

Please cite this paper as:

OECD (2003-04-17), "Seizing the Benefits of ICT in a Digital Economy", *OECD Digital Economy Papers*, No. 72, OECD Publishing, Paris.

<http://dx.doi.org/10.1787/233143713543>



OECD Digital Economy Papers No. 72

# Seizing the Benefits of ICT in a Digital Economy

OECD



MEETING OF THE OECD COUNCIL  
AT MINISTERIAL LEVEL

2003

SEIZING THE BENEFITS OF ICT  
IN A DIGITAL ECONOMY



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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# **SEIZING THE BENEFITS OF ICT IN A DIGITAL ECONOMY**

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

# ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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*Publié en français sous le titre :*  
METTRE LES TIC A PROFIT DANS UNE ÉCONOMIE NUMÉRIQUE  
Réunion du Conseil de l'OCDE au niveau des ministres

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## Preface

The 2001 OECD Ministerial report, *The New Economy: Beyond the Hype*, concluded that information and communications technology (ICT) was an important technology with the potential to contribute to more rapid growth and productivity gains in the years to come. Both the 2001 and 2002 OECD Ministerial meetings reiterated the importance of ICT for growth performance and requested the OECD to continue its work in this area. A request for further work on ICT and business performance was also made to the OECD in the autumn of 2001, by the US Secretary of Commerce, Mr. Evans.

This report, which responds to OECD Ministers, revisits the contribution made by ICT to economic performance using new and more recent data to assess the degree to which the findings that appeared valid at the end of 2000 remain intact. The report also examines whether the policy conclusions from the previous OECD work require adjustment in the current economic environment, and what measures OECD governments should take to seize the benefits of ICT. The findings and policy implications of the work are summarised below; they reaffirm and elaborate those of the OECD Growth Study.

## Introduction

*Some of the myths about ICT have been laid to rest,...*

The recent slowdown has laid to rest several myths regarding the new economy: the business cycle is not dead, stock market valuations must be realistic and backed by sound profit expectations, and the information and communications technology (ICT) sector is not immune to downturns. Nearly all assessments of the future role of ICT are more sober today than they were several years ago.

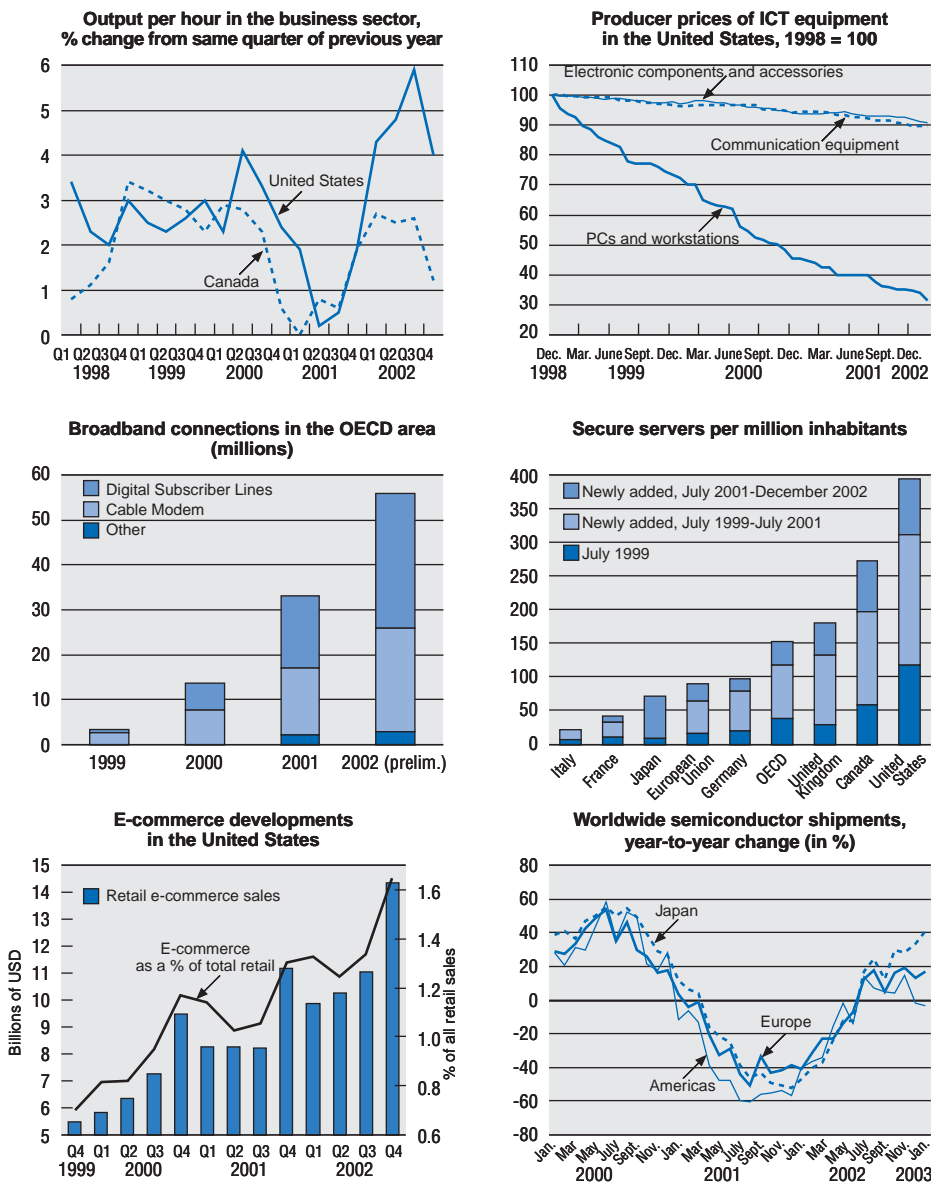
*... but ICT remains an important driver of growth and productivity,...*

Nevertheless, all the evidence suggests that ICT remains a major positive dynamic force in OECD economies. The economic benefits of ICT have not disappeared with the slowdown and the slump in parts of the ICT-producing sector. Productivity growth in the United States, Canada and Australia – examples of ICT-led growth – has continued to be strong in recent years, suggesting that the improvement in productivity in these countries was at least partly structural. ICT networks have now spread throughout the business sector of many OECD countries, and will increasingly be used to improve performance.

*... as technological progress and diffusion are continuing rapidly.*

Technological progress in ICT goods and services is continuing at a rapid pace, driving prices down and leading to a wide range of new applications (Figure 1). While much smaller than business-to-business electronic commerce, business-to-consumer e-commerce continues to gain in importance. Broadband is diffusing rapidly, and activity in the telecommunications sector continues to grow. Moreover, several applications, such as broadband and e-commerce, are still in their early stages and may have a large potential for future growth. ICT thus remains a technology that can underpin future growth and innovation.

Figure 1. Productivity growth has remained strong in the United States and Canada as ICT technologies continue to spread



Sources: US Bureau of Labor Statistics; US Department of Commerce; Statistics Canada; Netcraft [www.netcraft.com](http://www.netcraft.com); Semiconductor Association ([www.semichips.org](http://www.semichips.org)).



*Governments need to implement policies to help firms seize the benefits of ICT.*

Considering the ongoing spread of ICT and its continued importance for growth, policy makers should foster an environment that helps firms seize the benefits of ICT. All OECD governments can do more to support the diffusion of these technologies. However, policies to foster the uptake of ICT are no longer sufficient. Policy action is needed to help firms make more effective use of ICT and to address the barriers affecting demand. Moreover, policies specific to ICT diffusion and use will not, on their own, lead to stronger performance; they should be part of a comprehensive set of actions to create the right conditions for growth and innovation.

### **The role of ICT in business performance**

*ICT contributes to economic performance through production...*

ICT affects economic growth in three ways. First, the ICT-producing sector plays an important role in some countries, although it is small in most. Having an ICT-producing sector can be important, since the sector has been characterised by rapid technological progress and strong demand. In Finland, Ireland and Korea, close to 1 percentage point of aggregate labour productivity growth over the 1996-2001 period was due to ICT manufacturing (Figure 2). In the United States, Japan and Sweden, the ICT-producing sector also contributed significantly to productivity growth.

*... but primarily through investment,...*

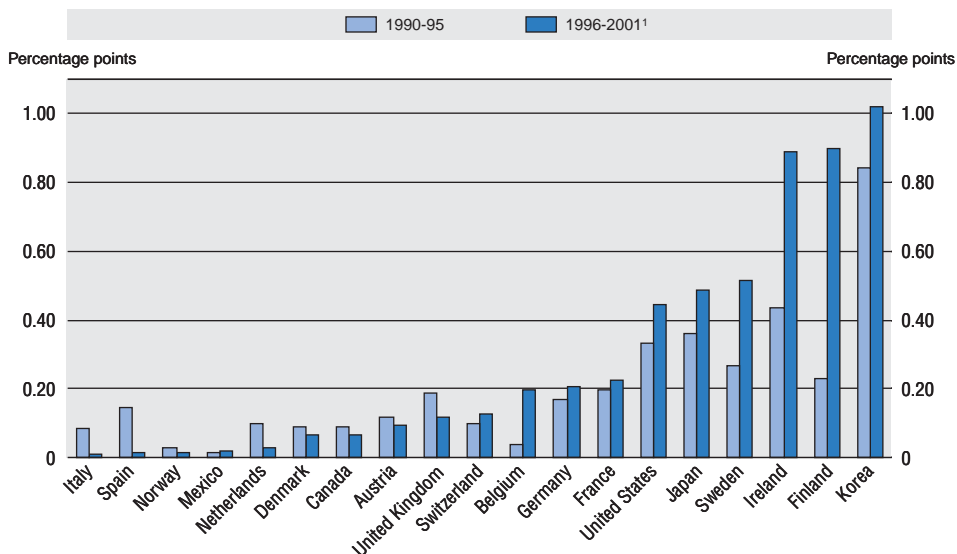
While the existence of an ICT-producing sector can support growth, this is not a prerequisite to benefit from ICT. Indeed, the most important benefits arise from its effective use. In particular, investment in the technology adds to the capital stock that is available for workers and thus helps raise labour productivity. Capital deepening due to ICT investment accounted for between 0.3 and 0.8 percentage points of growth in labour productivity over the 1995-2001 period. The United States and Canada received the largest boost, Japan and the United Kingdom a more modest one, and Germany, France and Italy a much smaller one.

*... and the use of ICT to enhance efficiency and innovation.*

In some countries, notably the United States and Australia, there is evidence that industries that have invested most in ICT, such as wholesale and retail trade, have experienced more rapid multi-factor productivity

Figure 2. **ICT manufacturing contributes to aggregate productivity growth in some countries**

Contribution of ICT manufacturing to annual average labour productivity growth, percentage points



1. Or latest available year.  
Source: OECD.

(MFP) growth. The use of ICT can help firms increase their overall efficiency in combining labour and capital, or MFP. More rapid MFP growth may also be linked to network effects arising from use of ICT, as these can lead to lower transaction costs and more rapid innovation.

*The benefits of ICT use are most evident from firm-level studies,...*

Detailed firm-level studies show that the use of ICT may help efficient firms gain market share at the expense of less productive firms, raising overall productivity. In addition, the use of ICT may help firms expand their product range, customise their services, or respond better to demand, in short, to innovate. Moreover, ICT may help reduce inventories or help firms integrate activities throughout the value chain. Studies for the United Kingdom, for example, show that purchasing through electronic networks can make particularly important contributions to improved productivity.

*... which show that ICT investment is only part of wider changes, which also include investment in skills and organisational change.*

Firm-level studies also show that ICT investment is only part of a broader set of changes that help enhance performance. Successful adopters of ICT and e-business strategies combine this with complementary investments, *e.g.* in appropriate skills, and with organisational changes, such as new strategies, new business processes and new organisational structures. These practices often entail greater responsibility for individual workers regarding the content and organisation of their work and, to some extent, greater proximity between management and labour (*e.g.* flatter management structures). They also involve a higher degree of outsourcing and a stronger focus by firms on their core strengths. Firms adopting these strategies tend to gain market share and enjoy higher productivity gains than other firms.

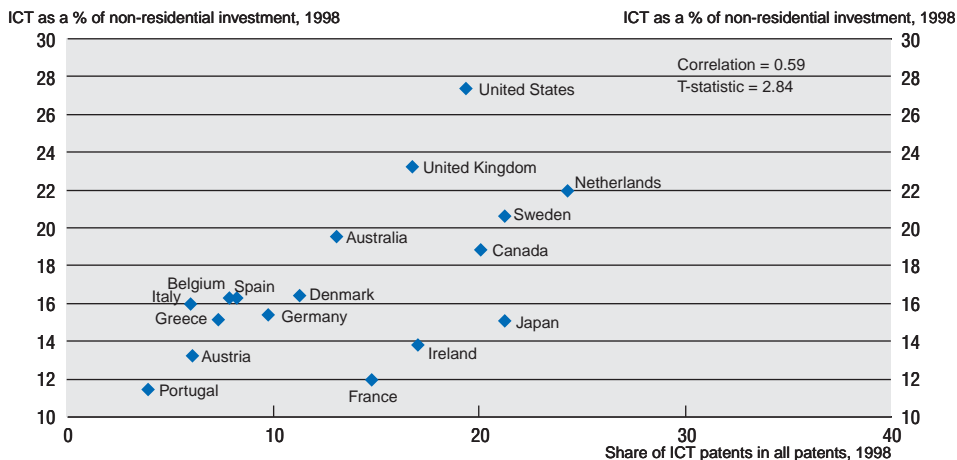
*ICT use is closely linked to innovation, particularly in the services sector.*

ICT use by firms is closely linked to the ability of a company to adjust to changing demand and to innovate. Users of ICT often help make their investments more valuable through their own experimentation and innovation, *e.g.* the introduction of new processes, products and applications. Without this process of “co-invention”, which often has a slower pace than technological innovation, the economic impact of ICT would be more limited. This link is also visible at the aggregate level; for example, those countries that have invested most in ICT also have the largest share of patents in ICT (Figure 3). Firms that have introduced process innovations in the past are often particularly successful in using ICT; in Germany, for example, the impact of ICT investments on output was about four times higher in firms undertaking process innovations than in firms that did not innovate. These impacts are particularly important in services, as ICT helps firms to improve and re-invent business processes and develop new applications, thus effectively enabling innovation in this sector.

*Investment in ICT is no panacea.*

Investment in ICT is no panacea. Firms may well over-invest in ICT, either in an effort to compensate for lack of skills or competitive pressure, or because they lack a clear market strategy. Firms that achieve the highest returns from ICT are often those that were already performing well or had successfully innovated in the past.

Figure 3. ICT investment is accompanied by rapid innovation in ICT



Source: ICT investment from Figure 4; ICT patents from OECD patents database.

**The benefits of ICT are not immediate.**

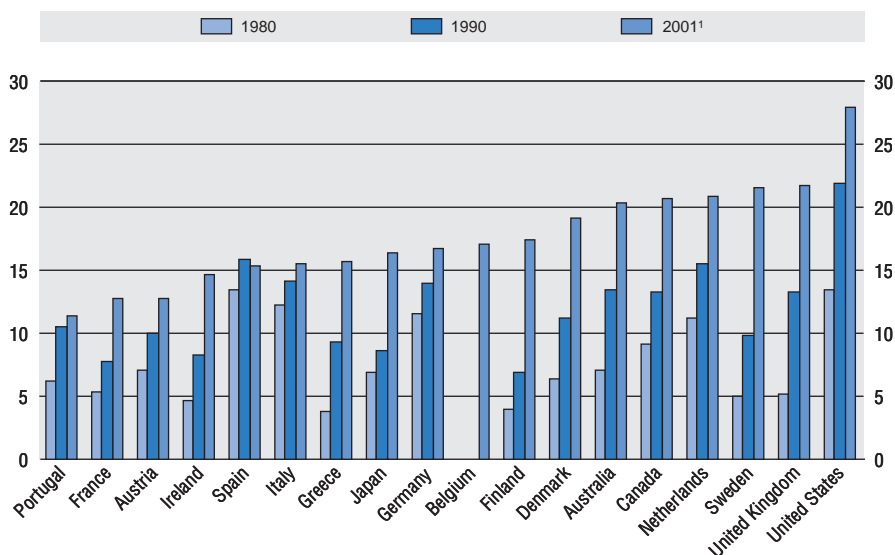
It also takes time to adapt to investment in ICT, *e.g.* by changing organisational set-ups and worker-specific skills. Firms that adopted network technologies several years ago, notably large firms, have often already been able to make the technology work, whereas more recent adopters are still adapting their organisation, management or skills. Evidence for the United Kingdom, for example, shows that among the firms that had already adopted ICT technologies in or before 1995, over 50% were using electronic networks for procurement by 2000. In contrast, of the firms that only adopted ICT in 2000, fewer than 20% made purchases through electronic networks in 2000.

**Some OECD economies have benefited more from ICT than others.**

Thus far, some OECD countries such as Australia and the United States have experienced greater productivity impacts from ICT than most other OECD countries. This leads to the question of why these differences occur. The amount of ICT investment and the resulting diffusion of ICT in different countries may play a role. These differ considerably across countries (Figure 4). Some countries lead in the uptake of ICT on almost every indicator, notably the United States, Canada, New Zealand, Australia, the Nordic

countries and the Netherlands. However, having the equipment and networks alone is not enough to derive economic benefits. Other factors, such as the regulatory environment, the climate for trust and security in a digital economy, the availability of appropriate skills, the ability to change organisational set-up, as well as the strength of accompanying innovations in ICT applications, also affect the ability of firms to seize the benefits of ICT.

Figure 4. **The share of investment devoted to ICT differs across OECD countries**  
ICT investment as a percentage of non-residential gross fixed capital formation, total economy



1. Or latest available year.

Source: OECD, Database on Capital Services.

***Policies need to be adjusted to better seize the benefits of ICT.***

The evidence above shows that ICT is a technology that has the potential to enhance business performance if it is made to work effectively. Policies that foster productive investment and enable firms to make the changes needed to seize the benefits of ICT are likely to be the most beneficial. For this to happen, competitive product markets and well-functioning labour markets are essential. Moreover,

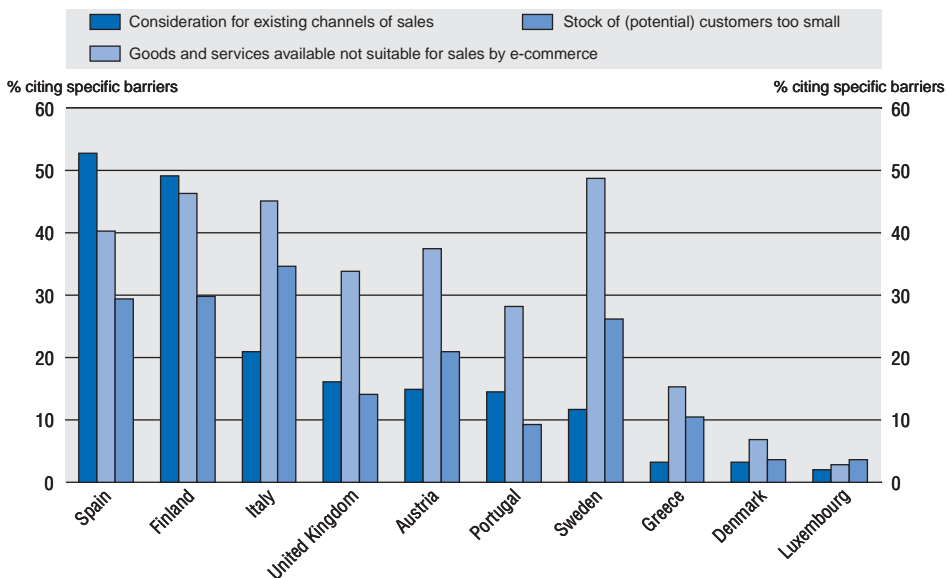
governments will need to shape a regulatory framework that strengthens security and trust in the use of ICT, which should also help foster demand. These policies are outlined below.

### Fostering a business environment for ICT adoption

*Competition is needed to ensure that firms have incentives to enhance performance...*

A competitive environment is more likely to lead a firm to invest in ICT, as a way to strengthen performance and survive, than a more sheltered environment. Moreover, the state of competition may influence firms' decisions to implement ICT applications, such as electronic commerce. For example, firms may not adopt Internet strategies because they believe the market is too small, because they do not consider their products to be suitable, or because such a strategy could threaten existing business models (Figure 5). While such concerns can be genuine, they may also reflect a conservative attitude and lack of competition.

Figure 5. **Market conditions affect Internet commerce for businesses**  
 Percentage of businesses with ten or more employees using a computer and citing specific barriers, 2000



Start-up firms can help instil greater dynamism, introduce new business models that make more effective use of ICT and invigorate mature industries. Policies that eliminate barriers to entrepreneurship and firm creation are of great importance in such markets.

*... and helps to select the firms that can make the technology work.*

Not all firms will succeed in making the changes needed to make ICT work. Competition is the key to selecting successful firms and makes them flourish and grow. Allowing room for experimentation by new firms is important too. New firms in the United States appear to experiment more with business models than those in other OECD countries; they start at a smaller scale than European firms, but grow much more quickly when successful. This may be linked to less aversion to risk in the United States and to its financial system, which provides greater opportunities for risk financing to innovative entrepreneurs. Moreover, low regulatory burdens enable US firms to start at a small scale, experiment, test the market and their business model, and, if successful, expand rapidly. Moreover, if they do not succeed, the costs of failure are relatively limited. In contrast, firms in many other OECD countries are faced with high entry and exit costs. In a period of rapid technological change, greater scope for experimentation may enable new ideas and innovation to emerge more rapidly, leading to faster technology diffusion. Even if many new firms fail, as was the case with many dot-com firms, the associated dynamism in firm entry and exit is a boon to growth.

*Excessive regulations may limit experimentation and the return that firms can extract from ICT.*

Regulations for product and labour markets, including high administrative burdens, are a barrier to experimentation as they increase the entry costs for new firms. Such regulations may also impede reorganisation or competition between firms and thus affect investment. If firms cannot adjust their workforce or organisation in a way that allows them to exploit the capabilities of ICT, they may decide to limit investment or relocate their activities.

*Clear and non-discriminatory tax rules are needed.*

If ICT is to be fully integrated into business models, the tax rules have to be neutral between these models. The Ottawa Taxation Framework advocates such neutrality for e-commerce but as ICT allows for international trade

beyond just e-commerce, neutrality must be applied consistently across the broad spectrum of services and intellectual property. Forms of dispute resolution may need to be developed if double taxation or unintentional non-taxation are to be avoided. Clarity in tax rules must also be fostered in order to encourage compliance, especially in the international environment.

*Work practices need to change...*

Governments should also reduce obstacles to workplace changes. Adapting the organisation of functions and tasks to ICT can be costly to firms, as it often meets with resistance within the firm, and may be limited by legal constraints. Social partners and government can work together to ensure that a virtuous circle of human resource upgrading, organisational change, ICT and productivity is set in motion. This depends on workers being given a sufficient “voice” in the firm. Flatter work structures, a greater sharing of responsibilities and information, as well as investment in human resources can help build a high-skill, high-trust enterprise climate that facilitates change. This may also require ensuring that working time legislation and employment regulations do not hamper such change, and that collective bargaining institutions are adapted to the new environment.

*... and education and training policies need to be strengthened.*

Matching the skills of workers to the new technology also requires considerable investment. For ICT to be developed and used effectively, and network externalities to materialise, the right skills and competencies must be in place. Having a good supply of qualified personnel helps, but education policies need to be supplemented with actions to foster lifelong learning. Policies aimed at enhancing basic literacy in ICT, at building high-level ICT skills, at lifelong learning in ICT and at enhancing the managerial and networking skills needed for the effective use of ICT are particularly important. Moreover, a certain degree of labour mobility may be needed to seize the new opportunities associated with ICT, which may require changes to regulations in some countries.

*Policies for ICT need to be linked to those on innovation.*

Policies to harness the potential of innovation are important for seizing the benefits of ICT. The use of ICT is closely linked to the ability of firms to innovate,



*i.e.* introduce new products, services, business processes and applications. Moreover, ICT has helped facilitate the innovation process, for example by speeding up scientific discovery. ICT has also fostered networking, which has enabled informal learning and interdisciplinary co-operation (*e.g.* in bio-informatics) between firms, as well as more outsourcing. Firms that have already innovated often achieve better results from ICT than those that have never innovated. To strengthen innovation, policy needs to give greater priority to fundamental research, improve the effectiveness of public R&D funding and promote the flow of knowledge between science and industry.

*Seizing the benefits of ICT requires good management.*

Firms that get the most out of their investment in ICT are often those that were already performing well. This points to the importance of good management. While governments cannot directly influence management decisions, they can help create framework conditions for good management and corporate governance. The OECD Principles of Corporate Governance, adopted in 1999 and currently under review, continue to provide a benchmark for best practices in this area.

### **Competition in ICT goods and services needs further strengthening**

*Competition has already brought great benefits and continued liberalisation is needed...*

Liberalisation and the competition it has generated have brought tremendous benefits. Prices have declined and continue to do so in certain market segments. Technological diffusion and new service development have been rapid and continue to grow. Incumbent telecommunication carriers have adjusted to the new market conditions by increasing efficiency and improving levels of service. A large number of new entrants have entered the market, and while some have failed, the number of market players in many OECD countries remains large.

*... particularly in local facilities...*

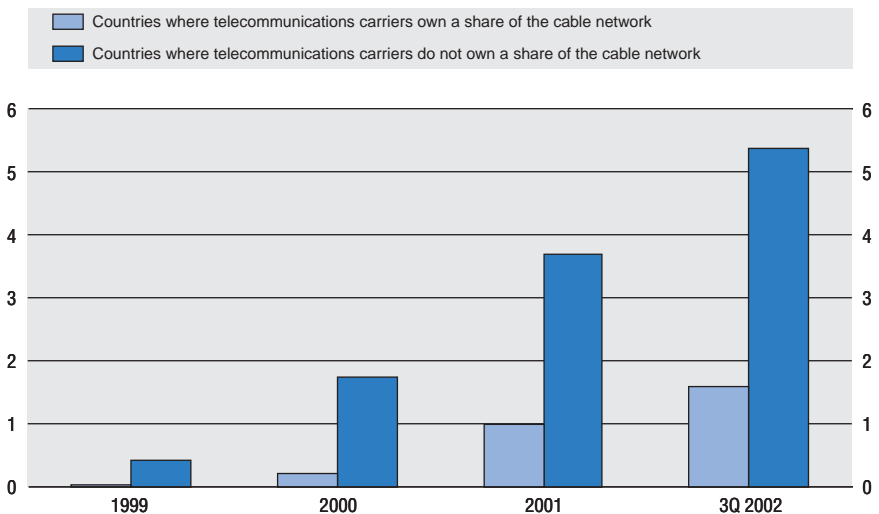
But efforts to improve competitive conditions have not yet been sufficient in many OECD countries. This is particularly the case in local facilities competition, including the local leased line market. Some OECD countries have, despite several years of implementing telecommunications

liberalisation, not yet succeeded in creating market conditions for effective competition. Improving the effectiveness of regulatory frameworks needs to be given priority in strengthening competition.

*... to facilitate the development of new services and information products.*

Countries that wish to develop e-business further and reap the economic benefits of ICT need to take action to strengthen competition across competing platforms and permit more rapid development of the broadband market. Unbundling of the local loop is particularly important to accelerate the development and diffusion of broadband Internet services. It is already having positive benefits, although its full impact may only become clear once effective competition has been established. In many countries, however, broadband uptake is still weak, mainly because of insufficient competitive pressure on the incumbent (Figure 6). This affects both the roll-out of broadband technologies and prices.

Figure 6. **Broadband uptake is highest in countries with competitive conditions**  
Average broadband connections per 100 inhabitants



***Governments should not retreat from liberalisation during this time of adjustment.***

Several telecommunication firms currently have a high level of indebtedness, linked to exuberant demand expectations and over-expansion in a period of buoyant financial markets. Despite these problems, new services, such as broadband, continue to emerge and grow, and emerging services such as wireless local networks are increasing rapidly. The activity of the industry also continues to grow, although at a slower pace. Governments should not succumb to calls to retreat from liberalisation or to assist industry unduly during this period of adjustment, as the fundamental drivers of the industry have not changed.

***Regulators will need to address anti-competitive behaviour...***

Regulators need to guard against market players with significant market power that continue to deny access to new entrants. This requires that they have adequate ability to impose in a timely manner and enforce service-level agreements between incumbents and new entrants. Efforts to ensure that facility-based competition develops must continue and should be strengthened.

***... and need to remain vigilant for new challenges to competition and ensure neutral treatment of alternative technologies...***

Technological progress will continue to affect ICT markets and requires continued vigilance by regulatory and competition authorities to ensure competition in new markets. Constraints on the growth of new network technologies need to be addressed, *e.g.* use of unlicensed spectrum by wireless local area networks (LANs) and rights of way for broadband networks. In content markets, higher broadband speeds are increasing competition between different communications platforms. Technological change is transforming network platforms, allowing them to provide a similar range of voice, audiovisual and data transmission services, and creating new services. The convergence of these technologies and markets will help increase the potential for competition across network platforms as well as for the services using these platforms. However, these changes require that regulatory and competition authorities ensure neutral treatment of different network platforms in policy and regulatory frameworks to develop fair competition across these platforms and in new markets. Spectrum policy must also be reviewed, to allow for more flexible and rapid reallocation of spectrum by licensees and to ensure that the use of spectrum is economically efficient.

*... which will also require that governments do not distort markets.*

Firms should move at their own pace in implementing ICT, as governments are not well placed to influence this process directly. Governments have put in place a range of schemes to assist firms in their uptake and use of ICT. These schemes, designed in principle to overcome market failures, have at times been counterproductive, for example because they were not neutral with respect to choice of technology and inappropriately favoured or subsidised specific ICT technologies. In several cases, firms were “locked in” to sub-optimal technologies that were not well integrated with the technologies used by partners, often foreign, in the value chain. Governments should work with businesses to develop appropriate standards, as these are important in ensuring the compatibility and seamless integration of network technologies within and across countries.

*Barriers to trade and foreign direct investment also need to be addressed.*

Barriers to trade and foreign direct investment, such as non-tariff barriers related to standards, import licensing and government procurement, may also limit competition in ICT goods and services and may keep prices artificially high. Moreover, the liberalisation of ICT services is still in its early stages. These ICT-related barriers should be addressed during the Doha Round.

### **Boosting security and trust**

*Policy needs to build greater confidence in the use of ICT.*

Businesses, governments, consumers and key infrastructures increasingly rely on the use of information networks, which are often interconnected at the global level. This raises new issues for security and trust as these electronic networks need to be stable and ready for safe, secure and reliable use under all conditions.

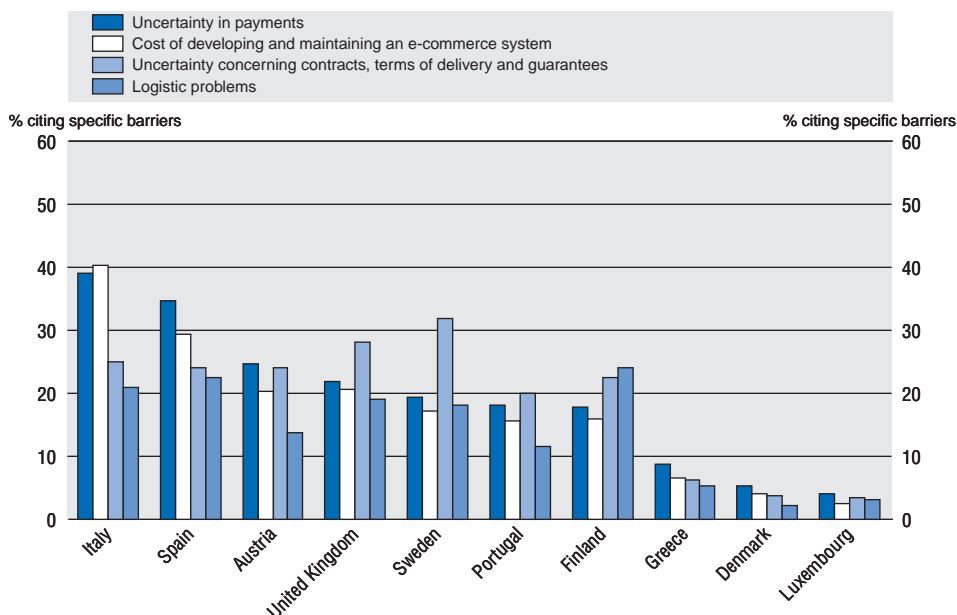
*Security, privacy and consumer protection continue to be a major concern.*

Uncertainties over the security of payments, contracts, terms of delivery and guarantees remain a barrier to electronic business (Figure 7). Likewise, business-to-consumer transactions are hampered by concerns about security of payments, opportunities for redress and the privacy of personal data. For all users, whether businesses or consumers, the security and reliability of systems and information networks is important. In Japan, almost one out of every two businesses rated viruses as the major reason for not using

the Internet. In Norway and the United Kingdom, “lack of security” was a more important barrier for firms already using the Internet than for non-users.

Figure 7. **Security and trust are key barriers to Internet commerce for businesses**

Percentage of businesses with ten or more employees using a computer and citing specific barriers, 2000



Source: OECD (2002), *Measuring the Information Economy*, based on Eurostat data.

**The OECD has adopted guidelines for network security, which are being implemented.**

Much work is currently under way to address these concerns. Authentication and certification mechanisms have been developed to help identify users and safeguard business transactions. To counter computer viruses, hacking and other threats, the OECD has agreed to new and comprehensive security guidelines that are currently being implemented. These guidelines aim to develop a “culture of security” in the operation of information systems and networks among all participants, including governments, firms and individuals, by promoting awareness and responsibility.

*User confidence also requires further action on privacy and consumer protection,...*

With the growth of business-to-consumer e-commerce transactions, consumer complaints regarding the online environment are growing. In part, this reflects a lack of consumer trust. The OECD privacy and consumer protection guidelines are an important step towards an international consensus on core protections. Continued efforts to implement these guidelines are needed and will require that governments, business and civil society work together. Further efforts are also required to improve Internet governance, including domain name management. Such solutions need to be global in nature.

*... which will require efforts to exploit technology, raise awareness and enforce rules.*

Further exploitation of information technologies can enhance consumer trust, by facilitating access to information and improving the ability of users to protect themselves, *e.g.* through privacy-enhancing technologies. But for any tool or measure to have a positive impact on trust, consumers and users must be aware of and understand the protections afforded. Education and awareness-raising policies are therefore important. Moreover, ensuring that current laws and regulations are effectively enforced in cross-border situations remains a major challenge.

*Governments should lead by example to strengthen confidence.*

Some of the slowness to do business (personal or otherwise) via the Internet has to do with attitudes. Governments can help to change these by using ICT applications themselves. Providing public services, *e.g.* “one-stop shops” for administrative formalities, and digital content, *e.g.* e-education and e-health, collecting taxes or procuring goods and services on line can help increase government efficiency and enhance access to public services, while having the additional benefit of building public confidence.

### **Spreading the benefits of ICT across the economy**

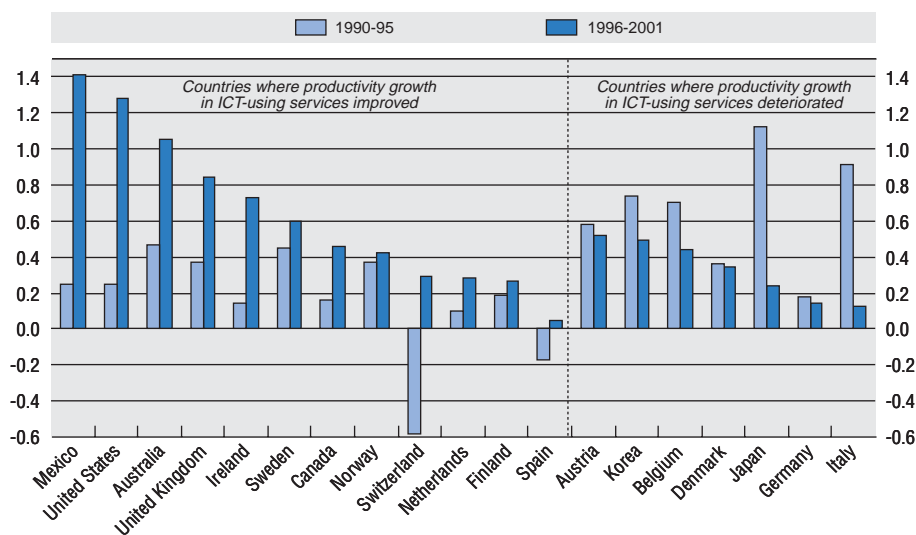
*Policy should ensure that the benefits of ICT are diffused to all sectors of the economy,...*

ICT is bringing many changes and has the potential to bring many further benefits. Governments should take action to facilitate adjustment and the changes associated with ICT. This will require spreading the benefits of ICT across the economy. Unequal access to new technology within OECD countries may be a matter of policy concern for equity reasons. Moreover, one of the main advantages

of ICT lies in the potential benefits of the network it creates. Spreading the benefits of ICT to service sectors is of particular importance, as these are among the most important users of ICT. It is in these sectors, not in the ICT sector, that the long-term impacts of ICT use may be most important. Evidence for countries such as the United States and Australia shows that ICT has already enabled productivity improvements in some ICT-using services (Figure 8).

Figure 8. **ICT-using services have experienced stronger productivity growth in some countries**

Contribution of ICT-using services to annual average labour productivity growth, percentage points



Note: ICT-using services include wholesale and retail trade, financial services, insurance and business services.

Source: OECD.

**... which will require reform of regulations that hamper competition and the uptake of ICT.**

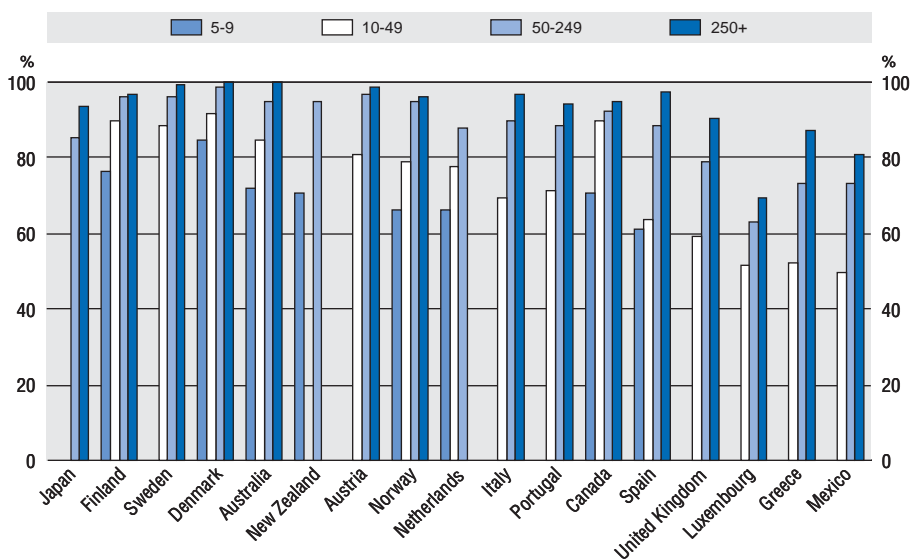
Policies must take better account of the characteristics of the services sector if they are to promote growth and innovation in business processes. Competition in many service sectors remains limited owing to sector-specific regulations, for example rules limiting the entry of more productive firms in the retail sector. This reduces pressures

to strengthen performance and invest in efficiency-enhancing ICT. International competition is also important and will require the reduction of trade and foreign investment barriers in services. Evidence from firm-level studies shows that in many countries, foreign-owned firms are often the first to adopt new technologies.

*Policy efforts are also needed to spread ICT use to small firms.*

Large firms have a greater uptake of ICT than small firms (Figure 9). They are also more likely to use a combination of network technologies or to adopt broadband technologies. These differences are partly due to the different uses of ICT by large and small firms. Large firms often use ICT to redesign information and communication flows within the firm, and to integrate these flows throughout the value chain. Many small firms only use the Internet for marketing purposes.

Figure 9. **Large firms have a higher rate of Internet penetration than small firms**  
Percentage of businesses using the Internet in 2001



Source: OECD (2002), *Measuring the Information Economy*, based on Eurostat data.



*Although small firms may not easily expand in global markets...*

While there is an untapped potential, small firms may often find it difficult to reach global markets through ICT. The costs of expanding into foreign markets are high, while uncertainty, brand image, inconsistent regulatory and legal frameworks across countries and cultural hurdles also impede foreign expansion.

*... they may benefit from ICT in their own context.*

Nevertheless, further economic and social benefits could accrue if small firms also seized the benefits of ICT use. Apart from the framework policies discussed above, policies have often focused on increasing the connectivity of small firms. However, many small firms already use ICT and, given their activities, not all firms may require more advanced network technologies. Policy should focus on helping small firms self-assess the opportunities and costs of doing electronic business in their own marketplace, *e.g.* through information programmes. Governments can also contribute to creating a more level playing field, greater market openness and transparency by fostering a regulatory framework that is neutral with respect to alternative technologies and by encouraging the interoperability of networks. More affordable redress mechanisms, *e.g.* for alternative dispute resolution, are also of great importance, particularly where small firms operate across international borders.

*Fostering ICT use in less developed regions may help address disparities within countries...*

Market reforms to reduce the costs of new technology can facilitate access by disadvantaged groups as well as by people living in remote areas. The development of infrastructure is the key to greater inclusiveness. Competition is important for this to happen, but may not be sufficient in all cases. If governments want to ensure that all areas and social groups eventually have access to high speed Internet services, they must do this in a least-cost way that does not distort market forces. Many countries have also taken initiatives to foster the uptake of broadband through public procurement, for example through the aggregation of demand from public services (*e.g.* schools and government services). Careful evaluation of such policies is needed to ensure that they balance increased coverage with greater competition.

*... and between countries.*

Many of the policies recommended in this report apply to developing countries as well. Moreover, development

co-operation policies have a key role to play in helping developing countries create the right policy environment to attract ICT investment and build the required capabilities to make use of ICT as part of achieving their broader economic and social goals. Increased cultural and linguistic diversity of ICT networks is desirable in this respect. Outreach of the OECD to the global community, *e.g.* through the World Summit on the Information Society, can help to build a more inclusive information society at the global level.

### Conclusions

*ICT continues to be an important driver of growth...*

ICT remains an important driver of growth, notwithstanding the slowdown in the economy and parts of the ICT-producing sector. The use of ICT has already led to better productivity performance in countries where appropriate policies to seize the benefits of ICT have been put in place. Since these technologies are continuing to improve in functionality, speed, and capacity, it is important that countries improve their policy frameworks to benefit from ICT.

*... provided the right conditions for growth and innovation are in place.*

All OECD governments can do more to exploit this technology by fostering a business environment that encourages its diffusion and use and by building confidence and trust. However, further diffusion and use of ICT will not, on their own, lead to stronger economic performance. Indeed, economic performance is not the result of a single technology, policy or institutional arrangement, but of a comprehensive and co-ordinated set of actions to create the right conditions for growth and innovation. Policies to strengthen economic and social fundamentals, in particular, are of great importance in reaping the benefits of ICT. The key policy implications arising from this report re-affirm those of the OECD Growth Study and are summarised in the box.

*Seizing the benefits of ICT will take time...*

Policy makers have to be prepared to invest time and political capital in meeting these challenges. Many of the countries that already reaped the benefits from ICT in the 1990s saw the results of their earlier efforts, for example in liberalising the telecommunications industry, improving their business environment, or investing in fundamental research.

... and raises  
new issues.

Policy makers will also be required to examine a range of thorny, yet unresolved issues, some of which may require better statistics if they are to be correctly assessed. There is a major knowledge gap regarding which impact, if any, ICT has on the functioning of markets, *e.g.* in reducing transaction costs and changing the respective market power of different parties. This may be particularly important in the development of markets for products and services that can be delivered digitally. A better understanding of ICT's impact on innovation is also essential, as long-term growth prospects will depend on the future pace of innovation. ICT has emerged over the past decade as a key technology that can transform economic and social activity. However, its full potential remains unknown, requiring continued monitoring of its impacts and the appropriate policies to seize its benefits.

### Key policy recommendations

The key policy implications arising from this report re-affirm and elaborate those of the OECD Growth Study. While specific policy priorities and challenges may differ across countries, *Seizing the Benefits of ICT in a Digital Economy* encourages governments to adopt a comprehensive strategy. Such a strategy should continue to give attention to ICT diffusion and infrastructure development, but needs to focus more on policies that strengthen security and trust and that reduce the barriers to demand and effective use of ICT. In particular, it should facilitate realisation of the potential offered by new technological developments, such as broadband. While access remains important, making better and smarter use of e-business throughout the value chain is increasingly becoming the key challenge for reaping the benefits of ICT. The strategy should be based on a combination of actions in order to:

1. **Strengthen competition**, by ensuring network infrastructure competition across and within different platforms, placing more emphasis on regulatory frameworks that are neutral with respect to alternative technologies and on the convergence of markets and technologies, maintaining a strong stance on competition in services, fostering competitive conditions in digital content and applications markets, and monitoring for anti-competitive behaviour. Governments should not succumb to calls to retreat from liberalisation or assist the ICT industry in a way that distorts competition, and should make regulatory frameworks more effective to ensure that incumbent firms provide adequate access to their network resources for new entrants.

**Key policy recommendations** (cont.)

2. **Foster a business environment for effective use of ICT.** Measures should aim to reduce obstacles to organisational change within firms, strengthen education and training systems, encourage good corporate governance practices, facilitate firm entry and exit, foster entrepreneurship, reform burdensome regulations and improve the functioning of labour and product markets. Harnessing the potential of innovation, as a key complementary factor to ICT use, will make an important contribution to using ICT more effectively.
3. **Spread the benefits of ICT across the economy,** by removing sector-specific regulations that affect the uptake of ICT, helping small firms assess the opportunities of e-business, ensuring a level playing field for all market participants in the value chain, and fostering ICT uptake for disadvantaged groups and in less developed regions in cost-effective ways, while not distorting market forces. Strategies for electronic government are important to help improve government efficiency and the delivery of public services, and can also help foster demand in less developed regions.
4. **Boost security and trust to enhance usage** of ICT by business and consumers, by implementing information security guidelines, by developing a culture of security, and by strengthening cross-border co-operation and enforcement in privacy and consumer protection.
5. **Support developing countries in seizing the benefits of ICT,** by using development co-operation policies to integrate ICT into national development strategies and help create the right economic, legal and institutional environment for ICT investment and use, by reaching out to non-OECD economies, *e.g.* through the World Summit on the Information Society, and by addressing international trade and investment barriers that inhibit the uptake of ICT through the Doha Round.

OECD PUBLICATIONS, 2, rue André-Pascal, 75775 PARIS CEDEX 16  
PRINTED IN FRANCE  
(00 2003 35 1P) – No. 82067 2003