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## **“OECD Efforts to Address the Measurement and Policy Challenges Posed by the Information Society”**

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### **Abstract**

The OECD has acted as a forum for the discussion of policies regarding the information society for over 20-years, producing guidelines and recommendations in areas such as privacy of personal information, computer security, cryptography, regulatory reform of communications, and most recently on-line consumer protection and the taxation of e-commerce. By and large, this work was undertaken without the benefit of statistical measures. But the economic performance of a number of OECD Member countries during the 1990s underscores that the policy challenges being posed by the information society are increasingly economic in nature -- how ICT is affecting productivity, growth rates, inflation, labour markets etc -- necessitating the need for statistically rigorous data. This paper outlines how recent efforts by national statistical offices to improve this situation have allowed researchers to gain new insight into the economic impact associated with ICTs and applications like e-commerce, leading to a number of policy recommendations as to how best to exploit the economic potential of these technologies. The paper ends by outlining important policy issues that require new statistical efforts.

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## Introduction

1. Systematic efforts to address the policy challenges posed by the information society began at the OECD in 1982 with the formation of the Committee on Information, Computer and Communications Policy (ICCP). Over the next two-decades, this group acted as a forum where OECD's Member countries met to analyse and discuss policy issues with the objective of formulating guidelines that would provide some co-ordination and coherence in national policies which are inherently international in nature (see Annex). These efforts were relatively narrow, targeted at updating or modifying existing regulatory frameworks to accommodate the challenges posed by the new technologies and were undertaken without the benefit of any statistical analysis.

2. With the emergence of the modern Internet in the mid-1990s, the importance of the information society began to be widely recognised, and soon began to demand the attention of Ministers. While many of the issues continued to focus on regulatory issues such as on-line privacy or consumer protection, the importance of ICT as an economic factor garnered greater attention. This can be tracked at the OECD by a series of high-level meetings starting in 1996 and continuing up to the meeting of Ministers at the OECD this year. As the focus shifted to economic issues, the need for internationally comparable data on the information society became apparent and assumed a high priority. This paper describes the nature of the policy issues being discussed and statistical work undertaken to help address them. It concludes by identifying some challenges that policy makers and statisticians are likely to face in the future.

## Measuring the ICT Infrastructure

3. In 1996, Ministers meeting at the OECD, endorsed the findings and recommendations of a report on the Global Information Infrastructure / Global Information Society (GII-GIS) which called for competitive safeguards as regards access to network infrastructures. Recognising the need for data to analyse the development and use of the "information highway", Ministers recommended the establishment of a new working party devoted to "... develop[ing] new indicators which identify, assess and monitor the emergence of the GIS." In particular it was noted that "the lack of comprehensive and internationally compatible data can be a severe problem in a rapidly changing and increasingly information-based world economy." Moreover, "... a common framework for indicators and standard definitions needs to be developed, tested and shared among OECD countries for better understanding of equipment diffusion and use, communication infrastructures, and services and content. Because most effort has been devoted to the first two, particular attention should be given to the last element."<sup>2</sup>

4. With the launching of this group (the Working Party on Indicators for an Information Society, WPIIS) in 1997, statistical work began. As a subsidiary body of the policy committee on Information, Computer and Communication Policy (ICCP), WPIIS's work has always been very closely tied to policy needs. This has necessitated that methodological work and data collection had to proceed in several areas at different speeds, in a step-by-step, pragmatic fashion.

5. The Working Party, in co-ordination with Eurostat and the Voorburg Group (a UN City group dedicated to services), focused first on developing an internationally agreed definition of the ICT sector. In 1998, a set of principles (Box A) was adopted that would provide a conceptual basis to the selection of industries chosen as "ICT" (see <http://www.oecd.org/dsti/sti/it/stats/defin.htm>). These principles were then

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2. OECD, 1996, "Global Information Infrastructure and Global Information Society" (GII-GIS) [OCDE/GD(96)93]. [http://www.oecd.org/dsti/sti/it/infosoc/prod/e\\_96-93.ht](http://www.oecd.org/dsti/sti/it/infosoc/prod/e_96-93.ht)

used to select industrial-activities from UN's International standard Industrial Classification (ISIC rev 3). Because ISIC rev 3 did not lend itself perfectly to use in the definition and because it was agreed that only whole industries, not parts, should be included in the definition at this time, a number of compromises had to be made. In addition, the definition is limited to those industries which facilitate, by electronic means, the processing, transmission and display of information, and it excludes those industries which create the information, the so-called 'content' industries. The activity-based OECD definition for the ICT sector was officially approved by the OECD in September 1998.

Box A

**Conceptual Principles for the selection of industries chosen as "ICT"**

For manufacturing industries, the products of a candidate industry must: be intended to fulfil the function of information processing and communication, including transmission and display; or use electronic processing to detect, measure and/or record physical phenomena, or to control a physical process. For service industries, the products of a candidate industry must: be intended to enable the function of information processing and communication by electronic means.

6. After agreement was reached on an activity-based ICT-definition, work was started to collect ICT supply data for the reference year 1997 on a limited set of "core" variables -- number of enterprises, employment, wages and salaries, capital expenditure, production (or revenue) and value added -- to these R&D expenditure, imports and exports were added from existing data sources. These data were published as indicators in 2000, marking the first compilation of data from official sources that adhered to a common international definition ([http://www.oecd.org/dsti/sti/it/prod/measuring\\_ict.htm](http://www.oecd.org/dsti/sti/it/prod/measuring_ict.htm)). Provisional plans have been made to issue a second, expanded edition of this publication near the end of 2001. Figure 1 contains one series from this forthcoming publication where it is apparent that while many associate the US and Japan with a large ICT sector, in fact a number of countries have as large or larger sector.

7. As with any work in a new area, these definitions are "living" and are open to refinement as users gain experience using them. At the 2000 meeting of WPIIS, users expressed concerns with respect to some aspects of the activity-based definition (e.g. the measurability across countries of the wholesaling of ICT). Two major pieces of work will help in the refinement of the activity-based definition of ICT. Firstly, following an OECD proposal presented in October 2000 at a UN technical expert meeting, the 2002 revision of the International Standard Industrial Classification (ISIC) will recommend a breakdown of the Wholesale activity into subclasses that will allow the detailed identification of the wholesaling of ICT products. Secondly the WPIIS is developing a commodity or product-based definition of ICT. Work carried out at the European-level on a product list of ICT goods will be combined with work on ICT service products done in North America (as an outgrowth of work on NAICS product classification). It is expected that at the 2002 meeting of WPIIS a preliminary list of both ICT goods and services will be discussed.

8. The second thrust of the work to improve the measurement of information and communication technologies has concentrated on developing some common methodologies to improve the international comparability of surveys that measure the use of ICT in households, businesses and government. The Nordic countries have led the work in the area of ICT usage in business. As a result of intensive collaboration among the three working groups involved -- the WPIIS, the UN Voorburg group and Eurostat -- a model questionnaire for measuring ICT usage in businesses was presented in 2000 and currently has five modules including: 1) the use of ICT in general, 2) the use of the Internet, 3) Internet

commerce, 4) commerce by other computer mediated networks (e.g. EDI) and 5) barriers to the use of the Internet and ICT in general. The model was pilot tested by Denmark, Finland and Norway with success. In 2001, the WPIIS adopted the model survey and recommended its use as a “core” in country surveys of ICT use by business. The official review of this recommendation will occur in October 2001. Preliminary data show that the business use of the Internet is nearing saturation levels in many countries (Figure 2) and the differences in penetration across size classes (Figure 3) are not as important as those that exist across sectors (Figure 4).

9. An initial proposal for “core” questions to be used in surveys for measuring the use of ICT by households was tabled by Australia in April 2000. Australia is currently working closely with the Nordic countries and Canada to table a final draft proposal for a model survey on ICT usage in the households in 2002. Preliminary data show the households with access to the Internet fall into three groups -- those countries where more than 40 percent of households enjoy access, those where only about a thirds enjoy such access and those where less than a fifth have access (Figure 5). Interestingly the situation changes when the focus shifts to individuals having access from any location: here, instead of being ranked as one of the top as they are with household access to the Internet, the United States falls into the second tier behind the Nordic countries and Canada (Figure 6).

10. While only few OECD Member countries have surveyed the use of ICT by government to date, many agreed that this was an important area to begin work, although the progress would be slower than for the other two areas. The initial thoughts presented by Canada at the April 2000 WPIIS meeting stressed the need to concentrate more on the electronic services being offered by government, particularly by the Internet, rather than the type of technologies used by government. Work will begin on this survey after the model survey for households is finished.

### **Definition and measurement of electronic commerce**

11. As an input to the 1998 OECD Ministerial on Electronic Commerce, a report entitled “The Economic and Social Impacts of Electronic Commerce: Preliminary Findings and a research Agenda” was prepared. By necessity, much of the analysis in this report relied on data obtained from private research and management consultant firms. While illuminating, the report cautioned that in many cases the data was not suitable for policy or economic analysis and suffered from a number of statistical shortcomings such as inconsistent definitions, changes in methodologies and poor statistical methodologies and have a potential to be systematically biased upwards.<sup>3</sup> The report recommended that “work should be undertaken to develop a statistical methodology and apparatus for measuring electronic commerce.” In the outcomes of the Ministerial, this recommendation was adopted.<sup>4</sup>

12. Although not on the original work programme of the WPIIS outlined in 1997, the working party agreed to take up the issue because of the extreme policy and media interest in e-commerce and organised a Workshop in 1999, which brought together the expertise of business, policy makers, researchers and statisticians to discuss issues of definition and measurement of e-commerce. An Expert Group on Defining and Measuring E-commerce was established and focused on the three inter-related aspects of this problem: a framework for user needs and priorities, definitions, and statistical measurement.

13. User needs were clearly articulated at the joint meeting, where a model that sets forth three basic sets of indicators required for policy purposes was adopted. They relate to readiness, to intensity and to impacts (Figure 7). At this meeting it was acknowledged that policy makers needs are often very broad, as

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3. OECD, 1999, *The Economic and Social Impacts of Electronic Commerce*, Paris, p.31.

4. [http://www.oilis.oecd.org/oilis/1998doc.nsf/linkto/sg-ec\(98\)14-final](http://www.oilis.oecd.org/oilis/1998doc.nsf/linkto/sg-ec(98)14-final)

they wish to understand the impact of e-commerce across the economy and over all business processes. On the other hand, they need data at a very fine level that measure different e-commerce segments as the drivers, technological solutions, impacts and policy implications may be different.

14. Given this, it became clear that one definition would not be suitable for all needs. The Expert Group has therefore developed two definitions of electronic transactions -- one based on a more narrow definition of electronic commerce restricted to the Internet and another that is broader and encompasses activity such as EDI. These definitions were endorsed in April of 2000 and guidelines for their interpretation were developed in 2001.

15. Having established operational definitions of e-commerce and the processes for which indicators might be required, the WPIIS was then able to consider the range of indicators. Based on their own national experiences, data availability and methodological coherence of the data, as well as input from the corresponding policy working party, the Working Party on the Information Economy, a list of priority e-commerce indicators was formulated. These indicators form the basis of an initial OECD data compilation exercise. As part of this process, it is expected that a good deal will be learned about the extent to which indicators are comparable between countries, or can be collected so that they are comparable. The initial data collection has revealed that in terms of value, e-commerce is still at an early stage (Table 1), although it is clear that many individuals are experimenting (Figure 8) with buying things on-line.

### **New Determinants of Growth?**

16. As the information society has developed, the interest has expanded from the micro to the macro and broadened from Ministers of Industry or Science to Ministers of Finance and Central Bankers. This became evident in 1999 when Ministers meeting at the OECD discussed whether or not new determinants of growth such as ICT could explain an observed divergence in growth trends across Member Countries during the 1990s. They asked the OECD to analyse these differences with particular attention to “...*rapid technological innovation, the growing impact of the knowledge society and conditions for fostering the start-up and growth of new enterprises.*” In short, is there a “new economy”?

17. Intensive work by three different parts of the OECD occurred over the next two years to explore the question. During this period, the project benefited greatly from work that had been launched earlier in a number of different statistical fields. This included a project to better measure quality improvements in products experiencing technological changes such as ICT (hedonic price indices), work underway to construct a manual on productivity measurement and work to improve OECD’s main database for productivity measurement (the STAN or Structural Analysis database) as well as methodological and data work undertaken by WPIIS on the production and use of ICT and applications like e-commerce that has been described above.

18. This and other work were synthesised in to a final report to Ministers, *The New Economy: Beyond the Hype*, that was delivered this May (OECD, 2001). Nearly 60 working papers were developed during the two-years of OECD’s Growth project (see <http://www.oecd.org/subject/growth/products/>), reflecting the fact that a wide range of factors effect growth. In this respect, the project concluded that no one factor can independently lead to superior growth, but rather it is the interaction of a constellation of events that led some countries to perform better than others. In this sense, a comprehensive and co-ordinated set of actions are needed to create the right conditions for future change and innovation. That said, many of these factors such as sound monetary or fiscal policy, or well functioning labour markets have been recognised for some time. What was new was that the important role of technology, specifically ICT, was recognised at a macroeconomic level. This conclusion was substantiated in a number of different

OECD reports that fed into the study.<sup>5</sup> Thanks to improvements in official data series and methodological work undertaken by various OECD Working Parties, these reports were able to analyse the impact of ICT on growth with a relatively high degree of international comparability and begin to unravel differences in the nature of growth across countries attributable to ICT.

19. Among the findings from this work are (table 2):<sup>6</sup>

- Despite different timing of countries' expansions and recessions in the 1990s, all the eight OECD countries analysed have witnessed a rapid increase, ranging from 10 to 25 percent, in constant price investment in information and communication equipment and software. In the US, Australia and Finland, ICT investment accounted for over 50 per cent of constant price growth of non-residential investment in the most recent years (1995-99).
- Software has been the most dynamic component of ICT investment and, in the 1995-99 period, accounted for 25 to 40 per cent of the ICT contribution to overall investment growth across the eight countries.
- Over the past twenty years (1980-99) the contribution of ICT equipment and software to output growth of the business sector has been between 0.2 and 0.5 of a percentage point a year depending on the country. Over the past 4 years (95-99) the contribution of ICT and software has raised to annual values that range from 0.3 to 0.9 per cent.
- Software capital accumulation accounted for a third of the overall contribution of ICT capital to output growth between 1995 and 1999. What is remarkable is that this result holds across all OECD countries in the sample, with the exception of Japan<sup>7</sup>. The United States is the most striking in that respect since the average percentage contribution of software in 1995-99 is four times up from its 1980-85 value.
- The United States is not alone in experiencing the "growth" effects of ICT. ICT equipment and software are playing a major role in driving output growth also in the case of Australia and Finland. In the case of Canada software investment series are not available but the contribution of ICT equipment is fairly strong and growing. The impact of ICT in the other countries in the sample, instead, seems not to have increased in the latest years. The distinguishing feature of the impact of ICT diffusion in the US in these latest years is the role played by software capital accumulation.
- This analysis, which looks at the impact of the *use* of ICT on output growth, seems to indicate that being a relatively large ICT producer is not a necessary, and perhaps not a sufficient condition to experience the growth effects of ICT. ICT diffusion does play a key role but the adoption of ICT must be enabled by other framework conditions.

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5. Colecchia, A (2001) "The Impact of Information and Communication Technology on Output Growth: Issues and Preliminary Findings" OECD STI Working Papers [forthcoming]; Pilat, D and Frank Lee (2001) "Productivity Growth in ICT-Producing and ICT-Using Industries: A Source of Growth Differentials in the OECD?" OECD STI Working Papers [2001/4], [http://www.oecd.org/dsti/sti/prod/wp2001\\_4e.htm](http://www.oecd.org/dsti/sti/prod/wp2001_4e.htm); Schreyer, P (2000) "The Contribution of Information and Communication Technology to Output Growth: A Study of the G7 Countries," STI Working Papers [2000/2], [http://www.oecd.org/dsti/sti/prod/wp2000\\_2e.htm](http://www.oecd.org/dsti/sti/prod/wp2000_2e.htm)
6. Colecchia, A (2001) "The Impact of Information and Communication Technology on Output Growth: Issues and Preliminary Findings" OECD STI Working Papers [forthcoming].
7. This is partly due to the fact that software investment in Japan is underestimated. See footnote 4.

20. As the OECD report was being finished, the US economy began to cool, especially in terms of investment in ICT and an abrupt correction in stock valuations for “dot.com” firms. This has instilled realism to the debate and put an end to some exuberant economic behaviour. But it would be wrong to conclude that there was nothing particularly exceptional about the recent US experience or that of other countries whose potential growth has been lifted. Likewise, while the pace of investing in ICT has declined, the use continues to increase as the number of Internet hosts, traffic and secure servers equipped for e-commerce transactions continues to increase (Figures 9 and 10). It appears that many of the OECD economies have evolved from a “gold rush” period as regards ICT, possibly fuelled by fears of a Y2K catastrophe, to a reflective period where organisations are learning how best to use this technology. In this sense, the economic impact of ICT may be just beginning and may be better analysed and understood in a more subdued economic period. It also gives the statistical agencies some time to consolidate the work done to date and consider thoughtfully the next steps that need to be taken.

### **Continuing and new challenges**

21. As is common with work that tries to empirically pin down the role of new factors in growth such as ICT, it generates more policy-related questions. Among these are why did the growth suddenly occur in the US in 1995? Has the long-term rate of economic growth been increased? Why didn't it occur in other countries who have invested heavily in ICT as well? Statistically, many of the challenges posed have in fact existed for some time and they are both methodological and topical in nature. In terms of topics, as the information society matures our ability to measure it needs to advance from statistics that show the readiness (the infrastructure, PC penetration, schools on-line) to the intensity and nature of use (time spent on-line, composition of traffic, value of e-commerce) and the impact of this technology (productivity, changing demand on skills, business / work organisation) on the economy and society. Already many OECD surveys of ICT use by businesses indicate that ICT use is near to saturation rendering such questions less useful while we have a poor understanding of the effects that ICT has had on the output of the service industries such as retail trade, transportation and health, where measurement was far from perfect even before the widespread adoption of ICT. It is likely that firm-level databases will be required to fully assess these impacts, which will entail a significant effort to make this work comparable internationally.

22. It is important that the impact analysis address societal impacts as well as economic. For example, monitoring developments such as the surge in peer-to-peer instant messaging and file transfers that are having a large impact on how we communicate and share information, effectively redefining what we consider our community. This entails a need to expand our focus on the Internet from the web to new tools like Gnutella and better understand the role of old tools like e-mail that remains the “killer app” of the Internet.<sup>8</sup>

23. Another area where measurement of the impact of ICT needs further development is that of human capital, skills and labour markets. ICT is at the root of the evolution of OECD economies towards “knowledge-based economies” that requires the use of many abstract, analytical skills as opposed to manual dexterity. To some degree this facet of the information society is at the root of the digital divide, but we still have a very imperfect idea of what we mean by being computer literate. The identification of what we mean by IT skills is a necessary prerequisite to tracking their supply, demand and flow

24. Lastly, the OECD work on differences in growth across Member countries during the 1990s showed the software is a key component of investment and an important determinant of growth. Likewise,

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8. See Odlyzko, Andrew (2001) “Content is Not King,” FirstMonday, Issue 6 [http://firstmonday.org/issues/issues6\\_2/odlyzko/](http://firstmonday.org/issues/issues6_2/odlyzko/)

software has been key to the development of the information society. This is not news since prior to the 1990s it was clear that Lotus 1-2-3 was a main reason why many initially purchased PCs. More recent developments such as Napster, viruses such as ILOVEYOU and correcting the millennium bug confirm its importance. XML is likely to do so again in the next few years as it becomes the *lingua franca* for the Internet<sup>9</sup>. many of the current information society policy issues such as on-line privacy, security, consumer protection and taxation of e-commerce that confront policy makers, will rely on software as an important component to the solution. Given its prominent role in the past, currently and in the future, it is important that we improve the depth and breadth of measurement. Even in the US where arguably the measurement of software is most developed, the recent, relatively large downward of revisions to annual output from 1998 to 2000, dropping the GDP growth rate by nearly a full-point in 2000. About one-quarter of the downward revision was due to lower than estimated software investment.<sup>10</sup> The fact that a significant part of software is developed internally by firms, rented or bundled with other capital equipment generate some difficult statistical challenges. How countries address these challenges will have an impact on how we perceive the economic role of software narrowly and ICT more broadly, as well as the impact of ICT in one country versus another. Already we see some countries allocate less than a fifth of all software expenditures to investment as opposed to intermediate consumption while others allocate over half. In general, we need to develop improved surveys of capital investment that include software and show investments by asset type by industry.

25. The methodological challenges are no less demanding, although well known, starting with the need to update our classification systems (industry / activity, commodity / product and occupation), especially at the international level to allow us to better track the use, manipulation and transformation of information into knowledge. Associated with this is the growing interest in technologies such as electronic commerce or biotechnology that are neither strictly industries nor products, but rather methods or processes. All of these challenges will require a crossing of statistical boundaries between enterprise statistics, national accounts, and science and technology surveys that represents important, but difficult work. To fully assess the impact of these technologies, price indices need to be constructed so as to capture changes in the quality of products caused by technological improvements. Important work has been done to construct such price indexes for computers and extend it internationally, but similar work needs to be undertaken in the areas of communications equipment and services, software and possibly services. The increasing use of quality-adjusted or hedonic deflators in turn entails a need to move away fixed weights towards chained weights.

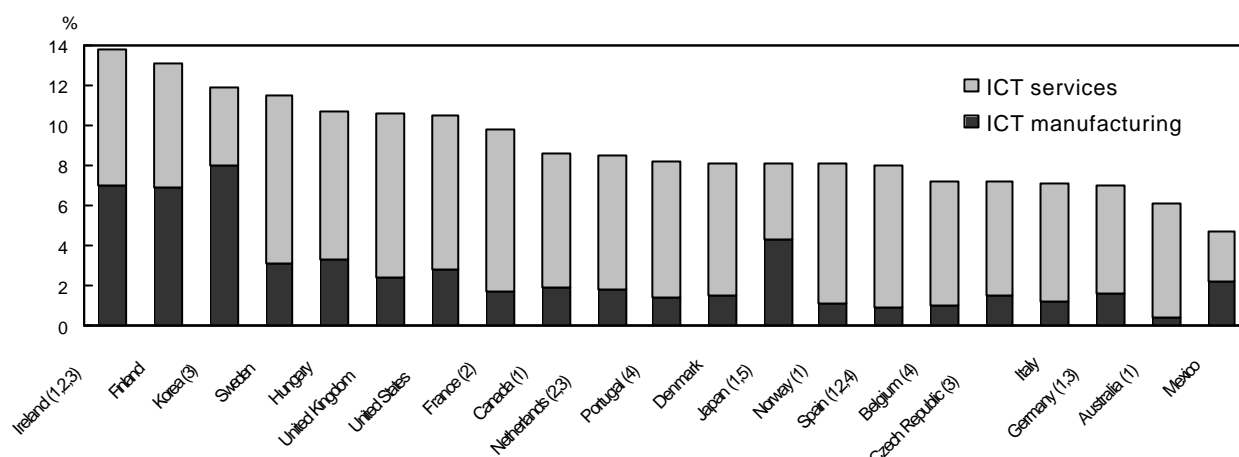
26. This list of challenges that we need to address may seem daunting, but in fact progress has already been made in many of these areas. And earlier challenges such as measuring e-commerce or surveying the use of ICT in businesses have been addressed in a rigorous and fast manner. A good part of this success is due to the sharing of ideas, techniques, successes and failures between countries. The OECD will continue to work with its partners such as Eurostat and the UN to provide support and a forum for exchange where these challenges can be addressed.

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9. Steve Ballmer, CEO Microsoft, 11 July 2001.

10. US Department of Commerce, Bureau of Economic Analysis, 2001, BEA News Release, "National Income and Product Accounts Second Quarter 2001 GDP (Advance) Revised Estimates: 1998 through First Quarter 2001" <http://www.bea.doc.gov/bea/newsrel/gdp201a.htm>.



**Figure 1. Share of ICT value added in business sector value added, 1999**

1. 1998.

2. Postal services included with telecommunications services.

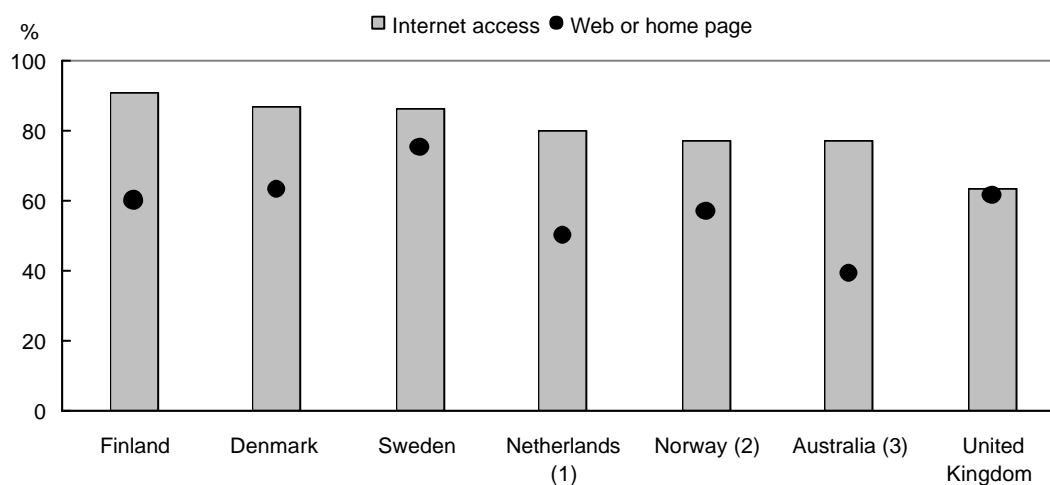
3. ICT wholesale (5150) and rental of ICT goods (7123) are not available.

4. ICT wholesale (5150) is not available.

Source: OECD, *STI Scoreboard 2001*, based on national sources; STAN and National Accounts databases, June 2001.

**Figure 2. Businesses with Internet and Web sites**

Percentage of businesses with ten or more employees, 2000



1. The figure refers to the Internet and other computer mediated networks. Reference period, 1st quarter of 2001.

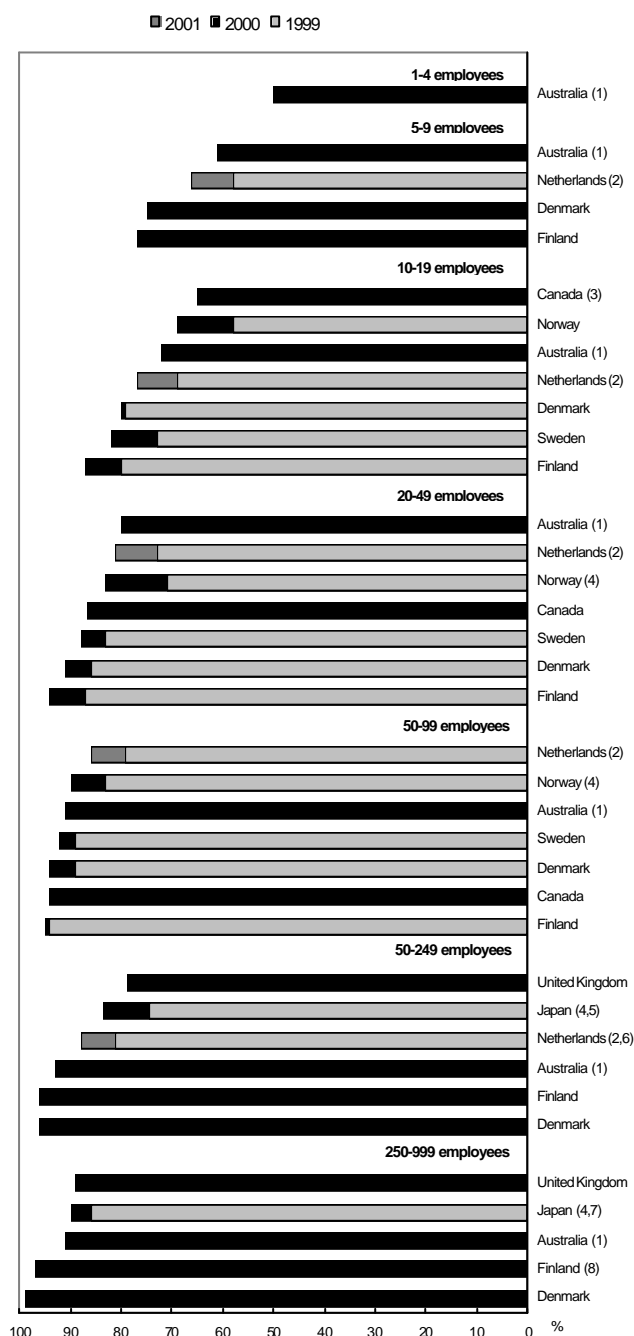
2. Expectations for 2000.

3. 1999-2000.

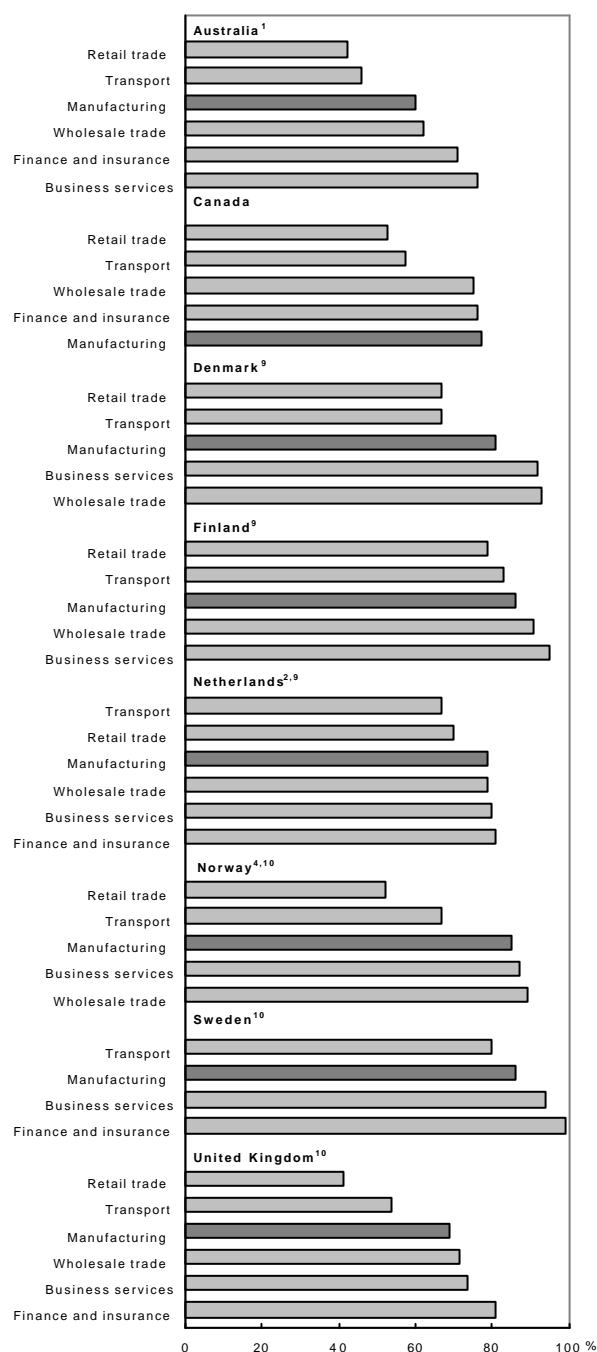
Source: OECD, *STI Scoreboard 2001*, based on ICT database, July 2001.

**Figure 3. Internet penetration by size class**

Percentage of businesses using the Internet

**Figure 4. Internet penetration by industry**

Percentage of businesses using the Internet, 2000



1. 1999-2000.

2. The figure refers to the Internet and other computer mediated networks. 1st quarter 2001.

3. 1-19 employees.

4. Expectations for 2000.

5. 100-299 employees.

6. 50-199 employees.

7. 300-499 employees.

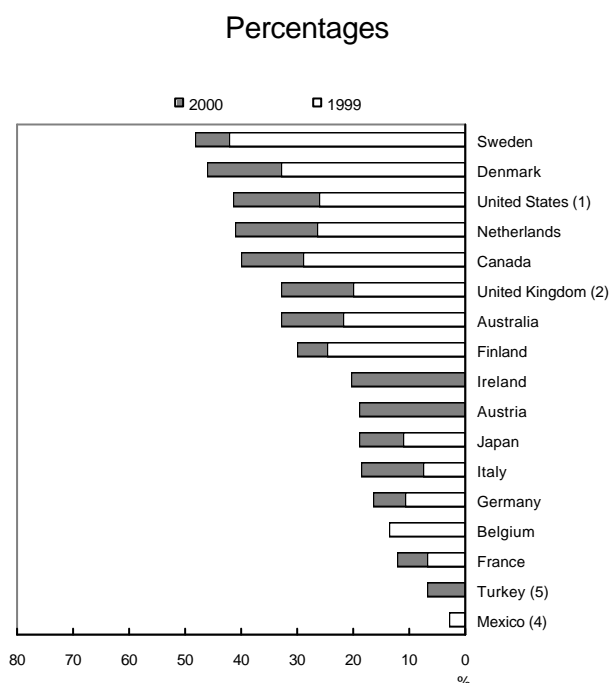
8. 250 and more employees.

9. All businesses with 5 or more employees.

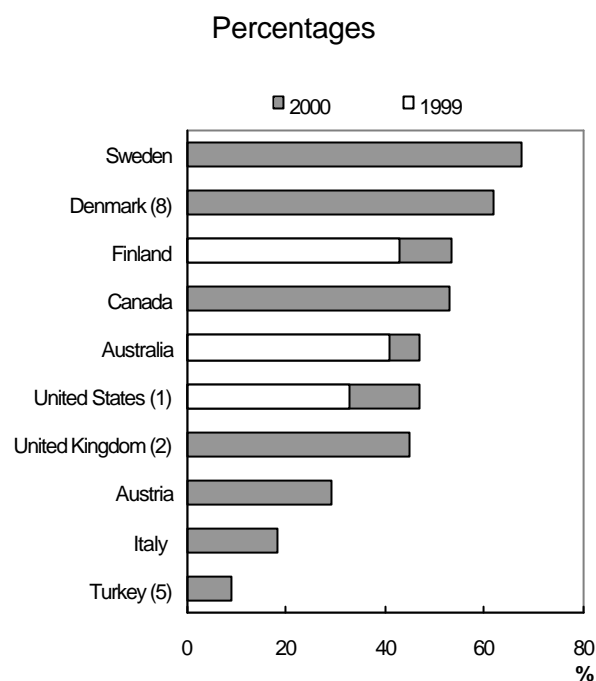
10. All businesses with 10 or more employees.

Source: OECD, *STI Scoreboard 2001*, based on ICT database, July 2001

**Figure 5. Households with access to Internet,<sup>6</sup> 1999 and 2000**



**Figure 6. Individuals using the Internet from any location<sup>9</sup>, 1999 et 2000**



1. 1998 instead of 1999.

2. Last quarter 2000.

3. Provisional data

4. Households in urban areas with more than 15 000 inhabitants only.

5. Households in urban areas only.

6. For Denmark, Ireland, the Netherlands and the United Kingdom, access to the Internet via a home computer; for the other countries access to the Internet through any device (e.g. computer, phone, TV, etc.).

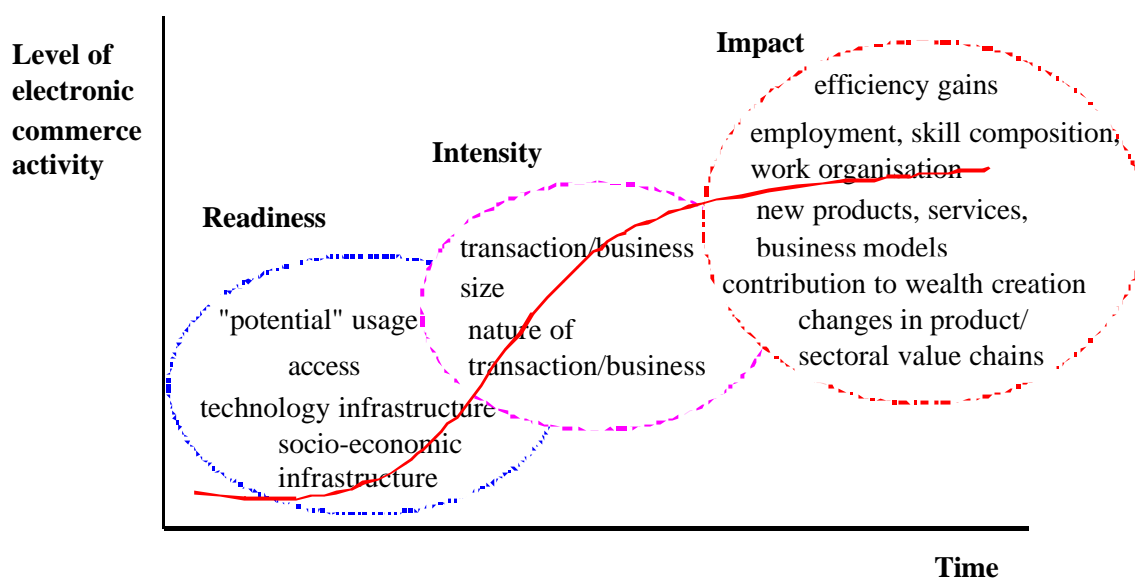
7. For the Netherlands, first and last deciles instead of quartiles.

8. First quarter 2001.

9. Age cut-off: 16 years and older except for Canada and Finland (15+), Italy (11+) and Australia and Turkey (18+).

Source: OECD, *STI Scoreboard 2001*, based on ICT database, July 2001.

Figure 7. Translating Policy Needs into Indicators for E-commerce



Source: Industry Canada, presented at the OECD Workshop on *Defining and Measuring E-commerce* (April 1999).

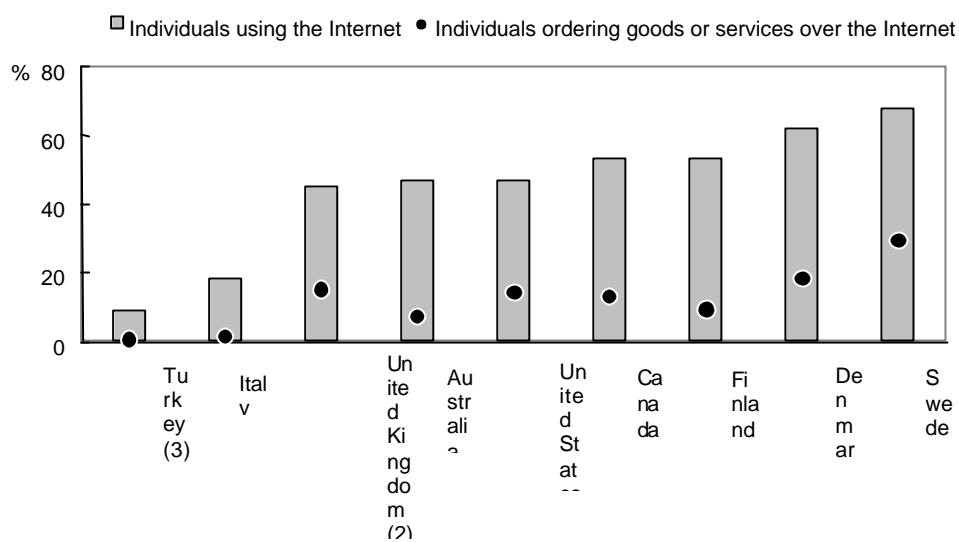
**Table 1. Official estimates of Web, Internet and electronic commerce transactions. Percentage of total sales or revenues**

BROADER	Business sector		2.04% (UK, 2000) 0.40% (Canada, 2000) 0.40% (Australia, 1999-2000)	5.83% (UK, 2000)
		0.90% (Denmark, 2000) 0.70% (Finland, 2000)	0.94% (UK, 2000)	5.95% (UK, 2000)
			1.04% (UK, 2000) 0.40% (Canada, 2000) 0.30% (Canada, 1999)	1.39% (UK, 2000) 0.91% (USA, 1st Q 2001) 0.70% (USA, 1st Q 2000) 0.63% (USA, 1st Q 1999)
	Retail sector	0.10% (France, 1999)		
		Web commerce	Internet commerce	Electronic commerce
				BROADER

Source: OECD, *STI Scoreboard 2001*, based on ICT database, July 2001.

Figure 8.

**Percentage of individuals using the Internet and purchasing and services over the Internet, <sup>1</sup>**



1. Age cut-off: 16 years and older except for Canada and Finland (15+), Italy (11+) and Australia and Turkey (18+).

2. Last quarter 2000.

3. Individuals belonging to households in urban areas.

Source: OECD, *STI Scoreboard 2001*.

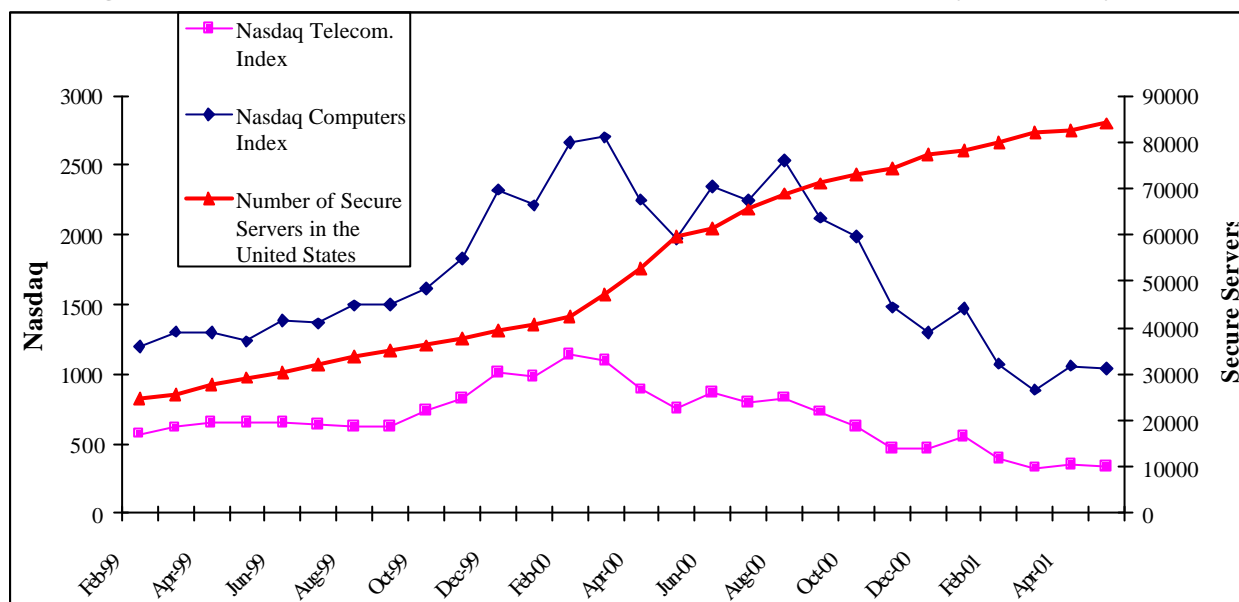
Table 2 - ICT contribution to output growth

Business sector, based on harmonised ICT price index

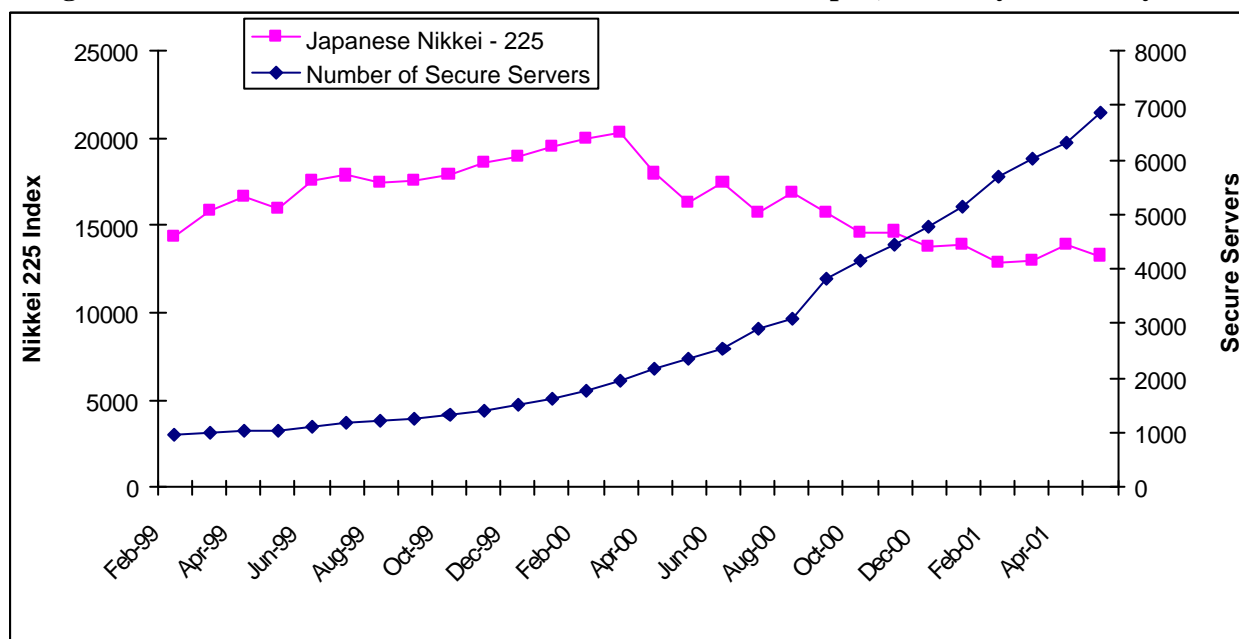
		USA	AUSTRALIA	CANADA	FINLAND	FRANCE	GERMANY	ITALY	JAPAN
<b>growth of output</b>	80-85	3.46	3.36	2.74	2.80	1.48	1.13	1.56	3.44
	85-90	3.26	3.79	2.90	3.42	3.45	3.59	3.06	4.83
	90-95	2.48	3.37	1.82	-0.70	0.96	3.75	1.44	1.46
	95-99	4.32	4.59	3.83	5.63	2.51	1.73	1.72	1.07
contribution (percentage points) from:									
<b>IT and communications equipment</b>	80-85	0.36	0.22	0.23	0.19	0.16	0.19	0.19	0.15
	85-90	0.32	0.34	0.27	0.30	0.21	0.26	0.23	0.23
	90-95	0.29	0.34	0.25	0.16	0.18	0.22	0.18	0.24
	95-99	0.61	0.44	0.36	0.40	0.24	0.21	0.24	0.30
<b>software</b>	80-85	0.07	0.05	...	0.07	0.06	0.04	0.02	0.02
	85-90	0.11	0.12	...	0.12	0.03	0.06	0.08	0.07
	90-95	0.14	0.12	...	0.08	0.02	0.05	0.03	0.06
	95-99	0.27	0.17	...	0.18	0.12	0.08	0.07	0.03
<b>total ICT</b>	80-85	0.44	0.27	...	0.26	0.21	0.23	0.21	0.17
	85-90	0.43	0.45	...	0.42	0.24	0.32	0.31	0.31
	90-95	0.43	0.46	...	0.24	0.21	0.27	0.21	0.30
	95-99	0.88	0.61	...	0.58	0.36	0.29	0.32	0.33
<b>total capital services</b>	80-85	1.25	1.62	1.45	0.75	0.78	0.75	0.81	1.13
	85-90	1.09	1.92	1.20	0.99	1.11	1.03	0.98	1.53
	90-95	0.97	1.34	0.69	0.26	1.00	1.15	0.74	1.46
	95-99	1.70	1.58	0.95	0.53	1.07	0.93	0.97	0.99
ICT contribution as a share of non-residential capital contribution:									
<b>IT and communications equipment</b>	80-85	0.29	0.14	0.16	0.25	0.19	0.25	0.23	0.13
	85-90	0.30	0.17	0.22	0.30	0.18	0.25	0.23	0.15
	90-95	0.29	0.25	0.36	0.61	0.17	0.19	0.24	0.16
	95-99	0.36	0.28	0.38	0.76	0.22	0.23	0.25	0.31
<b>software</b>	80-85	0.06	0.03	...	0.09	0.07	0.06	0.03	0.01
	85-90	0.10	0.06	...	0.12	0.03	0.06	0.08	0.05
	90-95	0.15	0.09	...	0.31	0.02	0.05	0.04	0.04
	95-99	0.16	0.11	...	0.34	0.11	0.08	0.08	0.03
<b>total ICT</b>	80-85	0.35	0.16	...	0.34	0.26	0.30	0.26	0.15
	85-90	0.40	0.24	...	0.42	0.20	0.31	0.31	0.20
	90-95	0.44	0.34	...	0.92	0.19	0.24	0.28	0.21
	95-99	0.52	0.38	...	1.09	0.33	0.31	0.33	0.33

**Notes:** Output is Gross Domestic Product, business sector, factor cost (OECD, ADB database); capital services refer to the accumulation of seven assets (software, equipment and non-residential structures) from National Accounts. Software is not included for Canada; only “order-made” software is included for Japan.

**Source:** OECD, STI/EAS estimates

**Figure 9. Growth of NASDAQ indices and US secure servers, February 1999 - May 2001**

Source: OECD based on Netcraft ([www.netcraft.com](http://www.netcraft.com)) and NASDAQ.

**Figure 10. Growth of Nikkei-225 index and secure servers in Japan, February 1999 - May 2001**

Source: OECD based on Netcraft ([www.netcraft.com](http://www.netcraft.com)) and NASDAQ.

**Annex. OECD Information Society Policy Guidelines**

OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data (1980)	The Guidelines define basic principles for the protection of privacy and personal data in the context of automated processing of personal data..
OECD Guidelines for the Security of Information Systems (1992)	The Guidelines define basic principles for the protection of the availability, integrity, and confidentiality of information systems. Key principles include: accountability, awareness, ethics, multi-disciplinarity, proportionality, integration, timeliness, reassessment, and democracy.
OECD Council Adoption of Global Information Infrastructure/Global Information Society report (1997) <a href="http://www.oecd.org/dsti/iccp/gii-gis.htm">www.oecd.org/dsti/iccp/gii-gis.htm</a>	The report provides recommendations regarding access to infrastructures, the competitive safeguards required, as well as applications and services provided on networks (electronic commerce) and related issues such as intellectual property rights, transaction safeguards, and multimedia content.
OECD Guidelines for Cryptography Policy (1997)	These guidelines provide internationally comparable criteria for encryption of computerised information for safeguarding electronic transactions, communications, and data storage.
Taxation Framework Conditions (1998)	Agreement that the taxation principles that guide governments in relation to conventional commerce should also guide them in relation to electronic commerce.
OECD Guidelines for Consumer Protection in the Context of Electronic Commerce (1999)	These are guidelines to: 1) control fraudulent and misleading commercial conduct; 2) resolve disputes and establish redress mechanisms; and 3) ensure on-line consumer privacy.

Source: OECD.