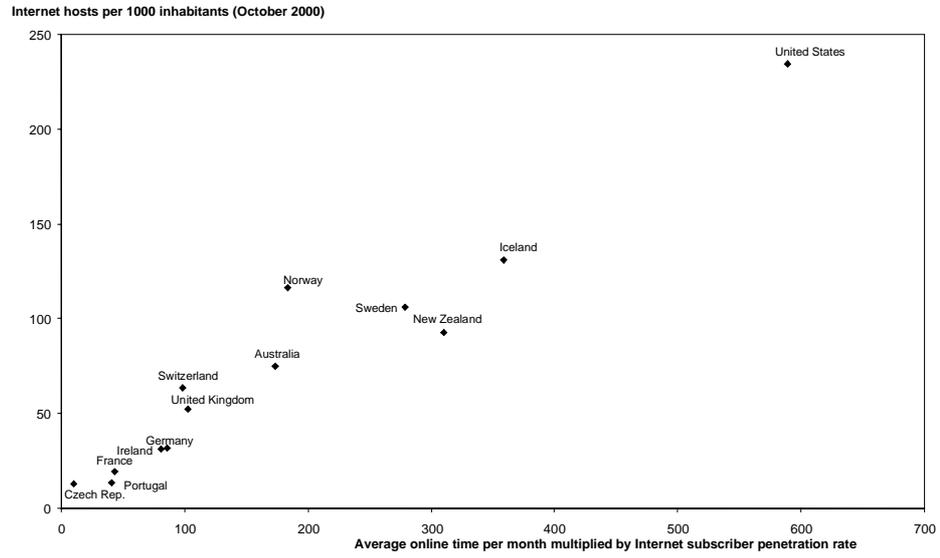
OECD Internet access basket for 40 hours at peak times using discounted PSTN rates, September 2000



1. In some countries, ISP and PSTN usage charges are bundled and included under the ISP charge.

Source: OECD (2001e).

Figure 2. Internet online time and hosts, by country, October 2000



Source: OECD (2001e).

ANNEX 3

ONGOING OECD WORK ON ELECTRONIC COMMERCE

The rapid growth and development of the Internet, and the technical, economic and societal issues that it raises, have received a significant amount of attention at national and international levels. The OECD has itself been engaged in developing solutions to challenges in four key policy areas (OECD, 1998*b*):

- Building trust for users and consumers.
- Establishing ground rules for the digital marketplace.
- Enhancing the information infrastructure for electronic commerce.
- Maximising the benefits of electronic commerce.

In addressing these areas, priority has been given to issues relating to privacy, authentication, consumer protection, taxation, access to infrastructure and the socio-economic impact. During the course of this work, issues have been raised concerning the role of stakeholders and the manner in which policies should be developed and applied. In this context, it has been noted that people no longer speak of a dichotomy between regulation and self-regulation: the challenge is to obtain the appropriate mix between these approaches. Second, there is increasing awareness that all stakeholders must be involved, including civil society. Third, not all countries are at the same level, so common solutions are not likely to be applicable to all. Finally, now that progress has been made in defining issues and policy approaches, attention increasingly needs to be turned to policy implementation.

In addition to these issues, the World Trade Organization has established a comprehensive work programme to examine trade-related issues relating to global electronic commerce (WTO, 2001). The programme is looking specifically at issues related to trade in goods, services and intellectual property, while examining the situation in developing countries.

Building trust for users and consumers

Progress has been made in a number of key areas in the past several years. In terms of building trust, guidelines establishing the core characteristics of effective *consumer protection* for online business transactions were adopted by the OECD Council in 1999 (OECD, 1999b). The guidelines deal specifically with principles associated with fair business, advertising and marketing practices, online business and information disclosures, handling of consumer complaints, provision of effective dispute resolution and redress, education and awareness, and global co-operation.

Protection of privacy and personal data is being pursued through a reinforcement of existing OECD guidelines, as indicated in a declaration adopted by Ministers at their 1998 conference on e-commerce, held in Ottawa (OECD, 1998c). In co-operation with industry, privacy experts and consumer groups, work has since focused on: *i*) identifying the legal and self-regulatory instruments used to implement and enforce guidelines on global networks at the national, regional and international levels; *ii*) encouraging the adoption of privacy policies and providing technical assistance to assist webmasters in this endeavour; *iii*) examining the development and use of contractual solutions to facilitate online transborder data flows; and *iv*) helping to ensure that effective enforcement mechanisms are available to address non-compliance with privacy principles and policies.

The importance of *security of information systems* was reinforced in the Ottawa Conference, which outlined a number of areas to be addressed by OECD countries to improve techniques to assure authenticity (OECD, 1998d).

Establishing ground rules for the digital marketplace

The digital marketplace is testing the existing legal and commercial frameworks. To assure that biases are not introduced either for or against digital markets, it has become clear that new and/or modified rules and regulations will have to be developed in the fields of taxation, trade, competition law, electronic finance. In furtherance of this work, framework conditions for taxation were developed and endorsed by Ministers at the 1998 Ottawa Conference (OECD, 1998a). Since that time, progress has been made in a number of areas.

Taxation

In the field of *consumption tax*, there is consensus that taxation should be based on the business presence of the recipient in the case of B2B transactions, and, in the case of B2C transactions, on the usual jurisdiction of residence of the private consumer. Work is continuing on refining these principles and on finding ways to ensure that implementation can take place utilising the technology itself to lighten the burdens on business. On *international direct taxation* issues, it has been agreed that a Web site or Internet service provider by itself would not constitute a permanent establishment for tax purposes, and that the mere downloading of digital products would not give rise to royalty payments. As regards *tax administration*, there is consensus on the need for tax authorities to work more closely together to improve co-ordination, and that efforts to facilitate tax compliance and tax collection should continue.

Other

In the field of *international trade*, the applicability of WTO commitments for the online delivery of services has been examined, as have approaches to liberalising e-commerce. The treatment of online products as goods or services is being reviewed. Issues related to Internet *access and competition* are receiving increased attention, as is the potential need to examine the functioning of the OECD Codes of Liberalisation in light of the growth in cross-border e-finance. Cross-border electronic delivery of insurance is also under review.

Enhancing the information infrastructure for electronic commerce

The ability to take full advantage of the opportunities provided by the Internet depends in large measure on its accessibility, cost and efficiency. The availability of sufficient bandwidth at the right price is key for businesses interested in developing e-commerce. The OECD has been addressing such issues, in co-operation with industry, with an emphasis on four key areas (OECD, 2001*d*):

- Public policy implications of the changing information and network technologies.
- Developments in pricing for access to broadband infrastructures.
- Governance issues.

- Policy requirements for open international telecommunications markets.

Related work pertains to new measurement tools affecting the domain names system and Internet traffic exchange. The tools required to assist self-governance and address access issues are being designed.

Maximising the benefits of electronic commerce

The potential of the Internet can only be realised to the extent that it is available to and used by businesses, consumers and institutions. Much of the work that the OECD is conducting in this area focuses on how use is developing. The *economic and social impact*, for example, is being explored through research, with a view to improving the ability to measure the structure and volume of electronic commerce, deepening understanding of the impact of e-commerce within and between businesses, and determining how e-commerce is changing employment levels and skill requirements. Special attention is being paid to the situation with *small and medium-sized enterprises*, and the difficult challenges facing *developing countries*.

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