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MEASURING THE NEW ECONOMY: TRADE AND INVESTMENT DIMENSIONS

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MEASURING THE NEW ECONOMY: TRADE AND INVESTMENT DIMENSIONS

SUMMARY

This paper considers the role of the new economy in the development of international trade and investment flows. In succession it analyses the impact of the new economy on the nature and quantity of goods and services traded, and on the volume of foreign direct investment. It also considers the range of new economy actors on the international trade and investment stage, with particular emphasis on the digital divide and market integration. Last, it demonstrates how e-commerce may affect the way in which goods and services are traded.

The paper seeks to define the "new economy". As a concept, it is frequently confused with the "Internet economy" or "e-economy". The new economy is not confined to e-commerce and Internet applications, though these developments do merit special attention. The definition of the new economy is far wider, and its effects in terms of growth, trade and investment need to be gauged across all the sectors making use of the new information and communications technologies (ICTs). Conversely, not everything that is new belongs to the new economy, and some leading sectors in international trade cannot be included in the definition. The paper accordingly deals essentially with trade in information and communications technologies, while seeking to identify their externalities on trade in other sectors.

The ICT sector is the one that has expanded most in trade terms over the last decade. By value, international ICT trade increased by 126% for the OECD area; at the same time, overall trade expanded by only 56%. This means that the ICT share in trade in goods and services has increased. The direct effects of the new economy on trade and investment are hence substantial. But it is not ICT trade as such which is the main driving force in the global expansion of trade, but the dissemination of ICTs throughout the economy. Through ICTs, the traditional economy is becoming more widely and more effectively open to trade.

In order to gauge the positive externalities, in trade terms, of the dissemination of ICTs, the paper compares the increase in ICT spending by selected OECD countries with their overall trading performance. Countries with the highest ICT expenditure frequently obtained the best trading results. But a number of countries with very low ICT expenditure have increased their trade still more rapidly. Factors other than the dissemination of ICTs are hence more decisive for the expansion of trade, such as the elimination of tariff and technical barriers to trade, or overall economic growth.

At the same time, the paper demonstrates a relationship between the openness of the economy and the level of ICT spending. This means either that ICT spending encourages openness to trade, or that the most open economies invest most in the new technologies.

With regard to the players in international ICT trade -- producers and consumers -- the paper shows significant disparities, from country to country and from business to business. Among the consumers, access to the new technologies depends in particular on the size of the business and its sector of activity. Among producers, while the liberalisation of ICT markets has fostered the emergence of more competitors and brought prices down, the heightened competition has recently led to substantial concentration.

At country level, the paper analyses the origin and destination of trade and investment flows linked to the new economy. It demonstrates that the emerging economies are achieving better results in international ICT trade than in other sectors. Put differently, while the digital divide is heightening the exclusion of some countries from trade, the new economy is contributing overall to greater world economic integration and less exclusion through ICT trade and related direct investment. The OECD area shows a significant deficit with the rest of the world in ICT trade.

The paper finally addresses e-commerce. Data here are still sparse and unreliable, no doubt because e-commerce is just in its infancy. At this stage, accordingly, it is hard to draw any trade policy conclusions from the early empirical findings. But it does appear that not all forms of e-commerce are profitable, and that not all sectors are benefiting equally from the business opportunities created by Internet.

INTRODUCTION

Outline of the study

1. The purpose of this study is to assess the new economy's effects on trade and investment. To this end, we shall proceed in turn through four steps, incorporating at all times the dichotomy between direct effects and indirect effects.

1. Work is needed to define the new economy. To date, studies on the subject have looked only at the new information and communications technologies (ICT) sector. Given the structure of trade, is that definition relevant? Would the available data and methodological considerations allow a broader definition, taking in other innovative sectors such as biotechnology?

2. How does the new economy affect trade and investment on the quantitative and qualitative levels?

3. Who are the new players in new economy-related international trade in goods and services?

4. How does the new economy affect the way in which products and services are traded?

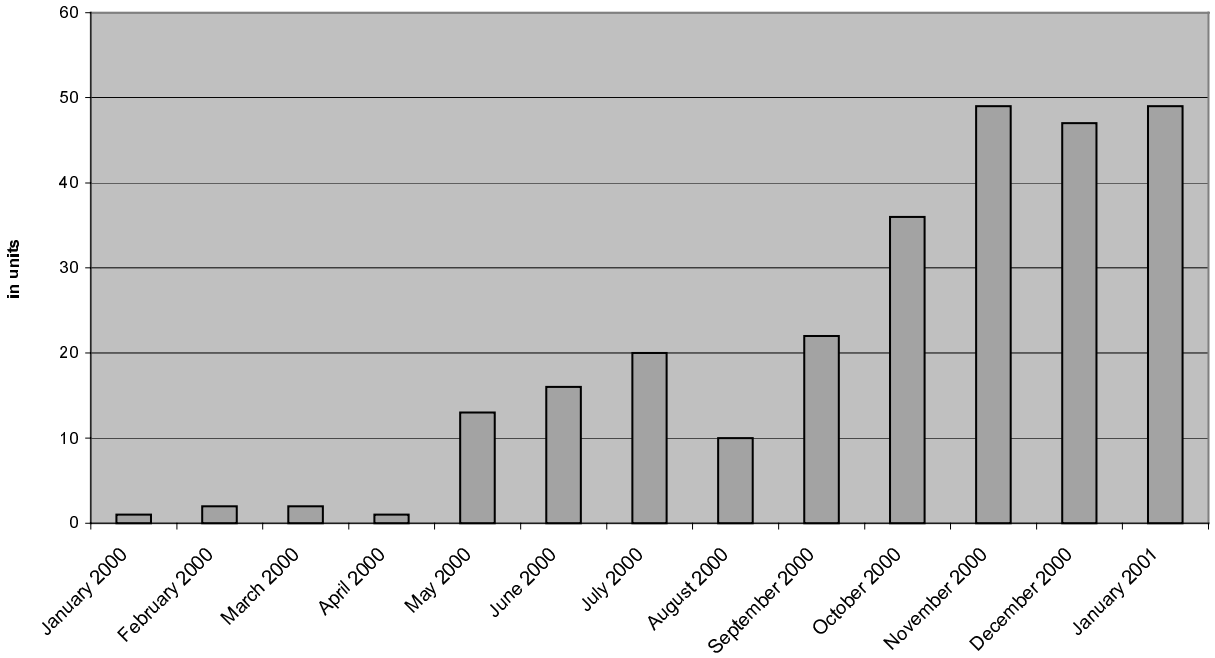
The New Economy - myth or reality?

2. The term "New Economy" has been used frequently in recent years to signify a non-inflationary growth model based both on heavy investment in new information and communications technologies (ICTs) and on restructuring the economy around these new technologies [OECD (2000*a*)]. But today this term is being reconsidered, and the very existence of a "new economy" is being called into question [Krugman (2001)].

3. What is the explanation for this reversal? First of all, the slowdown in the American economy has shattered the myth of uninterrupted fast growth. In addition, technology stocks have seen their prices plummet. Certain businesses that had led the pack of Internet start-ups or pioneered new technologies have either folded or announced mounting losses or deep profit declines leading to job cuts. On a cumulative basis, new economy firms would appear to have been badly affected by the economic downswing (see Figure 1)[1].

1. According to Gartner Dataquest, sales of personal computers are running 3.5% lower in first-half 2001 than in first-half 2000. Credit Suisse First Boston estimates that businesses will have to eliminate $190 million of surplus ICT investment over two years, or cut their investment by 16% a year on average (*The Economist*, 12 May 2001).

Figure 1. Internet start-up failures in the United States, 2000-2001



Source: webmergers.com in *Les Echos*, 12 March 2001.

4. But does this mean that the new economy is finished and no longer warrants attention? Such a public policy choice would be wrong for at least two reasons. First, the time frame of public policies is not that of the markets. Second, the *new* economy must not be confused with the *Net* economy, which is only one of its components.

5. The start-ups' medium- or long-term earnings prospects triggered short-term speculation on technology stocks. Today's bursting of the speculative bubble in no way means that the medium- or long-term earnings prospects of new economy firms have changed, but that the investors' time frame did not allow them to defer their returns on investment beyond a short-term horizon. The economy's structural changes—present and prospective—continue to herald the advent of a new economy based on new information and communications technologies, independently of the short-term financial performance of certain start-ups. On the contrary, this should heighten government's interest in the new economy, because it may become necessary to bolster the private sector's R&D investment if the payback horizon were to prove too distant for the sector. Such investment is needed to preserve the competitiveness of each national economy.

6. The Internet is clearly a vital component of the new economy, and e-commerce is a phenomenon that warrants very close attention. But the definition of the new economy is far broader than that, and its effects in terms of growth, trade and investment must be gauged across all of the sectors that make use of information and telecommunications technologies. ICTs are not limited to the Internet. "Far from being a technical epiphenomenon, the ICT sector is the visible portion of a far wider transformation of the industrial economies... The sector's deployment, for all its inherent usefulness to economic growth, would not warrant the attention it is getting if a great deal more were not at stake, i.e. the dissemination of a new productive model to the entire economy" [Conseil d'Analyse Économique (1998)]. The collapse of certain Internet stocks and the economic downturn are therefore in no way harbingers of a collapse of the new economy and do not cast doubt on the economy's structural changes. The new mode of economic organisation made possible by the ICTs affects all of the economy, and the old economy above all. The

new economy is therefore assessed primarily in terms of externalities. The advent of the new economy had prompted an increased interest for Schumpeterian growth theories based on the notion of creative destruction [see for example endogenous growth model in Aghion and Howitt (2000)]. But the new economy has proven to be less destructive than had been thought. For example, in the automobile sector, on-line sales have not replaced dealer sales. On the contrary, it has emerged that informational visits to Internet sites precede and encourage visits to dealer showrooms, where the actual sales still take place.

The linkage between the new economy, productivity gains and growth

7. In the late 1980s, endogenous growth theories sparked investigations of how externalities affected growth [Romer (1994)]. Endogenous growth factors include human capital and infrastructure. ICTs have a direct impact on these factors, since the infrastructure in question enables the development of human capital thanks to the dissemination of information.

8. Accordingly, a host of economic studies have sought to measure the productivity gains and growth made possible by the dissemination of ICTs [see for example, Gordon (2000); Oliner and Sichel (2000)]. Along those same lines, the OECD has produced a number of studies on the linkages between the new economy and growth [OECD (2000*a*), (2001*e*), (2001*h*); Colecchia (2001); Schreyer (2000)]. It emerges that ICTs have in recent years played an important role in economic growth in the OECD countries, and especially in the United States. The growth accounting exercise in Table 1 below shows that whereas 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, in the period 1995-1999 the contribution of ICT and software jumped to annual values that range from 0.3 to 0.9 per cent. In terms of shares in the overall contribution of non-residential investment, this translates in an average contribution that ranges between 33 and 100 per cent across countries in the sample. What was new in the 1990s was the sharp increase in the contribution of ICT capital across some OECD countries. In the period 1995-99, the contribution of ICT equipment to output growth in the United States was the highest (0.61 percentage points on average). This doubled with respect to the period 1980-85, but this also happened in Australia, Finland and Japan. In relative terms, the ICT contribution in the US in the last few years amounts to just over one-third of the entire growth contribution of fixed capital in the same period.

Table 1. ICT contribution to output growth

Business sector, based on harmonised ICT price index

		USA	AUSTRALIA	CANADA	FINLAND	FRANCE	GERMANY	ITALY	JAPAN
growth of output	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:							
IT and communications equipment	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
software	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
total ICT	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
total capital services	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:							
IT and communications equipment	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
software	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
total ICT	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. This table is preliminary and subject to revision (version: February, 2001).

Source: Colecchia (2001).

Box 1: Measuring investment in ICT equipment and software

Deflation methods and adjustment for quality

The measurement of investment in real terms requires price indexes that take changes in the quality of products into account. This is particularly important for products subject to rapid technological change such as computers or ICT products more generally. Computer quality has changed significantly; in constant quality terms (i.e. taking improved performance into account), computer prices have fallen very rapidly, while computer quantities (quality-adjusted) have risen very rapidly. Some statistical agencies apply so-called "hedonic" techniques to capture price changes in ICT goods. In the case of computers, the method consists in relating changes in computer prices to product characteristics such as memory, MIPS (million instructions per second) and processor speed. In the United States, hedonic deflation methods are used for most components of ICT investment, whereas other countries use a different, 'matched-model' approach, leading to very different trends in the price over time, which in turn affects comparisons of productivity and growth. Some countries (e.g. Canada, Japan, France) are starting to introduce hedonic adjustment to measure real computer investment and sometimes base their deflators on the US ones. The measures of ICT contribution to output growth in Table 1, and of ICT investment shown in Figure 3, are based on "harmonised" price indexes for ICT products. The "harmonised" series assumes that price ratios between ICT and non-ICT products have the same time patterns across countries, with the United States as the benchmark.

Efforts are being made by the Statistical Working Party of the Industry Committee to develop an 'OECD Handbook on Quality Adjustment of Price Indices for Information and Communication Technology Products'.

For further information see Colecchia (2001) and Schreyer (2001).

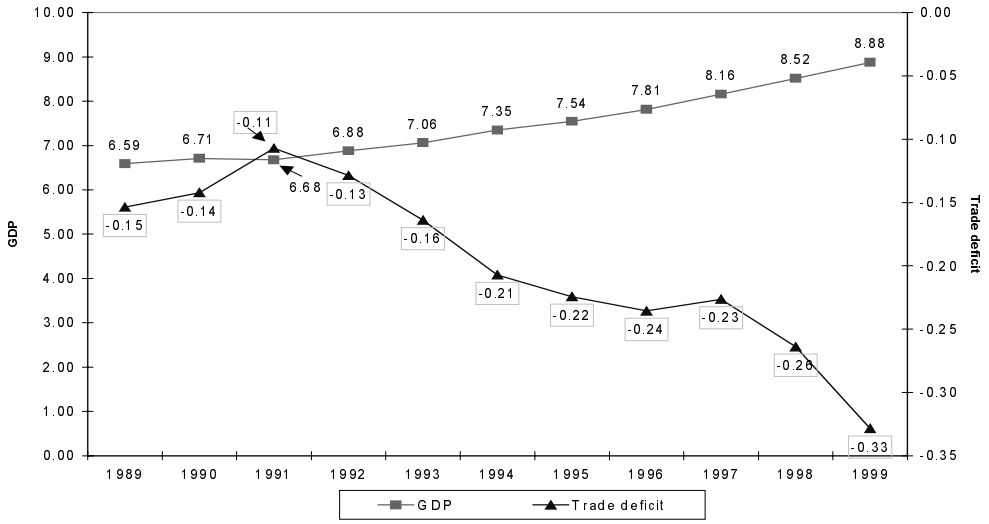
Source: Adapted from OECD (2001*a*).

The linkages between productivity gains, growth, and trade and investment flows

9. While the linkages between the new economy, productivity gains and growth have received much attention, the same cannot be said for the new economy's effects on trade. This is probably because it is difficult to have access to certain trade data and to identify flows that are related to the new economy, especially in the realm of services. And yet, trade now accounts for a significant share of the economic activity of the OECD countries. With the liberalisation of international commerce, trade has become a meaningful engine of growth [OECD (1998)]. Outside the OECD area, trade is also perceived as essential to the economic development of the less privileged countries [OECD (2001*d*)]. It is therefore the aim of this study to supplement work done elsewhere in the OECD, and focus on the trade and investment dimension of the new economy.

10. The linkage between growth and trade is ambiguous. The growth curves of the national product and trade are not symmetrical. Over the past fifty years, growth in trade has consistently outpaced that in national output. While growth in national output can be led by exports, strong growth does not necessarily feed through to an improvement in a country's foreign trade position, as the example of the United States shows (see Figure 2). On the contrary, the immediate effect of a surge in domestic demand is a rise in imports, and thus a deterioration of the fast-growing country's trade balance. More precisely, what is important are the growth differentials between countries: the greater the differential, the more attractive the country's market will be for other countries' exporters. The two effects are therefore cumulative and reinforce each other.

Figure 2. US GDP and trade deficit, 1989-1999 (US$ trillions)



Source: OECD, MEI database, GDP in constant prices; and OECD, FTS database.

11. As shown by various studies, it is the United States that has reaped the most benefit from the growth gains delivered by the new economy. But the US trade balance has been worsening steadily, even in the particular realm of ICTs[2]. It is therefore hard to draw clear trade policy conclusions from studies on the linkage between the new economy and growth.

12. The connection between productivity gains and trade is ambiguous as well, as Paul Krugman testifies in his critique of "pop economists" [Krugman (1996)]. In his view, productivity gains should be seen as allowing a boost in output, and not as a way to preserve or enhance an economy's competitiveness. Strong productivity gains, whether relative or absolute, can therefore not ensure that a country's foreign trade position will improve. The example of the United States, as discussed above, illustrates this finding.

13. Even so, this critique highlights two ways in which productivity gains can affect trade. In the particular case of the new economy, the productivity gains delivered by the dissemination of ICTs do in fact lead to greater output, all else being equal. In trade terms, this means that the firms reaping the gains need to explore new markets to find buyers for their increased production, which can feed through to a rise in exports. Subsequently, depending on business margin (or profit) trends, productivity gains, which correspond to a reduction in production costs, may be transformed into lower prices for traded products. It may then become feasible to export a product that had previously been profitable only domestically. Moreover, heightened competition may prompt firms to seek economies of scale and to expand their target markets.

14. Without developing an analysis of the intermediary steps, this study will test the overall linkage between the dissemination of ICTs and developments of international trade.

2. See Figure 2 above for the overall trade deficit; the ICT-specific curve will be presented later on.

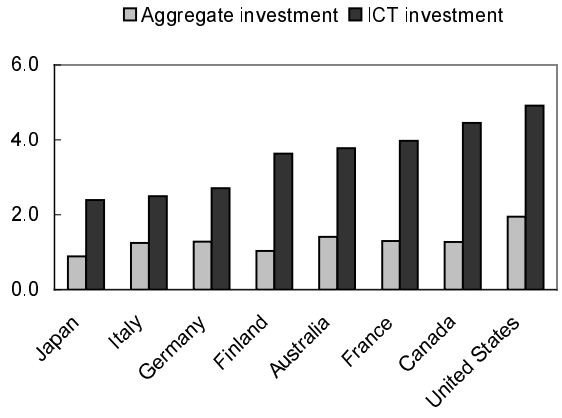
The linkage between the new economy and trade and investment flows

15. Analysis of the productivity gains and higher growth does not quantify the new economy's effects on trade and investment flows. An independent analysis of the link between the new economy and trade and investment flows is therefore needed, focusing on both the direct and indirect effects.

16. The new economy and the dissemination of ICTs are a direct source of new trade and investment. In recent years, flows of ICT-related goods and services have been increasing continuously, in both absolute and relative terms[3]. Similarly, ICT firms have contributed substantially to the private sector's investment efforts and have attracted a great amount of public- and private-sector investment (see Figure 3).

Figure 3. Growth in aggregate and ICT investment at constant prices in selected OECD countries, 1999 index (1990=1)

Based on harmonised deflators for ICT products[1]



Note: 1. Estimates of 'harmonised' price indexes assume that price ratios between ICT and non-ICT products have the same time patterns across countries, with the United States as the benchmark.

Source: OECD (2001*a*).

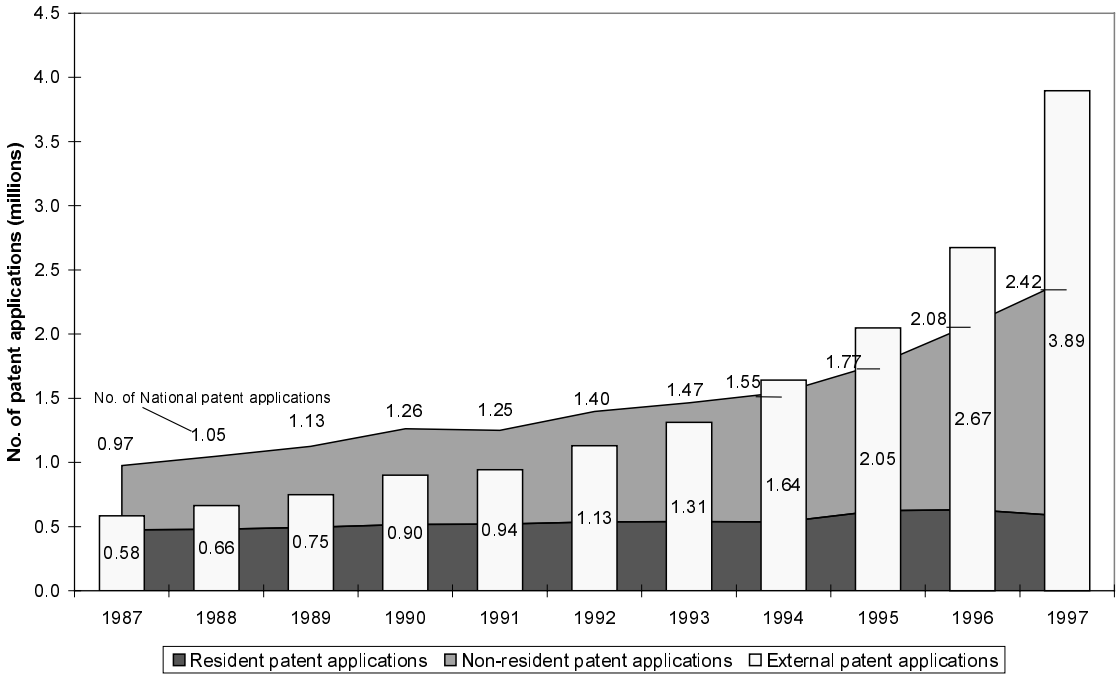
17. While the direct effects are easier to quantify, they probably do not constitute the new economy's main impact on trade. Because the new economy affects the economy as a whole, its trade impact extends to goods and services other than ICTs. The dissemination of these technologies enables traditional businesses to conquer new markets, locally and abroad, thanks in particular to lower production costs, more effective management methods and gradual elimination of the geographic and time barriers to trade. E-commerce in traditional goods such as books (B-to-C, *i.e.* business to consumer) or car parts (B-to-B, *i.e.* business to business) is one illustration. In the realm of investment, the direct effects of ICT dissemination are just as substantial, since it generates new investment requirements in the areas of training and research in particular.

18. Equally, trade plays a vital role in disseminating innovation. The proportion of patent applications from foreign sources has been rising continuously and now far exceeds that of domestic

3. See Figures 7, 8, and 11 to 13.

applications. This seems to indicate that trade is a major vehicle for the dissemination of new technologies, since patented goods traded on local markets are mainly of foreign origin (see Figure 4).

Figure 4. Patent applications, 1981-1997, OECD member countries



Note: The number of national patent applications is the sum of resident and non-resident patent applications over the given period, and shows the size of the technological 'market' of the OECD area. The number of resident patent applications refers to the sum of patents made by residents of OECD member countries within OECD member countries. Non-resident patent applications are those made by non-OECD countries within OECD countries, and indicates the technological 'penetration' of the OECD area. External patent applications are applications made by OECD countries in non-OECD countries, and indicates the technological 'diffusion' of the OECD area. For more details, refer to the General Methodology section of the OECD *Main Science and Technology Indicators, 2000-2* publication.

Source: OECD (2001*c*).

I. DEFINING THE NEW ECONOMY, AND THE METHODOLOGICAL PROBLEMS ENCOUNTERED

19. The introduction has highlighted the difficulty of defining the new economy, and the doubts raised by some observers as to the very existence of a new economy. It is therefore necessary to work on the definition. Moreover, no such effort undertaken for the purpose of specifying the framework for empirical analysis can disregard methodological considerations, and the availability of trade and investment data in particular.

Does everything that is new belong to the new economy?

20. To date, studies on the new economy have focused their attention on ICTs. Although this is a legitimate choice, insofar as the new economy is defined as an information economy, it nonetheless results in two distortions:

1. First, while the ICT sector is experiencing a surge of growth, it is above all because of the externalities of that expansion that one can refer to a "new economy". Analysing the ICT sector alone is too simplistic, and it is not enough if one is fully to grasp the new economy.

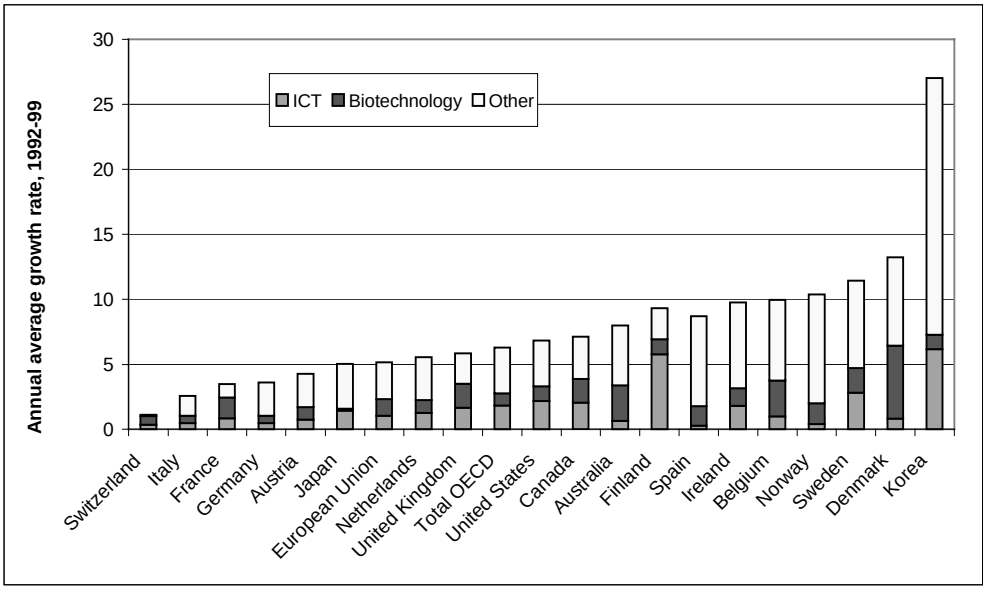
2. Second, the ICTs are no longer all that new. The computer was invented in 1946 and the transistor in 1948; the first geostationary telecommunications satellite was launched in 1962; the microprocessor and the smart card came out in 1974; and the Internet was the result of scientific experiments begun in the 1960's. The new economy revolution therefore consists primarily of new applications of existing technologies. This development is based on a "network effect": for instance, for a business, the value added of Internet access will increase with the number of customers and other businesses that are connected [Kelly (1997)]. The value of the network is therefore exponential, whereas the growth of the ICT sector itself, while self-sustaining (because of the need to renew the technologies), is merely proportional. The use of fax machines and phones illustrates this latter point.

21. But does this mean that all of the new technologies should be included in the definition of the new economy? For example, biotechnology, which exploits genetic information, is one of the latest developments of information technology. "New materials" are also getting a lot of attention. More broadly, reverting to the expression "knowledge-based economy" would mean analysing all of the developments made possible by innovation, making no distinctions between the technologies in question. But, as is illustrated by the sectoral distribution of patent grants, the bulk of innovation does not involve ICTs, and how innovation is split up amongst the various technologies varies considerably from one OECD country to another (see Figure 5)[4].

4 . Patents reflect innovation as novelty is a prerequisite to the grant of a patent.

Figure 5. Growth in patenting, 1992-1999

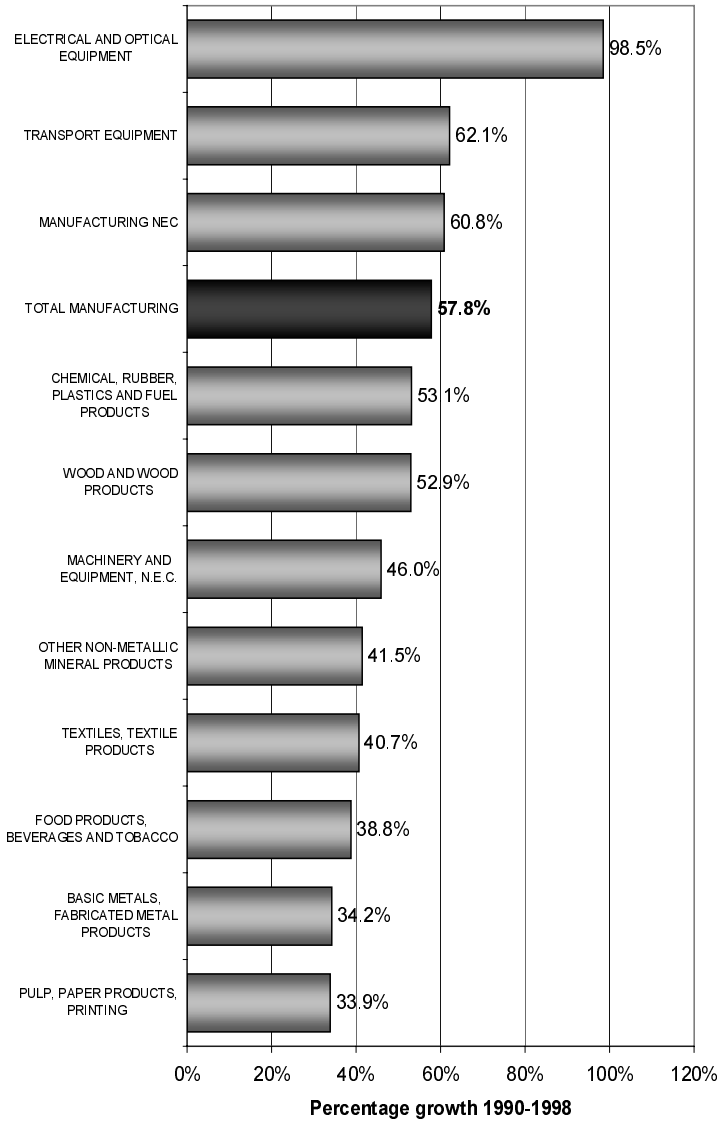
Annual average growth of patents granted at the US Patents Office, by country of inventor



Source: OECD (2001*e*), based on data from the US Patent and Trademark Office.

22. Can trade data be used to define the new economy more precisely? To answer this question entails analysing trends in the structure of trade, and determining the most promising sectors in international trade. At the OECD level, it emerges that the ICT sector is the one that has expanded most in terms of trade over the past decade (up 98.5%, as opposed to 57.8% for aggregate manufactures) (see Figure 6). A more detailed analysis (using two-digit nomenclature categories) reveals that the three categories encompassing ICTs have been growing fastest (see Table 3). Nevertheless, trade in a number of more specific products, such as pharmaceuticals, has expanded more than trade in ICTs. This single example illustrates that newly traded goods do not necessarily belong to the ICT sector.

Figure 6. OECD-22 Growth in exports per sector, 1990-1998



Note: The 22 OECD member countries consist of Australia, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Ireland, Iceland, Italy, Japan, Mexico, Netherlands, Norway, New Zealand, Portugal, Sweden, Turkey and the United States. The growth rates were calculated using exports in current prices, converted to US$ using OECD FTS exchange rates for exports, as methodological differences that exist across OECD Member countries prevent international comparisons in constant prices.

Source: OECD, STAN database.

Table 2. OECD-22 growth in exports per industrial sector

Industry Category	ISIC code	% growth 90-98	CAGR 90-98
Pharmaceuticals	2423	145.5%	11.9%
RADIO, TELEVISION AND COMMUNICATION EQUIPMENT	32	131.2%	11.0%
ELECTRICAL MACHINERY AND APPARATUS, NEC	31	100.9%	9.1%
OFFICE, ACCOUNTING AND COMPUTING MACHINERY	30	85.2%	8.0%
RUBBER AND PLASTICS PRODUCTS	25	68.9%	6.8%
OTHER TRANSPORT EQUIPMENT	35	68.1%	6.7%
MEDICAL, PRECISION AND OPTICAL INSTRUMENTS, WATCHES AND CLOCKS	33	66.2%	6.6%
MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS	34	62.2%	6.2%
CHEMICALS AND CHEMICAL PRODUCTS	24	62.1%	6.2%
FURNITURE; MANUFACTURING, N.E.C.	36	60.8%	6.1%
TOTAL MANUFACTURING	15-37	57.8%	5.9%
PUBLISHING, PRINTING AND REPRODUCTION OF RECORDED MEDIA	22	56.9%	5.8%
WOOD AND PRODUCTS OF WOOD AND CORK	20	52.9%	5.5%
FABRICATED METAL PRODUCTS, except machinery and equipment	28	52.0%	5.4%
Chemicals excluding pharmaceuticals	24ex2423	46.6%	4.9%
MACHINERY AND EQUIPMENT, N.E.C.	29	46.0%	4.8%
OTHER NON-METALLIC MINERAL PRODUCTS	26	41.5%	4.4%
FOOD PRODUCTS AND BEVERAGES	15	39.8%	4.3%
TEXTILES	17	37.0%	4.0%
LEATHER, LEATHER PRODUCTS AND FOOTWEAR	19	29.8%	3.3%
PAPER AND PAPER PRODUCTS	21	26.3%	3.0%
BASIC METALS	27	26.3%	3.0%
TOBACCO PRODUCTS	16	24.6%	2.8%
COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL	23	-10.5%	-1.4%
WEARING APPAREL, DRESSING AND DYEING OF FUR	18	-64.1%	-12.0%

Note: The growth rates were calculated using exports in current prices, converted to US$ using OECD FTS exchange rates for exports, as methodological differences that exist across OECD Member countries prevent international comparisons in constant prices. The ISIC revision 3 nomenclature was used for industrial sector classification.

Source: OECD, STAN database.

23. From an analysis of the structure of patenting and trade, it can be concluded that ICTs are only one of many engines of innovation. But not all engines of innovation have the same impact on economic restructuring, nor can it be claimed that they are all part of the emergence of a new economy. The development of pharmaceuticals, for example, exerts no such influence on trade in other goods and services. To analyse the ICT sector alone does not reflect a restrictive vision of the new economy, but rather an extensive vision (including externalities) of the sector's role in restructuring the economy.

Methodological problems

24. Despite these conclusions, methodological considerations argue for restricting the scope of the study to the ICT sector:

1. Trade data do not enable changes in the structure of trade to be grasped with precision. Harmonised customs nomenclatures are revised only periodically and cannot include all of the products spawned by the new technologies. Even when a revision is undertaken, technology advances more quickly than the revisers. "New" products therefore do not show up in international trade statistics.

2. New technologies, such as biotechnology or new materials, are used in different products and by different industries and can hardly be set apart in trade statistics[5].

3. Trade data cannot be used to identify which traded products are "new" (in the sense of "innovative"). R&D does not aim solely to create brand new products, but to enhance the quality or performance of existing products as well. Technological developments do not always lead to changes in a product's customs classification, making it impossible to distinguish it from previous products.

25. Empirical analysis of trade and investment flows related to the new economy, construed as an information economy, is complicated primarily by the difficulty of measuring the effects of the dissemination of ICTs throughout the economy, and on trade in particular. For example, data on e-commerce are still being developed. ICT flows are identifiable, but not the trade flows spawned by these new technologies. Nevertheless, this study will seek to grasp the externalities in terms of trade in ICTs.

26. The new economy is revolutionising trade in services. Some local services, such as retailing, are opening up to global competition because of ICTs. But data on trade in services are still in their infancy in a large number of countries.

27. Other products than ICT and related services, like biotechnology products, probably deserve equal attention in the framework of a study on the new economy. This could be the object of further work. However, it should be noted that the availability of data on trade in such products is currently very limited.

5. However, the OECD Group of National Experts on Science and Technology Indicators (NESTI) is developing a definition (technology based) that will allow the identification of biotechnology in trade. Also, the U.S. National Science Foundation already calculates trade flows for biotechnology.

II. THE NEW ECONOMY'S IMPLICATIONS FOR THE VOLUME AND NATURE OF TRADE

28. This part of the study will endeavour to analyse the new economy's quantitative and qualitative effects on trade. It will do so in three stages. First, it will identify and quantify ICT trade flows. Next, it will endeavour to grasp the externalities, in trade terms, of the dissemination of ICTs. Last, it will analyse the outlook for the development of these flows.

29. From a methodological point of view, the study notes the difficulty of establishing clear linkages between productivity gains, growth, and trade and investment flows (See Introduction). It does not attempt to create a new growth model based on the dissemination of new technologies, but merely aims to identify useful considerations for trade policy. The study therefore analyses and compares data such as growth in ICT spending, exports or global trade. It points out the role of externalities, and offers some thoughts about what they could be: trade facilitation effects, product life cycles, employment and welfare effects, etc… The study does not confine externalities to productivity gains, nor does it measure the relative importance of the different factors (amongst them ICT dissemination) contributing to global trade growth.

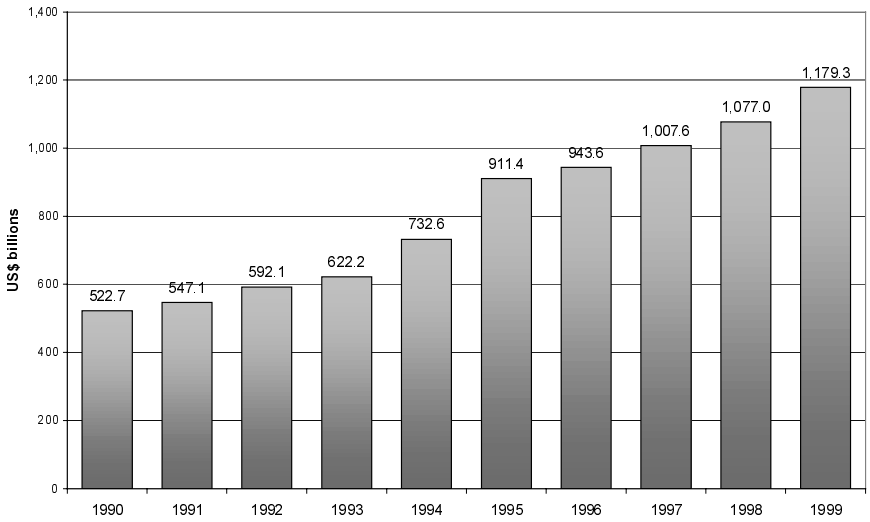
Trade in new information and communications technologies

30. According to the definition of the new economy, the high level of economic growth enjoyed by the OECD countries in recent years is partially attributable to the development of ICTs. In trade terms, this dissemination of new technologies should therefore feed through to sharply higher flows of ICT-related goods and services, in relative and absolute terms.

The value of trade and investment in ICTs

31. Over the past decade, the value of ICT trade increased by 126% for the OECD-22 area. From $523 billion in 1990, it rose to $1 180 billion in 1999 (see Figure 7). At the same time, the overall trade of those same countries expanded by only 56%.

Figure 7. OECD-22 total ICT goods trade, 1990-1999 (US$ bn)



Notes:

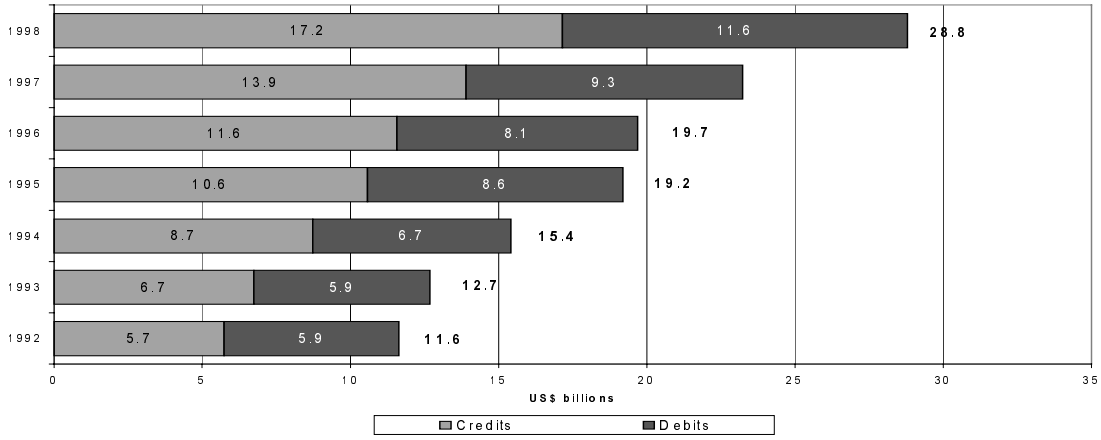
1. The 22 OECD Member countries consist of Australia, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Ireland, Iceland, Italy, Japan, Mexico, Netherlands, Norway, New Zealand, Portugal, Sweden, Turkey and the United States.
2. ICT trade data are comprised of the following ISIC (revision 3) industrial classes:
   3000 Manufacture of office, accounting and computing machinery
   3130 Manufacture of insulated wire and cable
   3210 Manufacture of electronic valves and tubes and other electronic components
   3220 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
   3230 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
   3312 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
   3313 Manufacture of industrial process control equipment

Source: OECD, STAN database.

32. Trade in ICT-related services grew even more rapidly. Between 1992 and 1998, total trade in computer and information services climbed from $11.6 to 28.8 billion for the OECD area (see Figure 8). The value of this trade therefore increased by 148%, versus 32% for services as a whole over the same period.

Figure 8. OECD-15 total trade in computer & information services, 1992-1998

(US$ billions)

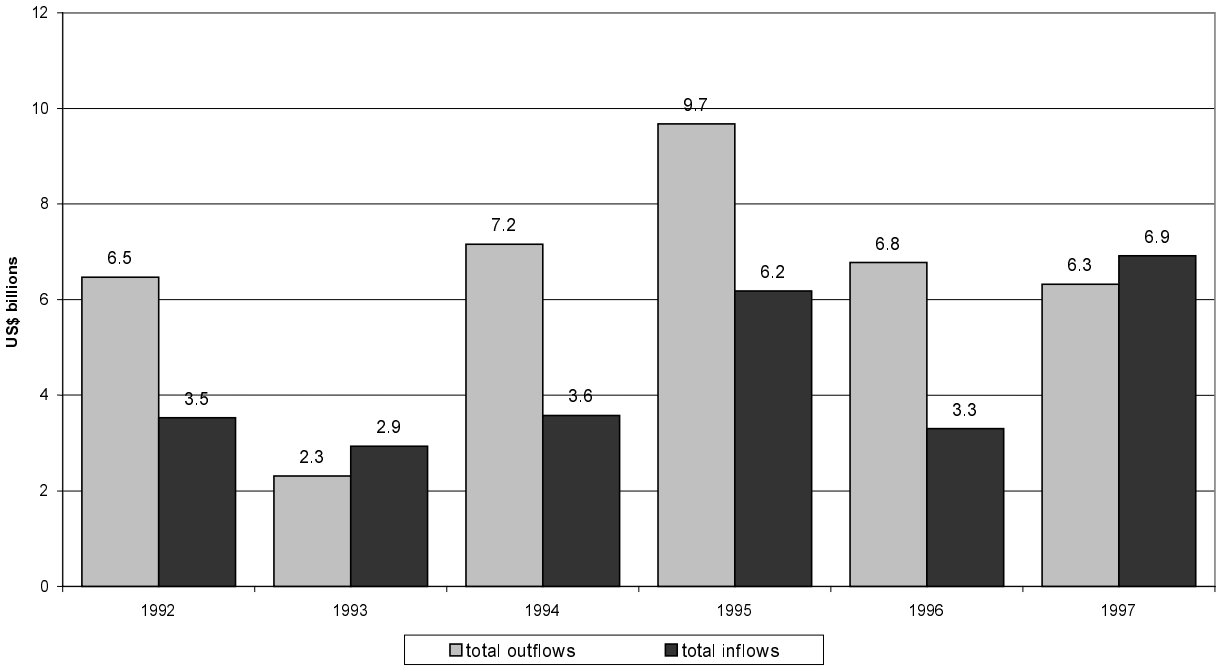


Note: The 15 OECD Member countries consist of Australia, Belgium-Luxembourg Economic Union, Canada, Finland, France, Germany, Ireland, Italy, Korea, New Zealand, Norway, Spain, Sweden, United Kingdom and the United States.

Source: OECD/EUROSTAT, Statistics on International Trade in Services database.

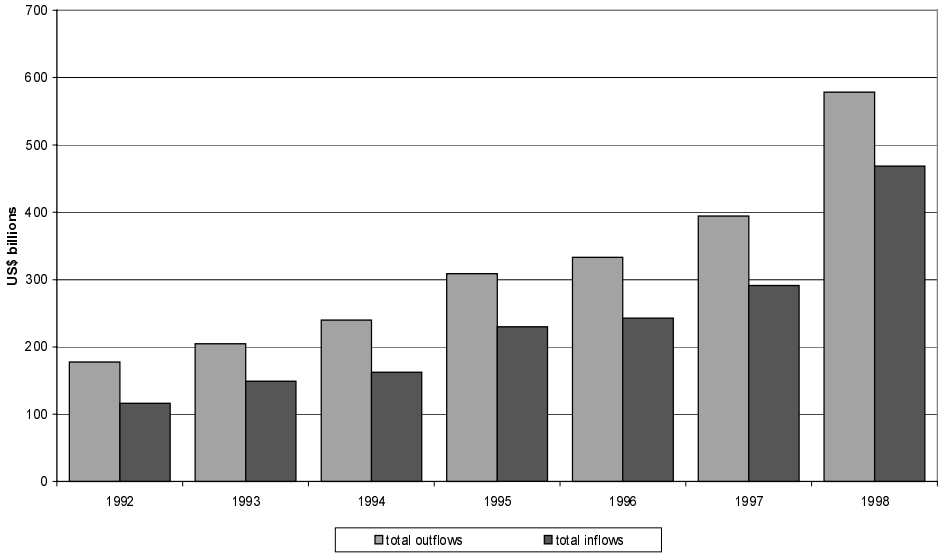
33. Data on foreign direct investment for the ICT sector are sparse. Full series covering 1992-1997 are available for just eight OECD countries (see Figure 9). Looking at FDI inflows and outflows in the ICT sector, no such steady expansion as in goods and services is observable. But FDI inflows and outflows for all sectors and for the OECD area have expanded steadily (see Figure 10).

Figure 9. Flows of Foreign Direct Investment in the ICT sector of 8 OECD member countries, 1992-1997



Note: 8 countries are: France, Germany, UK, USA, Finland, Italy, the Netherlands and Spain.
Source: OECD (1999*e*),. The ICT sector comprises the goods: office machinery, computers, and radio, television and communication equipment, based on the ISIC Rev. 3 and NACE Rev. 1 nomenclatures. Data for the telecommunications sector were not available.

Figure 10. OECD total inflows and outflows of FDI, US$ billions

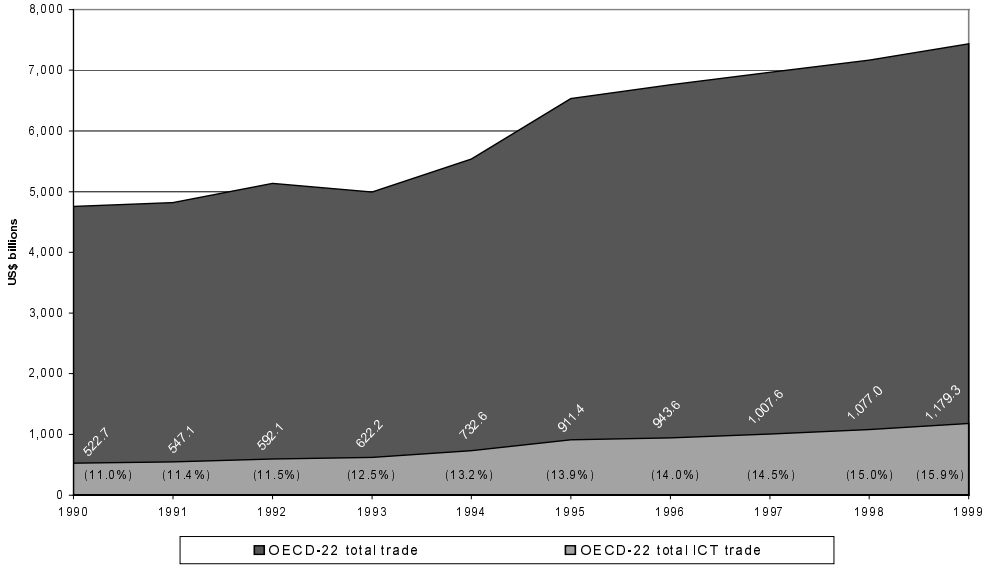


Source: OECD (1999*e*).

ICTs' share of trade and investment flows

34. Because the value of ICT trade outpaced that of aggregate trade, the proportion of trade in ICTs increased, rising within the OECD-22 area from 11.0% in 1990 to 15.9% in 1999 (see Figure 11).

Figure 11. OECD-22 evolution of the relative share of ICT goods trade, 1990-99 in US$ billion and percent

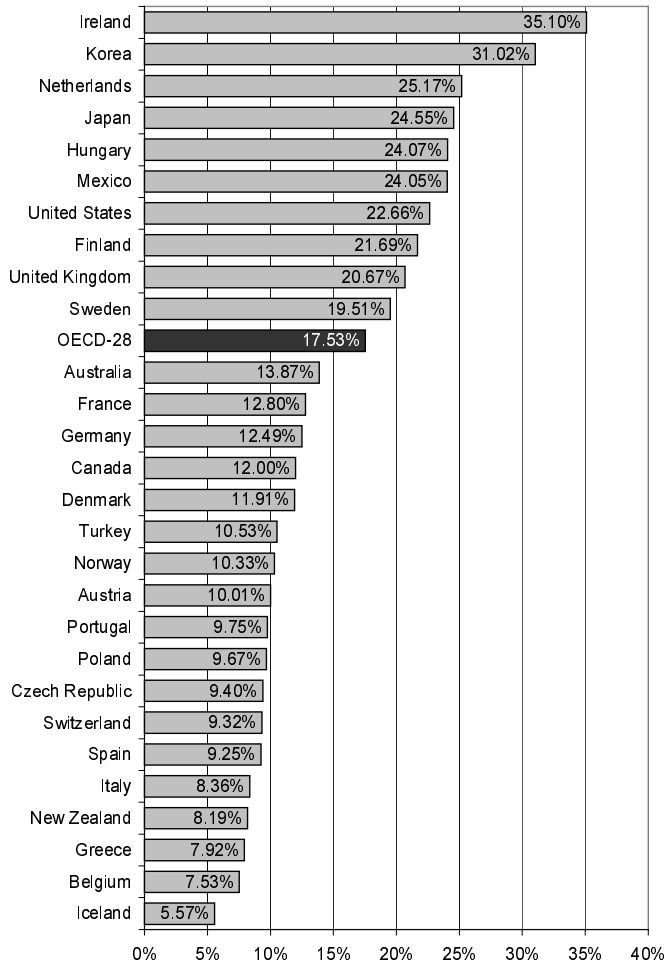


Note: The 22 OECD Member countries consist of Australia, Canada, Switzerland, Germany, Denmark, Spain, Finalnd, France, United Kingdom, Greece, Ireland, Iceland, Italy, Japan, Mexico, Netherlands, Norway, New Zealand, Portugal, Sweden, Turkey and the United States.

Source: OECD, STAN database. For a definition of ICT goods please refer to the note to Figure 7 of this document.

35. In 1999, however, the ICT share of trade differed sharply from one country to another. While the proportion reached 35.10% in Ireland and 31.02% in Korea, it was less than 10% in some ten OECD countries. The average share of ICTs in these countries was over 17%, but the median was slightly less than 12%, suggesting a wide spread in percentage shares (see Figure 12).

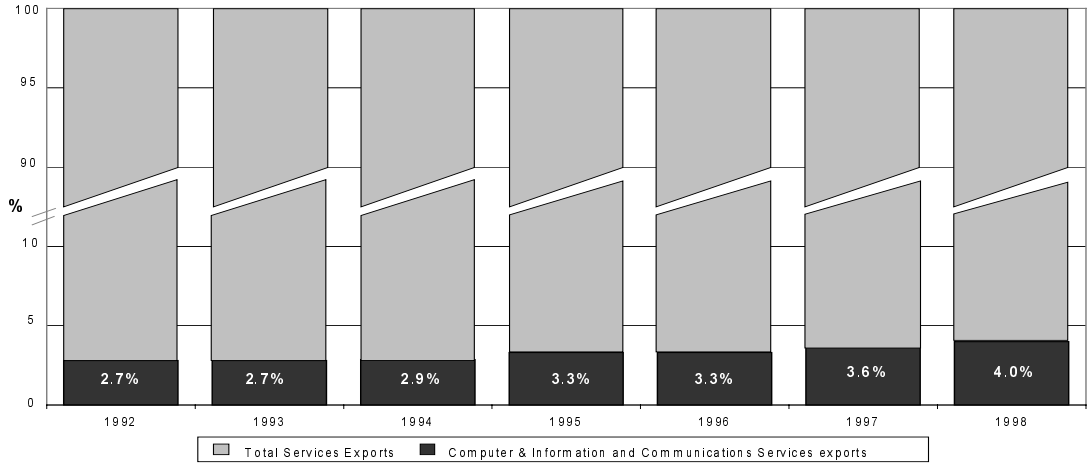
Figure 12. ICT goods trade as a percentage of total trade, 1999



Source : OECD, STAN database. For a definition of ICT goods please refer to the note to Figure 7 of this document.

36. The proportion of service exports directly related to ICTs has remained very modest, although it is increasing. For the OECD area, it rose from 2.7% in 1992 to 4.0% in 1998 (see Figure 13).

Figure 13. OECD-14 share of computer and information and communications services exports as a percentage of total services exports, 1992-1998

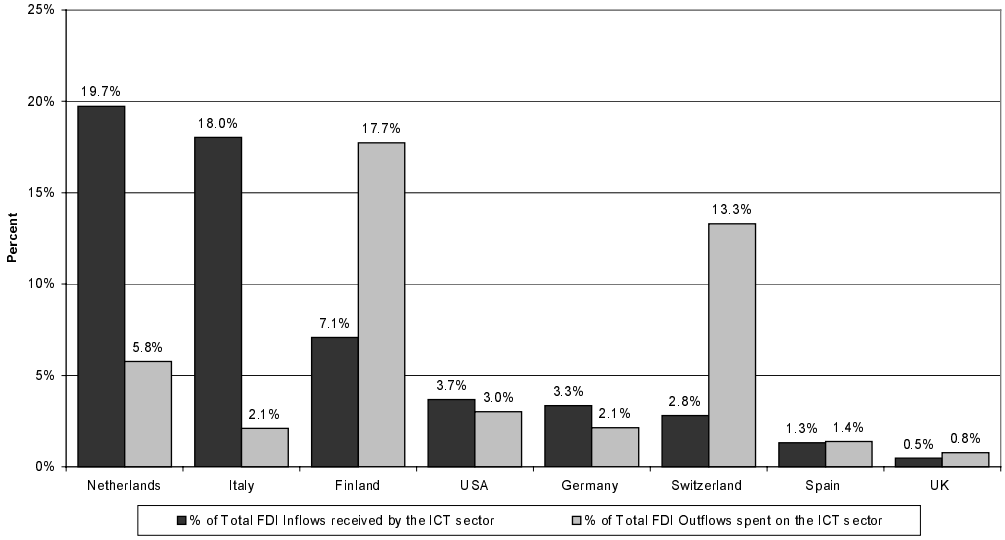


Note: The 14 OECD Member countries consist of Australia, Belgium-Luxembourg Economic Union, Canada, Finland, France, Germany, Ireland, Korea, Italy, Norway, Sweden, Spain, the United Kingdom.

Source : OECD/Eurostat, Statistics on International Trade in Services database.

37. Since there was no steady expansion of FDI in the ICT sector, its share of total investment has not changed significantly (see Figure 9). That share differs considerably among OECD countries (see Figure 14).

Figure 14. Share of total Foreign Direct Investment flowing to the ICT sector, 1997



Note: OECD International Direct Investment Statistics Yearbook. The ICT sector comprises the goods: office machinery, computers, and radio, television and communication equipment, based on the ISIC Rev.3 and NACE Rev.1 nomenclatures. Data for the telecommunications sector were not available.

Source: OECD (1999*e*).

Questioning the importance of ICT exports

38. In its *Growth Project*, the OECD demonstrates that countries should not necessarily endeavour to expand their production in the ICT sector [OECD (2001*h*), pp. 37-39].

39. While there is a relationship between the scope of the ICT sector and the pace of technological development, the study highlights that having an ICT sector may not be a prerequisite for growth based on the new technologies. Three arguments have been put forward:

1. Proximity to hardware producers may not be as important for ICT users as proximity to software producers or service providers, which are useful to firms needing skills and advice to implement ICT-related changes.

2. ICT production is heavily concentrated because of the high entry costs and economies of scale. As a result, very few countries can enjoy enough of a comparative advantage to succeed in this area.

3. A number of countries that are characterised by a high rate of investment in ICTs and are heavy users of the technologies, along with showing a high MFP growth, do not have very highly developed ICT production. Conversely, some countries with a large ICT production sector have not been among the high growth countries of the 1990s.

40. The study therefore concludes that countries should stop viewing development of their ICT production sectors as a panacea for bolstering economic growth. It does stress, however, that intensive use of ICTs, along with their dissemination, is a source of growth.

41. What conclusions should be drawn from the study in terms of trade policy? First, the study confirms the initial intuition that what is important is not trade in ICT products, but rather trade in the goods and services made possible by the dissemination of ICTs[6]. ICT exports or coverage ratios cannot be equated with trade success or growth. A more relevant choice is symmetrical analysis of the level of ICT expenditure and aggregate growth in trade. Where ICT products are made matters little; only their dissemination exerts a meaningful impact on trade. This is proven by the fact that ICTs still account for a modest share of total trade, irrespective of their sharp growth rate. Heavy imports of ICTs would even be more favourable to a country's trade prospects than heavy exports. These considerations shape the methodology employed below. To gauge the effects of ICT dissemination on trade and investment flows, ICT expenditure is considered, not exports.

Trade related to the dissemination of new information and communications technologies

42. Two preliminary comments may be deduced from the above considerations. Since ICTs account for 17.53% of total trade in goods and 4% of total trade in services, it is not trade in ICTs *per se* that is important, but rather the effect that the dissemination of ICTs has on the rest of trade. This effect includes productivity gains – with the resulting price and volume effects – and trade facilitation (e.g., use of fax machines, facilitation of communication, simplification of commercial transactions)[7]. Because the new technologies affect the entire economy, they also affect all trade in goods and services. Second, even though these externalities are essential, they are difficult to identify, and thus to quantify.

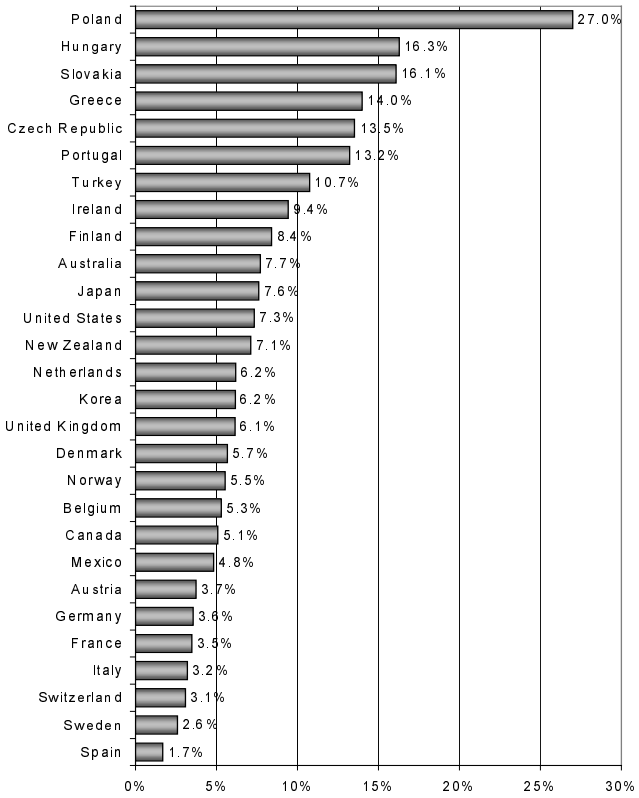
6 . See the linkage between the growth in ICT spending and global trade results (Table 3).

7 . This effect is highlighted in the section of this study on e-commerce (Section IV).

Macroeconomic analysis of ICT externalities: the linkage between the new economy and the development of trade

43. If the dissemination of ICTs is conducive to trade, either through productivity gains or trade facilitation, then the countries that spend most on the technologies should experience strong growth in imports and exports. These countries should also have a high degree of openness. For its part, analysis of exports alone should be able to show whether substantial ICT spending creates new trade opportunities and opens access to new markets.

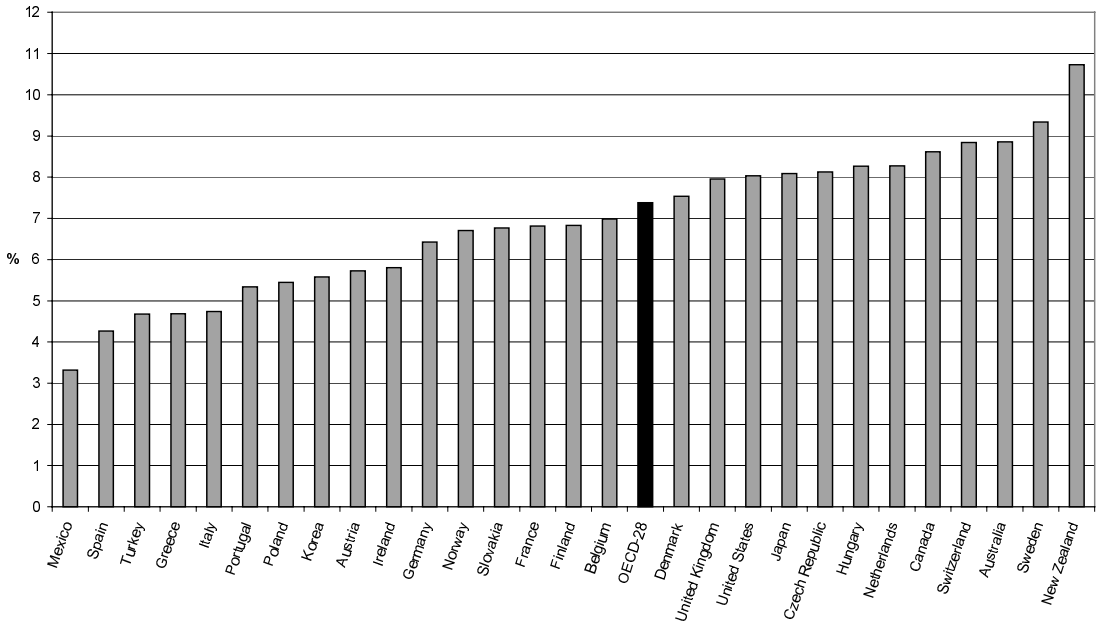
Figure 15. ICT spending per country: Compounded Annual Growth Rate (CAGR), 1992-1999 (%)



Note: ICT spending data comprises the segments: telecommunications, IT hardware, IT internal, IT office equipment, IT software and IT services.

Source : OECD Secretariat, based on IDC data.

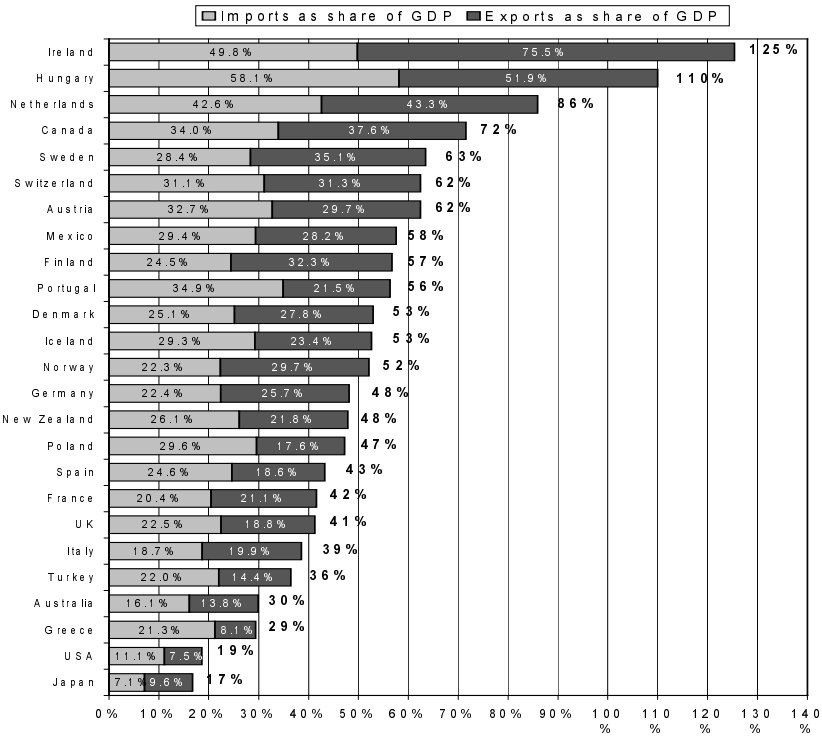
Figure 16. Total ICT expenditure as percentage of GDP, 1999 (OECD-28)



Note: ICT spending data comprises the segments: telecommunications, IT hardware, IT internal, IT office equipment, IT software and IT services.

Source: OECD, based on IDC data.

Figure 17. Exports, imports and total trade as a share of GDP, 1999 (%)



Note: GDP is in current prices and at current exchange rates.
Source: OECD, FTS database; OECD (2001*g*).

44. Table 3 shows that countries where ICT spending has increased sharply also have sharp growth in trade. But the example of Greece shows that intense spending on ICTs does not guarantee a symmetrical rise in trade and exports[8]. Moreover, countries such as Mexico, Canada and Spain, where ICT investment is relatively small, have posted excellent trade results. For the first two, this is fairly simply explained by the positive impact of regional integration and the opening of the US market under the NAFTA agreement. At intermediate level there is no precise relationship between countries' rankings by ICT spending and by overall trade performance.

Table 3. Summary: ICT spending and trade

	growth ICT spending, 1992-1999	growth in exports, 1993-1999	growth in total trade in goods, 1993-1999
Turkey	high	high	medium
Greece	high	low	low
Portugal	high	medium	medium
Poland	high	high	high
Ireland	high	high	high
Finland	high	high	high
Czech Republic	high	high	high
Hungary	high	high	high
Norway	medium	medium	low
Denmark	medium	low	low
United Kingdom	medium	medium	medium
United States	medium	medium	high
Japan	medium	low	low
Netherlands	medium	low	low
Australia	medium	low	medium
New Zealand	medium	low	low
Mexico	low	high	high
Spain	low	high	high
Italy	low	low	low
Austria	low	medium	medium
Germany	low	medium	low
France	low	medium	low
Belgium	low	medium	medium
Canada	low	high	high
Switzerland	low	low	low
Sweden	low	medium	medium

Source: OECD, IDC.

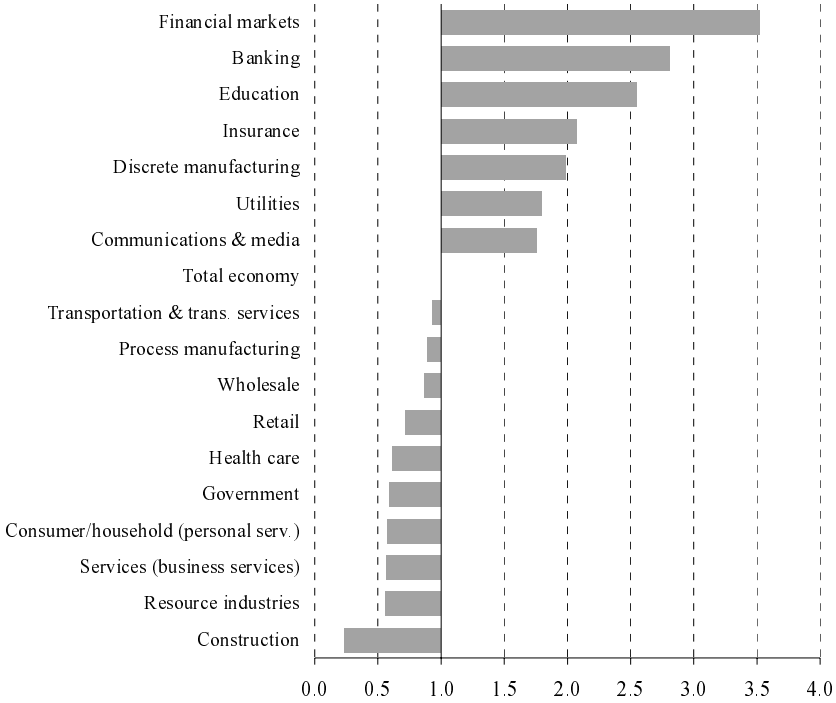
45. It should be noted that the relationship between growth in ICT spending and in trade could be read two ways: first, a high investment in ICT products might lead to better overall trade results; and second, conversely, growth in trade might increase the need for ICT investment. The preceding table and figures do not establish a causal link. They just reinforce the assertion that a relationship exists between ICT spending and trade performance.

46. Other factors than the dissemination of ICTs, such as the elimination of customs barriers, or economic growth, have fuelled trade expansion. ICT-driven competitiveness gains may therefore not be immediate. There is a time lag between the development of technologies, their dissemination and evidence of their impact on other productive activity. According to recent research by the Federal Reserve Bank of New York, up to a decade is needed for ICT investment to translate into productivity gains [Steindel and Stiroh (2001)]. An initial period elapses between technological dissemination and ensuing structural

8 . See following paragraph for a tentative explanation of this result.

changes, due for instance to the lack of flexibility of the labour market or to training and related education needs. A further period then elapses before productivity gains translate into exports and larger foreign market shares. It seems likely that the period since ICTs were brought into the production cycle is too short for us to judge whether ICT spending was the main origin of good trading results. It is worth noting also, that a longer period of reference would have led to different results, thus illustrating the lag effect. In addition to differences among different national labour market, education and structural factors, the transitional period might vary. This also explains why the relationship between ICT spending and trade growth is not always exact. Today's investment in ICTs foreshadows tomorrow's competitiveness. Lastly, ICT spending is of most benefit to service activities (see Figure 18), which account for about 70% of the national wealth of the OECD countries. But this spending is still highly local in nature. Trade in services is certainly assisted by the dissemination of ICTs, but few data are available.

Figure 18. Relative IT intensity index by industry in the United States, 1997



1. The relative IT intensity index represents industry's percentage share of information technologies expenditures relative to industry's share of GDP. An index of 1.00 reflects no over- or under-spending in IT relative to the size of the industry.

Source: OECD (2000*a)*, based on data from the US Bureau of Economic Analysis and IDC.

47. Table 4 shows a relationship between the level of ICT spending and an economy's degree of openness. In only three cases (Austria, Australia and Japan) is this relationship not patently manifest. This means that ICT spending is conducive to an economy's openness to trade or, conversely, that the most open economies are the ones that invest the most in new technologies. In either case, there is a linkage between openness and the need to invest in ICTs, or between a capability for openness and ICT spending.

Table 4. ICT spending and total trade as percentage of GDP

	ICT spending as % of GDP, 1999	Total Trade as % of GDP, 1999
Japan	high	low
Hungary	high	high
Netherlands	high	high
Canada	high	high
Switzerland	high	high
Australia	high	low
Sweden	high	high
New Zealand	high	medium
Ireland	medium	high
Germany	medium	medium
Norway	medium	medium
France	medium	low
Finland	medium	medium
Denmark	medium	medium
United Kingdom	medium	low
United States	medium	low
Mexico	low	medium
Spain	low	low
Turkey	low	low
Greece	low	low
Italy	low	low
Portugal	low	medium
Poland	low	medium
Austria	low	high

Source : OECD, ICT.

Microeconomic analysis of ICT externalities: the linkage between the new economy and the development of businesses' capacity to export

48. It is difficult to grasp the trade-related externalities of ICTs at the macroeconomic level, because a great many factors have repercussions on the expansion of trade. To get a clearer picture of the trade impact of the dissemination of ICTs, it is therefore necessary to take the analysis even further. It must be borne in mind, however, in performing microeconomic analysis, that the productivity gains arising from ICTs do not necessarily feed through to a rise in exports, but may be absorbed in higher corporate margins, or be used to conquer market share at the local level only.

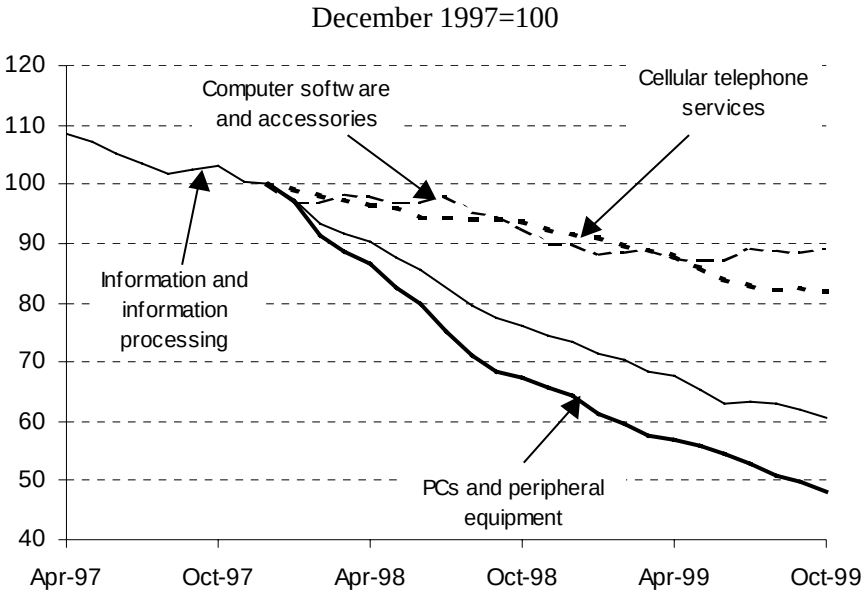
49. While the ICTs' impact on growth is confirmed by a number of empirical studies, their contribution to the improvement of multifactor productivity is more controversial [Pilat and Lee (2001)]. However, while it emerges that not all productivity gains can be attributed to ICTs, no study questions that the ICTs contribute to rising labour productivity. Rather, the controversies centre on how much of the productivity gains are attributable to ICTs.

50. As a rule, productivity gains are conducive to the development of trade, because they heighten competition among producers. Greater competitiveness among products makes it possible to conquer new markets, and above all, heightened competition entails a search for new outlets—often abroad.

51. ICTs generally contribute to removing geographic and time barriers to trade. For example, the Internet has created its own system for measuring time, and borders no longer exist between countries, but rather between persons who are connected to the network and those who are not.

52. ICT prices have come down considerably, cutting corporate costs and fostering long-distance communications (see Figure 19). For example, the price of an e-mail is the same, irrespective of its destination. It must be pointed out, however, that investment costs are high, and that the payback period can stretch out over a long period.

Figure 19. US consumer price index for selected ICT equipment and services[1]



Note: 1. Information and information processing, excluding telephone services.

Source: US Bureau of Labour Statistics (BLS), November 1999, in OECD (2000*a*).

53. As a result, the prices of telecommunications that incorporate the new technologies have all declined, amplifying the direct effect of the drop in ICT prices. Thus, the transaction costs of firms using new technologies to trade have been reduced substantially, while the quality of service has increased.

54. The trade effect of this dissemination of lower-cost new technologies is twofold. First, a number of sectors that had previously been shielded from international competition can now be challenged by foreign producers. It is therefore becoming economical to trade goods and services that before the advent of the new economy had too high an opportunity cost to export. Trade has therefore become more diversified. Second, this reduction in the cost of information and communications is creating new demand for goods and services—because it had been technically impossible to trade those goods and services, or because a new need has been created by the dissemination of the new technologies. Virtual art and electronic books illustrate the first type of new demand, while computer software and occupational training in computer technology illustrate the second. No charge used to be the rule on the Internet. Anti-virus software, for example, may be downloaded from the network free of charge, but updating it will cost money. The new economy is a perfect illustration of Say's Law: supply creates its own demand.

The new economy, product life cycles and trade

55. ICTs have a very short life cycle, like many other products whose innovative nature is essential to their commercial success (clothing, processed food products). This characteristic applies to goods and services having a high new-technology content. Moreover, for some electronic goods or services, the marginal production cost is nil or virtually nil. For example, to create a software package is costly, but to transfer it electronically is free. Production costs may therefore be the same, irrespective of the volume of goods produced.

56. The trade consequences are as follows:

1. If the marginal production cost is marginal or nil, it becomes immediately profitable to export output. It is no longer necessary to test the local market and to achieve economies of scale to be able to compete in foreign markets.

2. Shorter product life cycles encourage firms to dispose of their output as quickly as possible. To do so, they must compete directly in the largest markets possible. This entails a rise in exports.

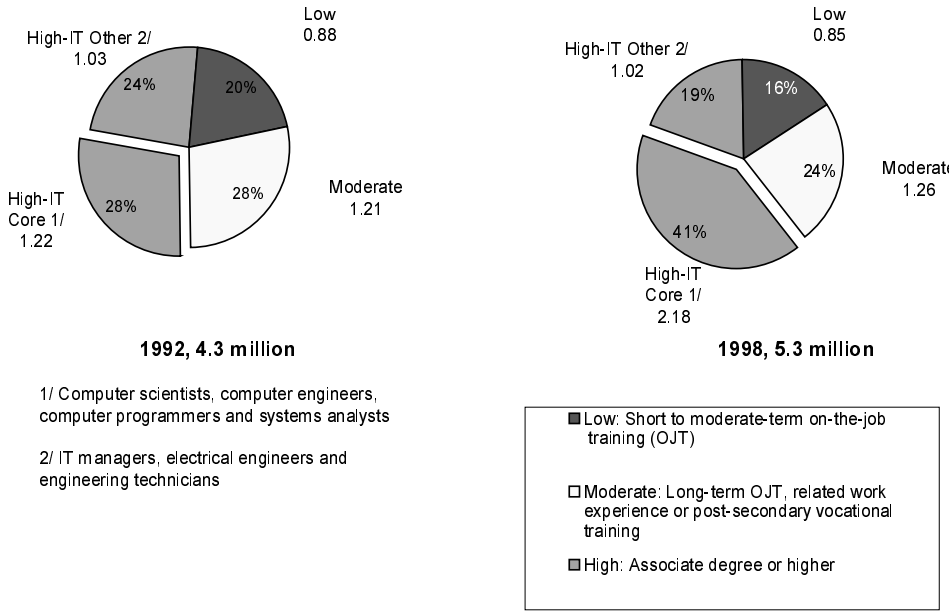
3. Trade in ICTs and in derivative products and services is driven essentially by the renewal of existing technologies. Here the challenge is to be able continuously to create new demand, and thus to have a sufficient technological advance to justify the renewal. Fashions also play an important role in the realm of ICTs and their derived products (as, for example, with the size and appearance of mobile phones).

Trade linked to the structure of the ICT labour force

57. In addition to services directly linked with ICTs, the dissemination of new technologies creates a demand for derivative services. These include training, and sometimes entail greater worker mobility, across sectors and across borders.

58. The qualifications of workers in ICTs are not necessarily any higher than those of workers in other industries. However, highest-skilled jobs are the fastest-growing ones in the ICT sector (see Figure 20). In traditional industries, the introduction of ICTs also requires an increase in worker skill levels or the hiring of new workers qualified to use the new technologies.

Figure 20. US employment in IT occupations, by level of education and training requirements

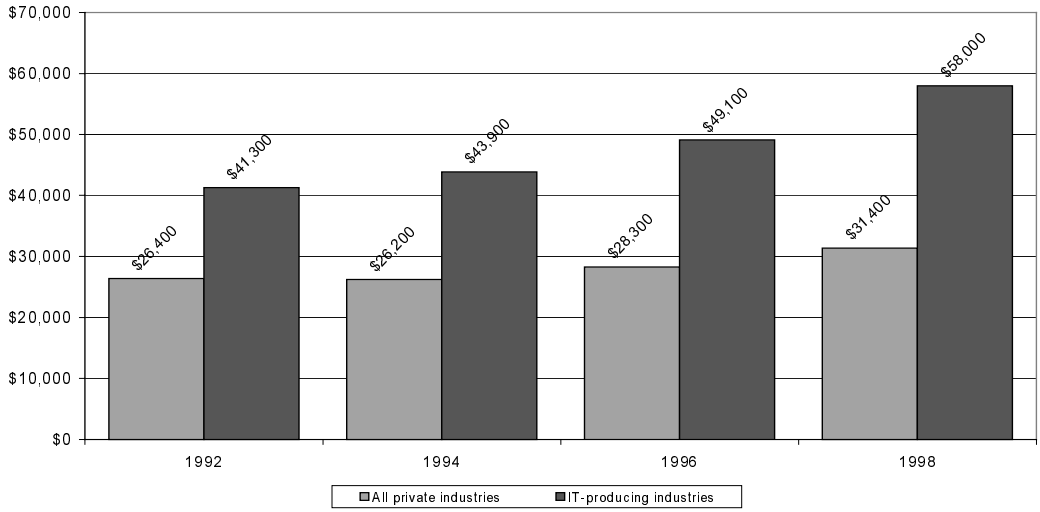


Source: ESA estimates, based on BLS data, in US Department of Commerce (2000).

59. This feeds through to an increase in the need for initial and ongoing training. Above all, however, these services are delivered locally. Even so, trade in educational products is on the rise, as is the mobility of workers most highly skilled in the new technologies. And this high individual mobility is conducive to the expansion of trade (the network phenomenon). To begin with, the expatriates are naturally inclined to trade with their countries of origin, and some services will be supplied to them non-locally (banking, pensions, social insurance).

60. Moreover, ICT-sector workers are on the whole better paid than those in other sectors of the economy (see Figure 21). From a purely Keynesian standpoint, there ensues a rise in demand, which is conducive to trade. There is also a spill-over effect leading to an overall increase in the wages of the most highly qualified workers. Sharply rising demand for labour in the industry has kept unemployment—especially in the United States—at a fairly low level, and this too is conducive to consumption and hence to trade.

Figure 21. Average annual salaries in IT-producing industries, United States



Source: ESA estimates based on BLS data, in US Department of Commerce (2000).

The outlook for the expansion of new economy-related trade

61. A variety of factors are going to contribute to the expansion of trade that is directly or indirectly related to the ICTs. If empirical demonstrations of the trade externalities of ICTs are currently so unconvincing, it is because the new economy is only in its infancy. The required investments are substantial, but the resultant efficiency gains are not immediate. Structural change in the economy is inevitable, but today it is difficult to ascertain which uses of new technologies will be conducive to trade growth. The prospects of technological progress, access to new technologies and network effects all ensure gradual expansion of new economy-related trade.

The continuity of technical progress

62. Technical progress makes it possible to develop new commercial applications of ICTs. For example, mobile telephony is about to switch to a new third-generation standard that will allow for greater interactivity and Internet compatibility. Technical improvement and related costs of secure payment systems over the Internet and its cost's reduction should spur on-line sales. Ultimately, these developments are apt to affect trade by amplifying the externalities of ICTs—especially insofar as technical progress triggers lower prices at constant technology, or higher performance at constant prices. The opportunity effect is thus magnified by a price effect.

Expanded access to new technologies and the network effect

63. Expanded access to new technologies is essential to the dissemination of the ICTs' favourable effects on trade. Not only do producers need access to these technologies to be able to use them and develop business-to-business (B-to-B) trade, but these techniques must be accessible to individuals, so that they can affect consumption patterns (B-to-C). It so happens that access is steadily growing, foreshadowing an expansion in new economy-related trade (see Table 5).

Table 5. Internet hosts per 1 000 inhabitants

	Oct. 1997	Oct. 1998	Oct. 1999	Oct. 2000
North America	46.28	69.74	116.41	168.68
Oceania	26.81	34.76	43.84	59.16
Europe	6.13	9.45	13.41	20.22
Central and South America	0.48	0.91	1.67	2.53
Asia	0.53	0.87	1.28	1.96
Africa	0.17	0.21	0.28	0.31

Source: Netsizer (http://www.netsizer.com).

64. Access to the new technologies is still very unequal in the various OECD countries (see Table 6). It is even more unequal between the OECD countries and the rest of the world. A catching-up process is therefore to be expected, which would also suggest an increase in ICT-related trade.

Table 6. Technology, Media and Telecommunications (TMT) penetration levels

(sorted by average penetration, in percent)

Country	Tel. Lines	Cable Subs.	PCs	Mobile Phone Subs.	Internet users	Average Penetration
Sweden	78	48	37	46	51	52
Denmark	60	60	38	36	52	49
Switzerland	67	82	42	23	29	49
Norway	65	32	37	47	58	48
USA	66	69	46	25	33	48
Finland	60	44	35	57	38	47
Netherlands	59	86	32	21	32	46
Canada	63	68	32	18	32	43
Belgium	50	92	29	17	22	42
Australia	53	16	42	34	39	37
Ireland	44	68	27	26	18	36
Germany	57	53	30	17	23	36
Japan	50	29	24	37	23	32
Austria	49	37	23	28	21	32
UK	56	13	26	25	31	30
Korea	43	10	15	50	30	30
New Zealand	48	0	28	20	33	26
France	57	7	21	19	18	24
Italy	45	1	17	36	11	22
Portugal	41	20	8	22	8	20
Hungary	34	38	6	11	4	18
Spain	40	4	14	17	14	18
Czech Republic	36	19	10	9	5	16
Poland	23	27	4	0	1	11
Turkey	25	4	2	5	2	8
Mexico	10	9	5	4	3	6

Note: Telephone lines represent total (business & commercial) lines in use; source - World Bank, MSDW estimates. The number for Cable Subscribers is based on information from the World Bank, cross referenced with Kagan World Media Ltd. and reflects calendar year 1998; source - World Bank, MSDW estimates, Kagan. PC numbers represent the raw total (business and commercial) PC figures for 1998, both desktop and laptop; source - World Bank, MSDW estimates, IDC, the Yankee Group. Mobile Phone subscriptions data is for 1998 and is sourced from the World Bank, MSDW estimates, the International Telecommunication Union and IDC. Internet users reflect 2000 estimates representing the number of users accessing the web (users may share/use multiple devies, users accessing the web from home and work are counted only once); source - MSDW estimates, IDC, eMarketer, Jupiter Communications. *Methodology*: With the exception of cable penetration (which was calculated on a TV household basis), penetration levels were calculated using populations.

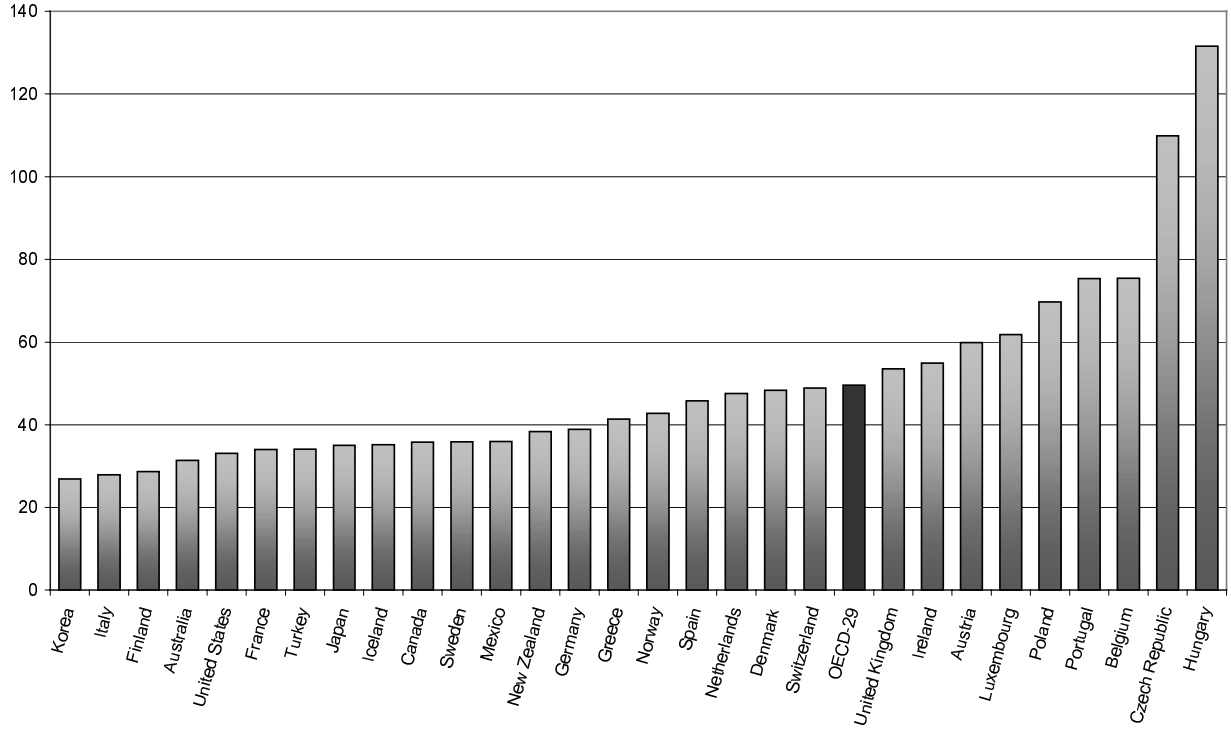
Source: Morgan Stanley Dean Witter (2001).

65. The expansion of access to new technologies depends essentially on lower prices for that access. This includes the price of the hardware itself[9] and the price of communications or network access. Where trade is concerned, these costs must not constitute an obstacle to the consumer's decision to buy, or to the producer's decision to make use of these technologies. While inequalities persist regarding access to, and the cost of, new technologies, significant progress has been made (see Figure 22). It also can be seen that low-cost local telephone rates, which lead to unlimited Internet access, lengthen the duration of on-line visits and therefore constitute a primary vector for the development of e-commerce.

9. See Figure 19 above.

Figure 22. OECD Internet access basket for 20 hours at peak times, 2000

total charge at PPPs

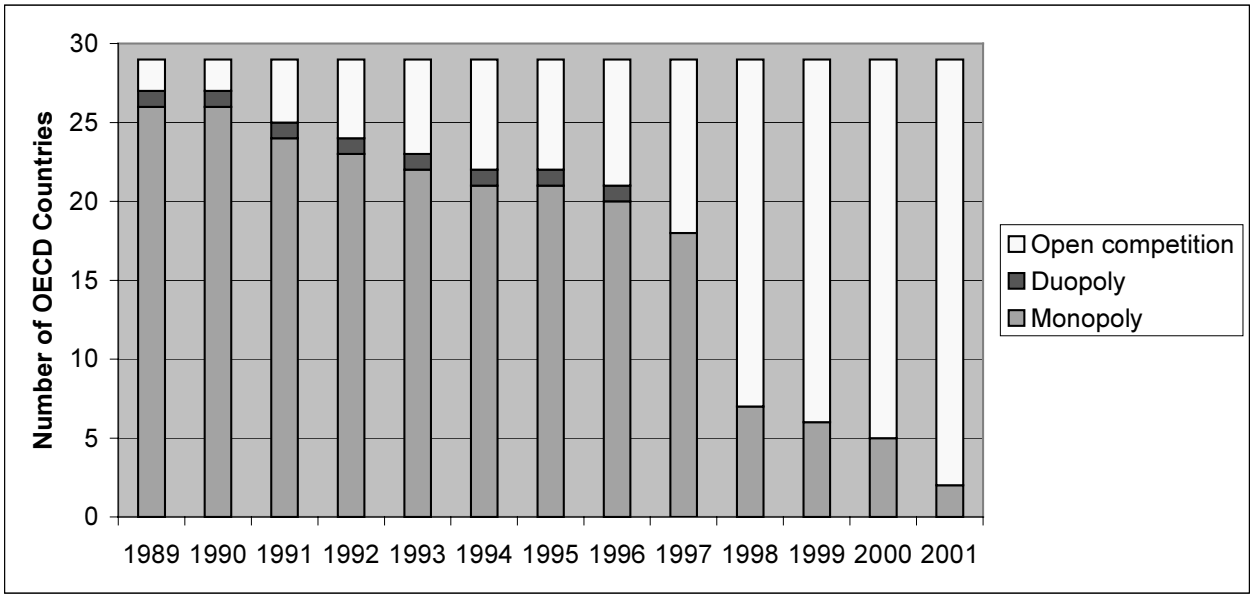


Note: Basket elements are:
1. Fixed charge: the fixed charge comprises the monthly line rental for a residential user.
2. Usage charge: the price of local telephone calls to an ISP for residential users.
3. ISP charge: the price of Internet access from the largest telecommunication operator.
4. Discount schemes: the best available scheme for each basket is selected.
5. Tax: the value added tax rate.
6. Peak: the price of local calls at 11:00 hours during weekdays.

Source : OECD (2000*e*).

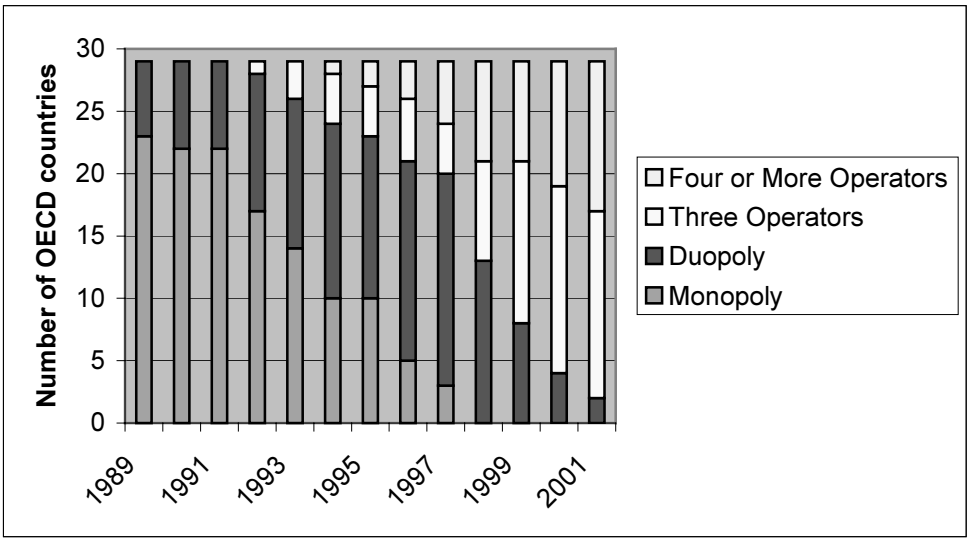
66. Lower prices to access new technologies in turn depend on the market's fluidity and level of competition. Here too, the progress made to date suggests that the expansion of ICT-related trade will be easier in the future (see Figures 23 and 24). The network effect also amplifies the commercial externalities of the dissemination of ICTs. Internet commerce begets more Internet commerce, thus creating a virtuous circle.

Figure 23. Fixed network infrastructure competition in OECD countries



Source : OECD (2001*i*).

Figure 24. Cellular mobile infrastructure competition



Source : OECD (2001*g*).

III. HOW THE NEW ECONOMY AFFECTS THE TRADE ACTIVITY OF VARIOUS INTERNATIONAL PLAYERS

67. The growing importance of ICTs in the economy has affected the volume and nature of trade. The new economy has also kindled new hopes (facilitating trade by small and medium-sized enterprises, and for the poorest countries) and new fears (the digital divide) regarding the distribution of roles on the international trade scene. This part of the study provides an empirical basis for these hopes and fears. In particular, a distinction needs to be made between two levels of analysis: (1) at the company level, has the new economy created new trade opportunities for new players?; (2) at the country level, has the new economy contributed towards a better apportionment of trade or, on the contrary, has it deepened the divide between participating countries and countries that are excluded from trade flows?

Private players in the new economy-related goods and services trade

68. By reducing time barriers and geographic obstacles to trade, as well as transaction costs, the new economy should facilitate access to trade for firms of more modest dimensions. Indeed, the decision to export is no longer motivated by economies of scale alone, but is taken very early in a product's life cycle. Among the new economy-related vectors of the potential "democratisation" of trade are: lower transaction costs, simplified marketing procedures (on-line or telephone selling, information on the competition, exchanges of e-mails or faxes, etc.), simplified access to government trade data (including administrative forms and explanations of procedures to be followed) and greater credit and financing facilities.

69. Here too, however, a distinction must be made between the direct and indirect impact of trade in ICTs, or between producers and users of the technologies. This apparent "democratisation" of trade is running up against a growing concentration of firms whose business is linked to the new economy, and to the spread of intra-firm trade.

The size and number of firms in the ICT market

70. Companies that produce ICTs, or whose business is directly tied in to the new economy, have been growing—in terms of both quantity (number of market players) and quality (size and financial structure).

71. Trade in ICTs is involving an ever-growing number of firms. From a situation in which public-sector monopolies once played a pivotal role, the gradual opening up of public information and telecommunications markets has spawned an expansion of trade in ICTs and a symmetrical increase in competition. This has brought about a drop in the prices of ICT goods and services.

72. Since the end of the Uruguay Round of multilateral trade negotiations, States have negotiated new reductions of the obstacles to trade in ICTs. In December 1996, for example, the Agreement on Information Technologies (AIT) opened up the world market for computer hardware and software by obliging the contracting parties to abolish customs duties on a specified list of products. Over 93% of the trade in information technologies was covered by the agreement. In February 1997, the Agreement on

Basic Telecommunications Services (ABT) tackled the issue of access to the markets for telecommunications networks. It has been estimated that this agreement opened up 95% of the world's telecommunications markets [OECD (2000*b*)]. However, while markets for international calls are now very much open to competition, markets for local calls remain in many cases much less competitive [OECD (2001*g*), Chapter 2)].

73. This mushrooming of the number of telephone operators is a good illustration of the profusion of firms whose lines of business are tied in with the new economy. The start-up phenomenon and the plethora of services available to users of the new technologies also point in this same direction. Even so, an opposite trend is taking shape—namely, an ever-increasing concentration in the ICT industries. Especially with the switch to new standards, such as UMTS in mobile telephony, the volume of infrastructure and investment outlays are forcing industry businesses to concentrate their financial efforts.

74. Various indicators can measure this concentration. First, the number of mergers and acquisitions has increased considerably—from 2 383 transactions in the first five months of 1999 to 2 881 during the same period in 2000, representing values, respectively, of $389.3 and 657.9 billion[10]. The telecommunications sector is being affected more by these movements than other ICT sectors. The capital flows involved in this concentration have increased in volume.

75. Greater competition and concentration are not necessarily contradictory. The opening of telecommunications markets, for instance, has brought in many newcomers. Not all are viable, and the outcome has been a wave of failures[11], or concentration of firms necessary in order to face up to competition.

76. Today, ICT-producing firms rank high amongst multinationals. For example, UNCTAD lists 23 producers of ICTs amongst the top 100 multinational firms (see Table 7), ranked by the size of their foreign shareholdings[12]. Of these 23, 13 specialise in electronics, three in computer systems and seven in telecommunications. Moreover, it should be noted that a number of other multinationals on the list, such as Mitsubishi and Vivendi-Universal, while not specialising in ICTs, nonetheless have extensive shareholdings in the new technologies. But it is astounding to note that many of these ICT-producing firms have a low degree of internationalisation in comparison with other multinationals, which could suggest that they may play a lesser role in trade.

10. In respect of Europe and the United States (http://www.broadview.com).

11. See Figure 1 on start-up failures above.

12. For the full list of these 100 firms, see UNCTAD (2000).

Table 7. The world's largest ICT companies, ranked by foreign assets, 1998

(billions of dollars and number of employees)

Ranking 1998 by:					Assets		Sales		Employment		TNI [a]
Foreign assets	TNI [a]	Corporation	Country	Industry [b]	Foreign	Total	Foreign	Total	Foreign	Total	(Per cent)
1	75	General Electric	United States	Electronics	128.6	355.9	28.7	100.5	130,000	293,000	36.3
7	54	IBM	United States	Computers	43.6	86.1	46.4	81.7	149,934	291,067	53.0
15	8	ABB	Switzerland	Electrical equipment	...	32.9	23.1	27.7	154,263	162,793	89.1
19	52	Siemens AG	Germany	Electronics	...	66.8	45.7	66.0	222,000	416,000	53.6
20	41	Sony Corporation	Japan	Electronics	...	52.5	40.7	56.6	102,468	173,000	59.3
33	14	Philips Electronics	Netherlands	Electronics	19.0	32.8	32.1	33.9	189,210	233,686	77.8
35	28	Cable And Wireless Plc	United Kingdom	Telecommunications	17.7	28.5	8.8	13.2	37,426	50,671	67.5
36	53	Hewlett-Packard	United States	Electronics/Computers	17.6	33.7	25.2	46.5	...	124,600	53.2
42	42	Alcatel	France	Electronics	16.7	34.6	14.5	23.6	80,005	118,272	59.1
48	24	Nortel Networks c	Canada	Telecommunications	14.3	19.7	12.2	17.6	...	75,052	70.8
51	62	Motorola Inc	United States	Electronics	14.0	31.0	14.0	31.3	66,800	141,000	45.8
52	86	Telefónica SA	Spain	Telecommunications	13.8	42.3	6.1	20.5	27,802	101,809	29.9
55	72	Matsushita Electric	Japan	Electronics	12.2	66.2	32.4	63.7	133,629	282,153	38.9
56	79	Fujitsu Ltd	Japan	Electronics	12.2	42.3	15.9	43.3	74,000	188,000	34.9
58	97	Hitachi Ltd	Japan	Electrical equipment/Electronics	12.0	76.6	19.8	63.8	58,000	331,494	21.4
76	100	SBC Communications	United States	Telecommunications	...	75.0	...	46.2	...	200,380	13.5
80	37	Ericsson LM	Sweden	Electronics/telecommunications	9.6	20.7	17.8	22.8	58,688	103,667	60.4
82	4	Electrolux AB	Sweden	Electrical equipment/electronics	...	10.3	13.8	14.5	89,573	99,322	92.7
87	64	Mannesmann AG	Germany	Telecommunications/engineering	...	20.3	10.8	21.2	43,821	116,247	44.4
92	55	Canon Electronics	Japan	Electronics/office equipment	7.4	23.5	17.8	24.4	41,834	79,799	52.3
94	99	GTE Corporation	United States	Telecommunications	7.3	43.6	3.3	25.7	22,000	120,000	16.0
97	68	Compaq Computer Corporation	United States	Computers	7.0	21.7	16.4	31.2	...	71,000	42.6
100	93	Toshiba Corporation	Japan	Electronics	6.8	48.8	14.5	44.6	...	198,000	23.3

Source: UNCTAD/Erasmus University database, based on UNCTAD World Investment Report, 2000, Table III.1 'The world's 100 largest TNC's, ranked by foreign assets, 1998'.

a TNI is the abbreviation for "transnationality index", which is calculated as the average of three ratios: foreign assets to total assets, foreign sales to total sales and foreign employment to total employment.

b Industry classification for companies follows the United States Standard Industrial Classification as used by the United States Securities and Exchange Commission (SEC).

c Nortel Networks replaces BCE due to internal restructuring and reduction of BCE's ownership in Nortel Networks.

… Data on foreign assets, foreign sales and foreign employment were not made available for the purpose of this study. In case of non-availability, they are estimated using secondary sources of information or on the basis of the ratios of foreign to total assets, foreign to total sales and foreign to total employment.

Intra-firm trade

77. As an offshoot of the wave of concentration and technological alliances, intra-firm trade is swelling. Likewise, exports from firms to the countries in which their parent companies are located are on the rise. As a result, it is difficult to judge a country's ICT trade performance on the basis of its trade balance in the ICT sector alone.

78. According to a study by the United States Department of Commerce, the volume of these flows (intra-firm and output of US subsidiaries abroad) is part of the reason why the United States, despite being a pioneer in the new technologies, suffers a growing trade gap in the realm of ICTs [US Department of Commerce (2000), pp. 52-54] [13].

79. It should be noted, however, that there is a lack of comprehensive national data on these flows within the OECD area, and that it is difficult to gauge the extent of intra-firm trade.

Firms that make use of ICTs in order to do business

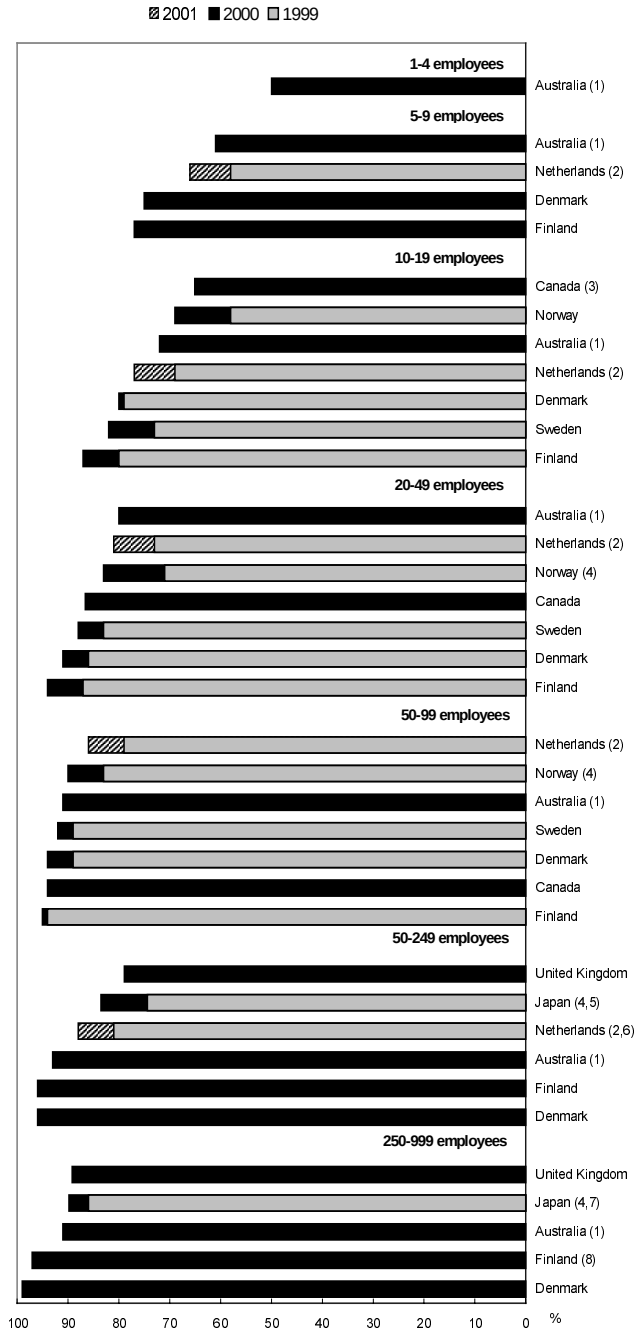
80. The new economy does not create new trade opportunities within the ICT sector alone. On the contrary, the new economy's main feature is that it enables certain businesses to engage in international trade, whereas a cross-border dimension had previously been out of the question for strictly technical reasons, or for a lack of financial viability. The idea is that a small family business in an isolated region can now promote and sell its products remotely (over the Internet in particular) — or, conversely, no longer depend on a sole supplier, taking advantage of competition in order to obtain lower prices for its inputs. This idea does however run up against a number of empirical considerations.

81. First, it would appear that access to the new technologies is very unequal - across regions and countries, and even across businesses within a given geographic area. One factor of discrimination is firm size: the larger the company, the easier its access to the new technologies, since ICT investments are so large as to require a certain financial leverage—especially insofar as the return on investment is not always immediate. Computerisation of a company initially triggers a decline in its productivity because, for instance, of the need for training.[14] However, this period of adjustment can be expected to shrink, since younger generations are now cast in the mould of computers and ICTs even before they enter the job market. But small businesses still cannot seize all of the trading opportunities held out by the use of ICTs, as illustrated by the inequalities of Internet access (see Figure 25).

13. For a graphical illustration of this deficit, see Figure 29.

14. Addressing the issue of productivity, R. Solow noted a few years ago, in his famous paradox, that "you can see the computer age everywhere these days except in the productivity statistics."

Figure 25. Internet penetration by size class percentage of businesses using the internet

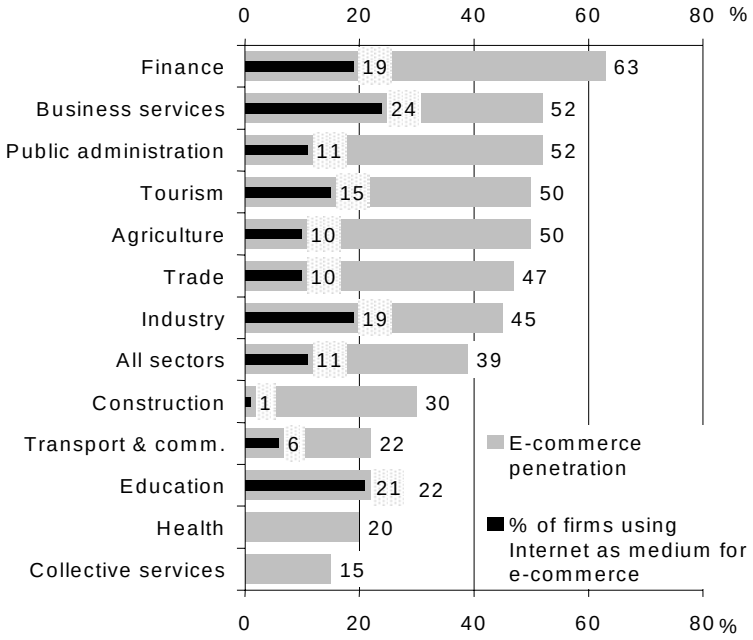


Notes: 1. 1999-2000
2. The figure refers to the Internet and other computer mediated networks. 1st quarter 2001.
3. 1-19 employees.
4. Expectations for 2000.
5. 100-299 employees.

Source: OECD (2001*a*).

82. Second, not all industries make the same use of ICTs, and therefore do not enjoy the same business opportunities created by the new economy (see Figure 26). The question that arises is thus: is this difference imposed or is it chosen? While size imposes constraints on investment outlays, a firm's line of business would not seem, on the surface, to affect its capacity to invest in the new technologies. But a company's size can depend on its line of business. For example, the financial sector will make greater use of the new technologies than the construction industry, because banks tend to be large groups, while building firms are in many cases modest-sized concerns. Thus, the usefulness of ICTs may not be the same in all industries. For example, because major construction projects are generally arranged through public calls for bids, communication over the Internet is of limited use in developing business in this area. In contrast, new technologies are conducive to the fluidity, security and rapidity of financial flows and therefore create new opportunities for trade in financial services.

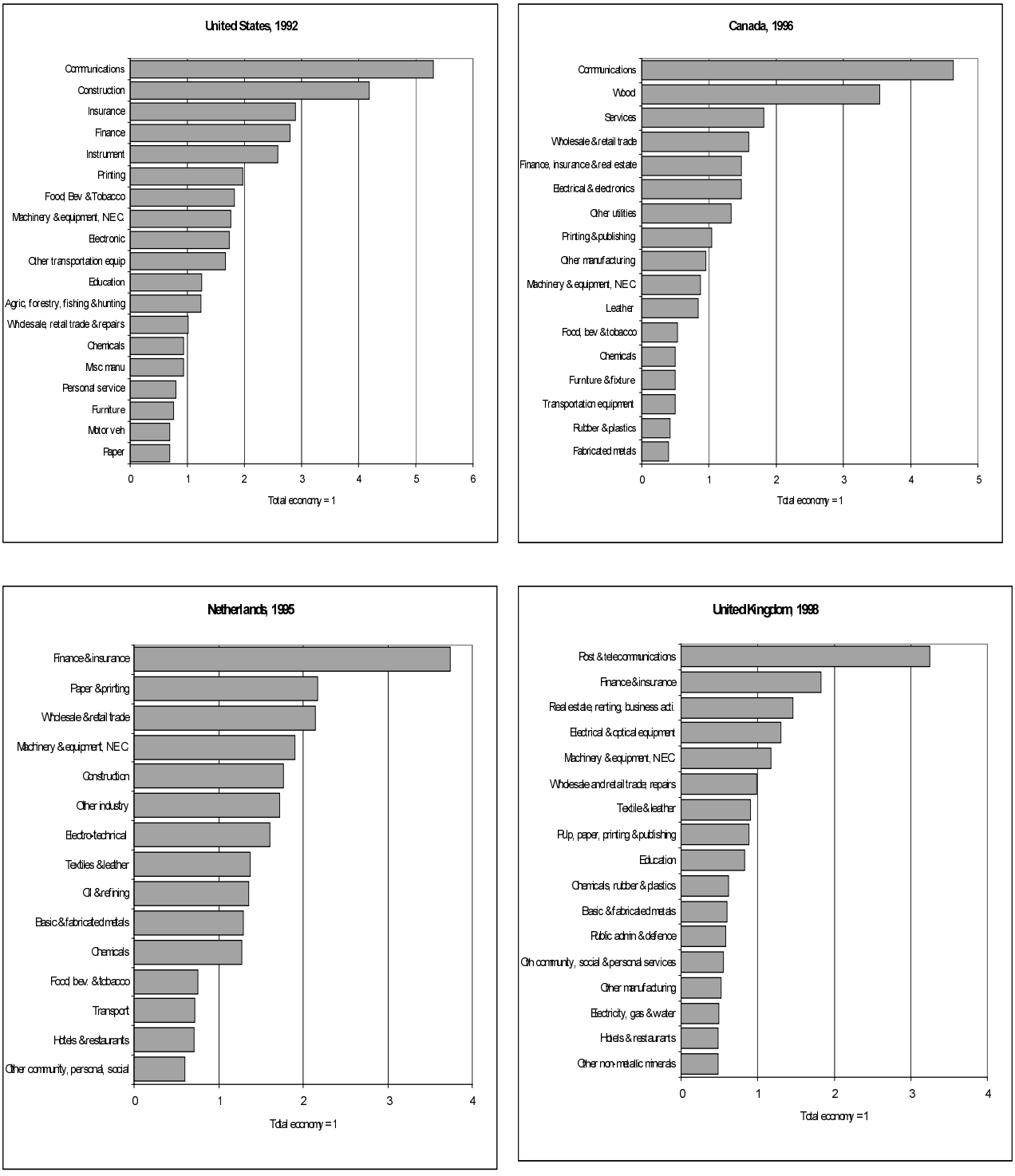
Figure 26. E-commerce penetration and internet usage, France, 1997



Source: Observatoire des échanges et du commerce électronique, 1998 survey, cited in Ministère de l'Économie, des Finances et de l'Industrie, *Technologies et société de l'information* , March 1999.

83. Data for relative ICT investment also show that not all industries invest to the same extent in the new technologies. Sectors investing most include communications and banking and finance. But it is hard to build up an OECD-wide ranking of the sectors investing most in ICTs because data are sparse and not always comparable (different reference years). Moreover, the ranking seems to be influenced, in individual countries, by the structure of production (Figure 27). The timber sector in Canada has invested heavily in ICTs, for example, though elsewhere that sector is not greatly involved with the new technologies.

Figure 27. Relative investment in ICT by economic activity



Source: Pilat and Lee (2001), OECD calculations based on the data from the Bureau of Economic Analysis, Statistics Canada, CPB Netherlands Bureau for Economic Analysis, U.K. Office of National Statistics.

The geographic distribution of new economy-related trade: commerce between countries

84. Not only can the new economy be expected to bring more companies into international trade, but it should also help enhance global economic integration. Because the new economy facilitates trade, the new technologies are creating new opportunities for certain countries that had previously been left on the sidelines of trade. For example, a remote retailer can now relocate its call receiving centre thanks to the drop in telecommunications prices. Similarly, an Internet site can be created and distribute from any country; it is no longer necessary that the country hosting the site be the same as the one in which the products are made, dispatched, sold or consumed. The new economy could therefore constitute an opportunity for developing countries. On the other hand, the risk of a digital divide exists, and without the necessary infrastructure and technology the most disadvantaged countries are threatened with even greater exclusion from trade and investment flows. Because the new economy is one of networks, it is becoming necessary to be connected in order to reap the economic benefits of the dissemination of new technologies.

Has the number of countries taking part in trade increased?

85. Since the conclusion of the Uruguay round, the number of WTO member governments has risen to more than 140, and today more than 30 countries have applied to join. The number of countries aspiring to take part in trade is thus clearly on the rise, but does this reflect a redistribution of the roles? Considering the externalities of the ICTs, which facilitate trade, more countries can now be expected to participate.

86. Over the past decade, the region with the highest annual growth in goods exports was Latin America (8% annual export growth between 1990 and 1999), followed closely by North America and Asia (at 7% per annum). These three regions saw their respective shares of world exports rise, while those of Europe, the Middle East and Africa declined. Africa is the region that posted the lowest export growth rate (at 1% per year). The most dynamic regions in terms of exports were also the most dynamic in terms of imports, reflecting a better integration into trade. In the realm of services, the trends are comparable.

87. The conclusions to be drawn from trends in the geographic patterns of trade are therefore mixed. First, trade has increased in every region of the world, which would tend to confirm that trade has in fact been facilitated. However, not all regions have benefited equally from this dissemination of trade. Africa, for example, saw its relative participation in trade, which had already been low, slip even further. And yet, there is no divide between developed countries and developing ones, since Asia and Latin America benefited more from the rise in trade than either North America or Europe.

88. To what extent is this improved integration of national economies, through trade, attributable to the new economy? Apart from looking at the relationship between trade performance and spending on ICTs, one might well wonder whether improved integration of trade in the new technologies reflects improved integration of trade in general. It is therefore useful to look at the geographic breakdown of flows of ICT-related goods and services. A relationship would show that vitality in leading sectors of trade, such as those of the new economy, foreshadows overall trade vitality.

What countries are taking part in trade in ICTs?

89. For two decades, the United States and Japan have retained their leadership in ICT exports. Below them, however, the rankings have changed. European countries, for example, have lost market share (as reflected in a decline in their relative share of world ICT exports) to emerging countries of Asia (especially Singapore, Taipei, Malaysia, Korea, Hong Kong and China) and Latin America (Mexico). Like trade in general, trade in ICTs is therefore opening up to new players. For instance, the combined share of the two leading ICT exporters fell from 41.3% in 1980 and 39.7% in 1990 to 28.2% in 1999. This means

that trade in ICTs is more and more geographically diversified, allowing a greater number of countries to take part in this trade—a trend that took shape essentially during the 1990s. It is important to note that trade in ICTs is more favourable to emerging economies than is overall trade. With respect to aggregate trade in merchandise, China, Hong Kong, Korea, Mexico, Taipei and Singapore rank respectively 9th, 11th, 12th, 13th, 14th and 15th amongst exporters. With regard to trade in ICTs, Singapore, Taipei, Malaysia, Korea, Hong Kong, China, Mexico and the Philippines rank respectively 3rd, 4th, 5th, 7th, 8th, 11th, 13th and 14th. These figures show clearly that the developing countries do better trading ICTs than they do in a good number of other trade sectors (see Tables 8 and 9). The new economy hence appears to be conducive to global economic integration, and to constitute an opportunity for development via trade.

Table 8. Leading exporters of office machines and telecom equipment, 1999

(billion dollars and percentage)

	Value	Share in world exports			Annual percentage			
	1999	1980	1990	1999	1990-99	1997	1998	1999
Exporters								
United States	125.66	20.2	17.3	16.3	10	14	-4	10
Japa	91.27	21.1	22.4	11.9	3	1	-11	7
Singapor	60.60	3.2	6.4	7.9	14	0	-11	5
domestic	38.62	2.5	4.9	5.0	11	-2	-12	5
re-exports	21.99	0.7	1.5	2.9	19	4	-10	6
Taipei, Chinese	45.10	3.2	4.7	5.9	14	13	-3	17
Malaysia [a]	44.27	1.4	2.7	5.8	21	4	-5	28
United	44.04	6.4	6.5	5.7	10	8	3	2
Korea, Rep.	42.92	2.0	4.8	5.6	13	6	-6	35
Hong Kong,	38.42	-	-	-	13	9	-3	5
domestic	3.61	2.0	1.6	0.5	-3	4	-17	-16
re-exports	34.81	-	-	-	18	10	0	8
German	36.96	9.9	7.5	4.8	6	4	7	4
Netherland	31.77	4.0	3.4	4.1	14	28	-3	6
China [a]	30.14	…	…	3.9	…	25	18	19
France	28.40	4.7	4.1	3.7	10	10	15	-1
Mexico [a]	25.42	0.1	1.5	3.3	21	25	21	17
Philippines [a]	23.09	0.1	0.6	3.0	32	41	31	24
Ireland	22.43	0.9	1.7	2.9	18	22	17	21
Above	655.67	78.3	85.4	85.2	-	-	-	-

a Includes significant shipments through processing
b Imports are valued

Note: 'Office machines and telecom equipment' comprises: office machines and automatic data processing machines; telecommunications and sound recording and reproducing apparatus and equipment; thermionic, cold cathode or photo-cathode valves and tubes (SITC divisions 75,76 and group 776).

Source: WTO (2000).

Table 9. Leading exporters and importers in world merchandise trade, 1999

(billion dollars and percentage)

ank	Exporters	Value	Share	Annual percentage change	Rank	Importers	Value	Share	Annual percentage change
1	United States	695.2	12.4	2	1	United States	1059.1	18.0	12
2	Germany	541.5	9.6	0	2	Germany	472.5	8.0	0
3	Japan	419.4	7.5	8	3	United Kingdom	320.3	5.4	2
4	France	300.4	5.3	-2	4	Japan	311.3	5.3	11
5	United Kingdom	269.0	4.8	-1	5	France	290.1	4.9	0
6	Canada	238.4	4.2	11	6	Canada	220.2	3.7	7
7	Italy	230.6	4.1	-6	7	Italy	216.9	3.7	-1
8	Netherlands	200.4	3.6	0	8	Netherlands	187.6	3.2	0
9	China	195.2	3.5	6	9	Hong Kong, China	180.7	3.1	-3
10	Belgium	176.3	3.1	-		retained imports a	28.7	0.5	-21
					10	China	165.8	2.8	18
11	Hong Kong, China	174.4	3.1	0	11	Belgium	160.9	2.7	-
	domestic exports	22.4	0.4	-9	12	Mexico	148.7	2.5	14
	re-exports	152.0	2.7	1	13	Spain	144.8	2.5	9
12	Korea, Rep. of	144.7	2.6	9	14	Korea, Rep. of	119.8	2.0	28
13	Mexico	136.7	2.4	16	15	Singapore	111.1	1.9	9
14	Taipei, Chinese	121.6	2.2	10		retained imports a	65.1	1.1	18
15	Singapore	114.7	2.0	4	16	Taipei, Chinese	110.7	1.9	5
	domestic exports	68.7	1.2	8	17	Switzerland	79.9	1.4	0
	re-exports	46.0	0.8	-1	18	Australia	69.1	1.2	7
16	Spain	110.1	2.0	1	19	Austria	68.8	1.2	1
17	Sweden	84.9	1.5	0	20	Sweden	68.5	1.2	0
18	Malaysia	84.5	1.5	15					
19	Switzerland	80.4	1.4	2					
20	Russian Fed.	74.3	1.3	0					
21	Ireland	70.4	1.3	9	21	Malaysia	65.0	1.1	11
22	Austria	63.5	1.1	1	22	Brazil	51.7	0.9	-15
23	Thailand	58.4	1.0	7	23	Thailand	50.3	0.9	17
24	Australia	56.1	1.0	0	24	Ireland	46.4	0.8	4
25	Saudi Arabia b	50.5	0.9	27	25	Poland	45.9	0.8	-2
26	Denmark	49.0	0.9	2	26	India	44.6	0.8	4
27	Indonesia	48.7	0.9	0	27	Denmark	44.3	0.8	-4
28	Brazil	48.0	0.9	-6	28	Russian Fed.	41.1	0.7	-30
29	Norway	44.9	0.8	13	29	Turkey	40.4	0.7	-12
30	Finland	41.7	0.7	-3	30	Portugal	38.6	0.7	1

(contd.) **Table 9. Leading exporters and importers in world merchandise trade, 1999**

(billion dollars and percentage)

ank	Exporters	Value	Share	Annual percentage change	Rank	Importers	Value	Share	Annual percentage change
31	Philippines	36.7	0.7	24	31	Norway	34.0	0.6	-6
32	India	36.6	0.6	9	32	Israel	33.2	0.6	13
33	United Arab Emirates b	29.5	0.5	15	33	Philippines	32.5	0.6	3
34	Poland	27.4	0.5	-3	34	Finland	31.5	0.5	-3
35	Czech Rep.	26.9	0.5	2	35	Greece	30.2	0.5	5
36	South Africa	26.7	0.5	1	36	United Arab Emirates b	28.9	0.5	6
37	Turkey	26.0	0.5	-4	37	Czech Rep. c	28.8	0.5	0
38	Israel	25.8	0.5	12	38	Saudi Arabia	28.0	0.5	-7
39	Hungary	25.0	0.4	9	39	Hungary	28.0	0.5	9
40	Portugal	23.9	0.4	-4	40	South Africa	26.7	0.5	-9
41	Argentina	23.3	0.4	-12	41	Argentina	25.5	0.4	-19
42	Venezuela	19.9	0.4	15	42	Indonesia	24.0	0.4	-12
43	Iran, Islamic Rep. of b	16.2	0.3	27	43	Egypt	16.0	0.3	-1
44	Chile	15.6	0.3	5	44	Chile	15.1	0.3	-19
45	New Zealand	12.5	0.2	3	45	Venezuela	14.8	0.3	-7
46	Kuwait b	12.2	0.2	27	46	New Zealand	14.3	0.2	14
47	Algeria b	11.9	0.2	17	47	Iran, Islamic Rep. of b	13.2	0.2	6
48	Ukraine	11.6	0.2	-8	48	Ukraine	11.8	0.2	-19
49	Colombia	11.6	0.2	7	49	Viet Nam	11.6	0.2	1
	Total of above d	5354.0	95.2	-		Total of above d	5434.0	92.4	-
	World d	5625.0	100.0	3		World d	5881.0	100.0	4

a Retained imports are defined as imports less re-exports. See the Technical Notes.

b Secretariat estimates.

d Includes significant re-exports or imports for re-export.

Note: For annual data 1989-99, see Appendix Tables A3 and A4.

Source: WTO (2000).

90. For imports, the United States has held on to first place, accounting for nearly a quarter of aggregate ICT imports (22.3% in 1999). This proportion has risen over the past two decades. Similarly, while the European countries' relative share of ICT exports has declined, their relative share of imports has remained the same or increased. This means that these countries' need for the new technologies has not waned, but that the domestic markets have been entered effectively by emerging country exporters. As a result, the trade deficit of the wealthiest countries has deepened in the area of ICTs (see Table 10,Figures 28 and 29), even though these countries are in the vanguard of the sector's technological innovation and research. There is nothing inherently wrong or troubling with such a deficit in economic terms. Considering the fast growing needs in new technologies, the national production might not suffice to meet such needs. Moreover, this study has already mentioned that intra-firm trade might to a large extent explain the ICT trade deficit of OECD countries[15]. Finally, an increase in ICT imports might result in a comparative advantage in other traded sectors and benefit overall trade, while improving overall allocative efficiency. Also, this figure confirms that not only the OECD countries but also developing countries benefit from trade in ICT, which is good in itself.

15. See above, paragraphs 77 to 79.

Table 10. Leading importers of office machines and telecom equipment, 1999

(billion dollars and percentage)

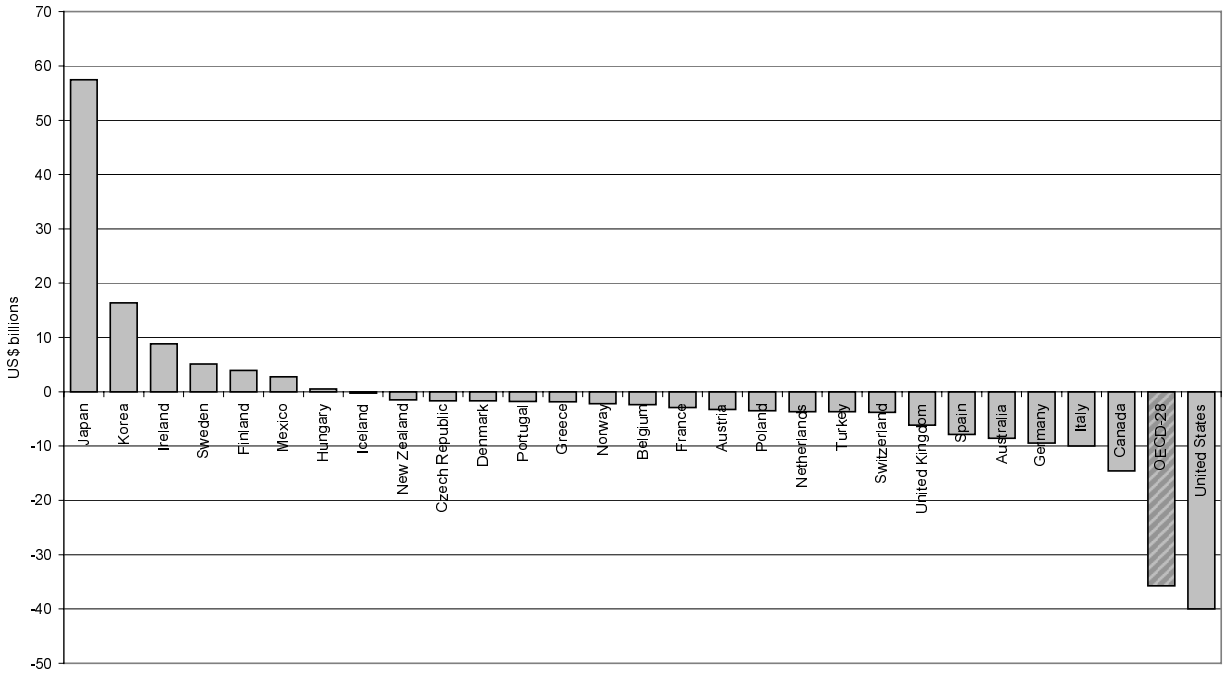
	Value	Share in world imports			Annual percentage change			
	1999	1980	1990	1999	1990-99	1997	1998	1999
Importers								
United States	176.84	15.9	21.1	22.3	12	8	3	13
United Kingdom	51.74	7.0	8.0	6.5	9	6	4	9
Germany	50.39	9.7	9.8	6.4	6	-3	17	2
Japan	44.05	2.6	3.7	5.6	16	-3	-13	21
Hong Kong, China	43.55	-	-	-	15	14	-9	1
retained imports	8.75	1.7	1.4	1.1	8	25	-28	-18
Singapore	42.28	2.6	4.5	5.3	14	2	-18	14
retained imports	20.30	1.9	2.9	2.6	10	1	-27	24
Netherlands	34.37	3.9	4.1	4.3	12	29	6	8
France	30.68	6.4	6.0	3.9	6	6	16	-1
China a	30.49	…	…	3.8	…	20	32	38
Taipei, Chinese	28.79	1.4	2.5	3.6	16	20	5	21
Malaysia a	25.23	1.6	1.9	3.2	18	1	-10	17
Canada b	24.88	4.1	3.5	3.1	10	10	0	10
Korea, Rep. of	24.73	1.3	2.6	3.1	14	10	-20	49
Mexico a, b	21.09	0.9	1.5	2.7	18	23	19	25
Italy	18.27	4.6	4.4	2.3	4	2	9	4
Above 15	612.58	63.5	74.9	77.3	-	-	-	-

a Includes significant shipments through processing zones.
b Imports are valued f.o.b.

Note: For a definition of "Office machines and telecom equipment", please refer to the note to Table 8.

Source: WTO (2000).

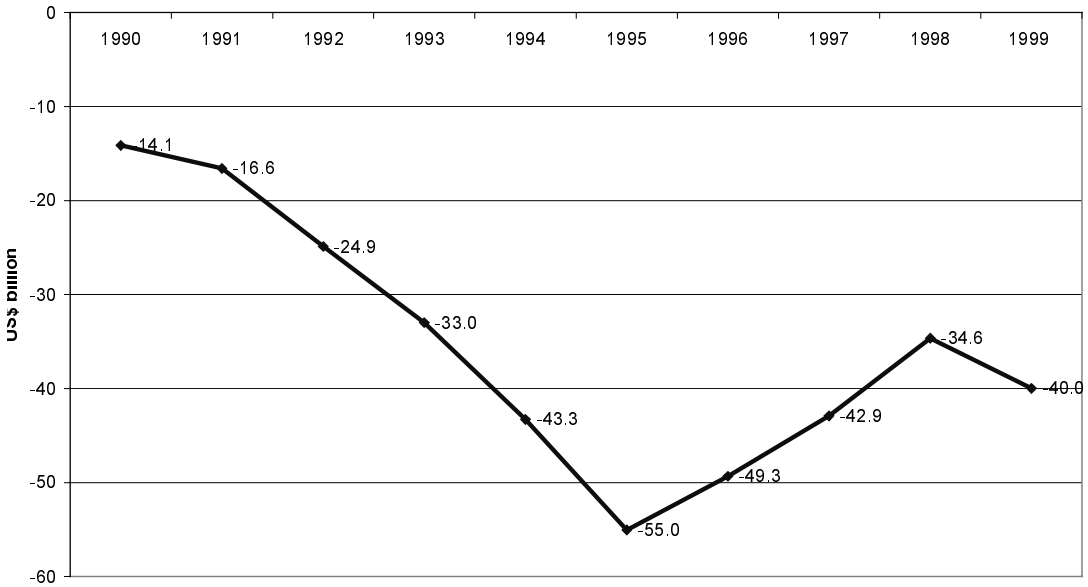
Figure 28. Trade balance in ICT goods, 1999



Note: For a definition of ICT goods please refer to the note to Figure 7 of this document.

Source: OECD, STAN database.

Figure 29. USA net ICT trade in goods, 1990-1999

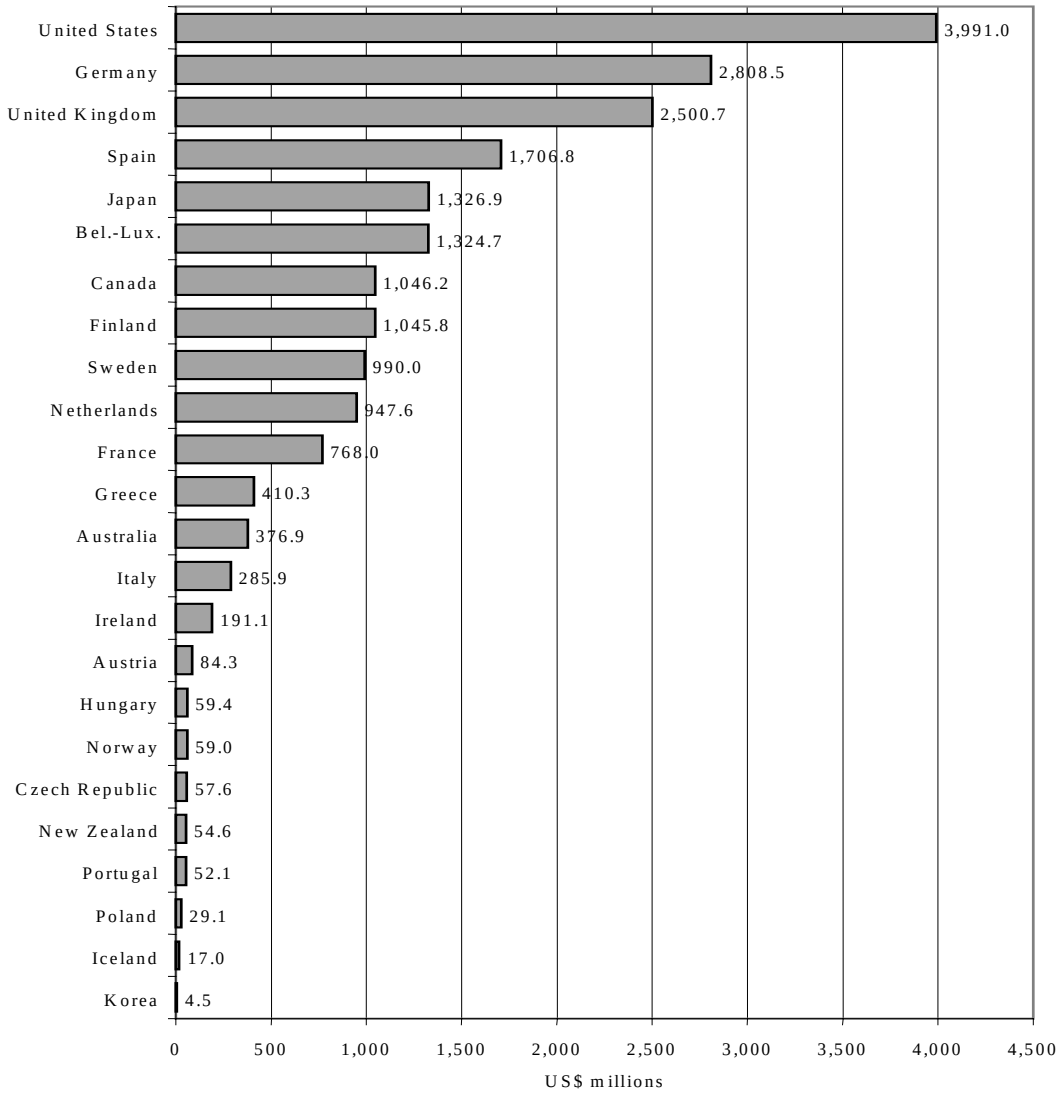


Note: For a definition of ICT goods, please refer to the note to Figure 7 of this document.

Source: OECD, STAN database.

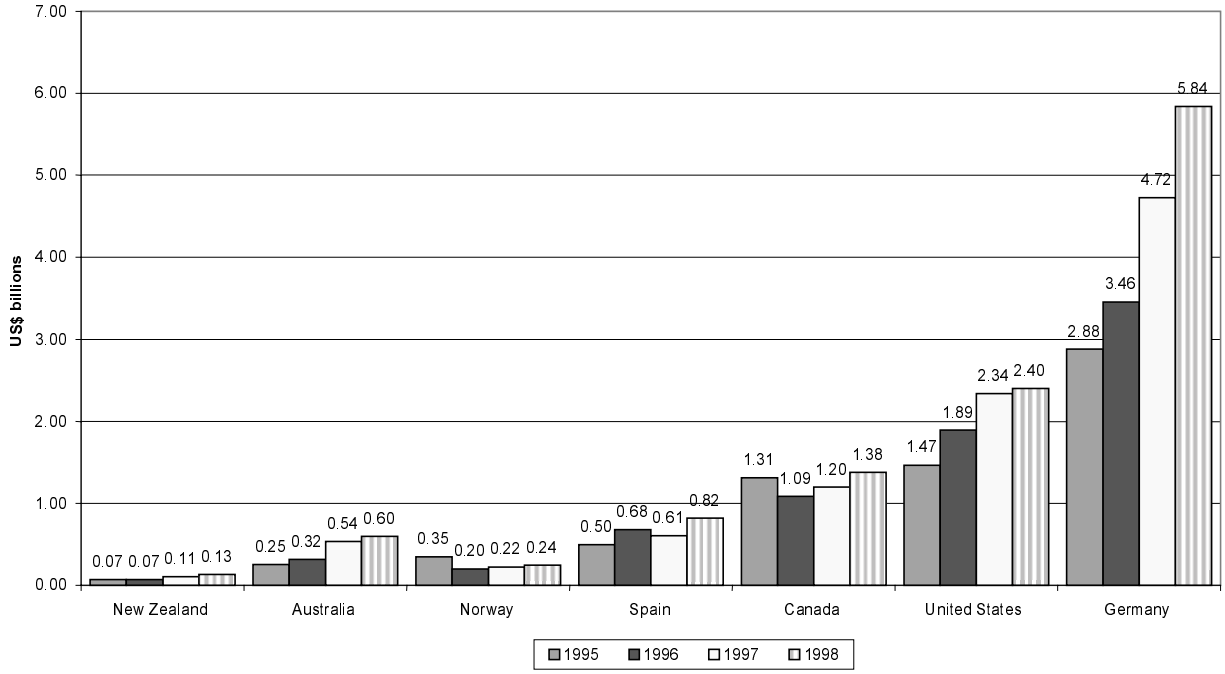
91. Data on services are much sparser. Those that are available, however, show that the United States is the leading exporter of ICT-related services, with nearly $4 billion in 1998, versus $2.8 billion for Germany and $2.5 billion for the United Kingdom (see Figure 31). An analysis of growth in trade in computer services over four years shows very little change in trade patterns (see Figure 32).

Figure 30. Exports of computer & information services, 1998 (US$ millions)



Source: OECD/Eurostat, Statistics on International Trade in Services database.

Figure 31. Total trade in computer services, 1995-1998



Source: OECD/Eurostat, Statistics on International Trade in Services database.

Lack of data on investment

92. While it is possible to analyse the geographic spread of capital inflows and outflows linked to foreign direct investment, no sharper analysis at sectoral level can be made. Data are available for only a few OECD countries. Accordingly, they do not show whether ICT-related investment flows are of more benefit to OECD or non-OECD members. Looking at FDI as a whole, however, the flows remain largely within the OECD area [OECD (1998)].

What are the growth markets for trade in ICTs?

93. Exporters think above all in terms of access to various markets and market share gains. A number of criteria are possible, including spending on ICTs, which encompasses both consumption of domestically made products and imports (see Table 11). It would therefore appear that the United States and Japan are still the largest consumers of ICTs, regardless of the ICT sector in question. Since 1992, that predominance has not wavered.

Table 11. Top ten markets per ITC sector

a. Top 10 Telecommunications Markets (ranked by 1999 spending)

	1992		1993	1994	1995	1996	1997	1998	1999		92-99
Country	Spending (US$M)	% of World	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	% of World	CAGR
United States	170,398	33.2%	181,331	195,166	205,577	209,587	220,067	231,070	242,623	26.2%	5.2%
Japan	63,525	12.4%	76,435	89,001	108,030	128,892	152,092	164,628	192,661	20.8%	17.2%
Germany	43,774	8.5%	44,703	43,711	53,682	51,831	47,477	48,208	49,600	5.4%	1.8%
Brazil	6,154	1.2%	7,891	5,984	9,696	13,924	20,109	28,663	44,292	4.8%	32.6%
United Kingdom	26,369	5.1%	23,119	24,655	28,756	31,743	35,533	37,271	38,326	4.1%	5.5%
China (PRC)	4,301	0.8%	6,930	7,384	15,057	18,542	18,857	29,126	35,181	3.8%	35.0%
France	26,681	5.2%	26,532	26,261	31,526	32,720	31,215	32,070	33,169	3.6%	3.2%
Italy	21,501	4.2%	18,035	21,909	23,570	27,478	27,229	27,988	29,020	3.1%	4.4%
Canada	13,537	2.6%	12,785	13,584	13,916	15,177	16,648	17,279	19,232	2.1%	5.1%
Australia	10,420	2.0%	10,208	12,036	13,271	15,427	16,854	16,905	17,573	1.9%	7.8%

b. Top 10 Hardware Markets (ranked by 1999 spending)

	1992		1993	1994	1995	1996	1997	1998	1999		92-99
Country	Spending (US$M)	% of World	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	% of World	CAGR
United States	70,741	33.5%	80,965	89,792	105,670	128,874	138,611	147,098	155,750	43.1%	11.9%
Japan	38,938	18.5%	40,966	41,750	46,496	50,512	47,156	37,797	38,718	10.7%	-0.1%
Germany	14,772	7.0%	13,773	14,896	18,811	19,619	19,547	21,926	23,382	6.5%	6.8%
United Kingdom	11,532	5.5%	10,527	11,399	15,087	16,748	19,602	19,581	20,849	5.8%	8.8%
France	10,722	5.1%	9,525	9,435	11,604	11,908	11,836	12,996	13,818	3.8%	3.7%
China (PRC)	2,848	1.4%	2,154	3,366	4,059	5,066	7,006	8,069	9,528	2.6%	18.8%
Canada	5,845	2.8%	5,311	5,674	6,763	7,508	8,206	8,736	9,452	2.6%	7.1%
Italy	7,309	3.5%	5,145	5,275	6,093	6,293	6,349	7,557	8,104	2.2%	1.5%
Netherlands	3,415	1.6%	2,771	3,036	4,343	4,741	4,664	5,413	5,914	1.6%	8.2%
Australia	2,749	1.3%	3,792	4,756	5,019	5,486	5,773	5,422	5,890	1.6%	11.5%

c. Top 10 Other Office Products Markets (ranked by 1999 spending)

	1992		1993	1994	1995	1996	1997	1998	1999		92-99
Country	Spending (US$M)	% of World	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	Spending (US$M)	% of World	CAGR
United States	2,510	11.4%	4,661	5,169	6,458	7,639	7,582	8,046	8,520	27.3%	19.1%
Japan	4,142	18.7%	4,268	4,564	5,222	4,574	4,263	3,417	3,500	11.2%	-2.4%
Germany	3,275	14.8%	2,992	2,226	2,391	2,306	2,380	2,670	2,847	9.1%	-2.0%
France	1,804	8.2%	1,562	2,010	2,147	1,989	2,065	2,268	2,411	7.7%	4.2%
United Kingdom	1,933	8.7%	1,552	2,281	2,302	1,951	2,020	2,018	2,149	6.9%	1.5%
Netherlands	740	3.3%	667	838	897	832	858	996	1,088	3.5%	5.7%
Italy	1,288	5.8%	943	1,068	1,118	872	851	1,013	1,087	3.5%	-2.4%
China (PRC)	303	1.4%	224	368	389	459	633	729	861	2.8%	16.1%
Canada	622	2.8%	553	620	603	680	742	790	854	2.7%	4.6%
Spain	813	3.7%	610	901	911	733	694	760	801	2.6%	-0.2%

d. Top 10 Software Markets (ranked by 1999 spending)

Country	1992 Spending (US$M)	1992 % of World	1993 Spending (US$M)	1994 Spending (US$M)	1995 Spending (US$M)	1996 Spending (US$M)	1997 Spending (US$M)	1998 Spending (US$M)	1999 Spending (US$M)	1999 % of World	92-99 CAGR
United States	29,720	*43.6%*	33,020	37,780	40,669	46,802	54,010	65,250	75,006	*48.4%*	14.1%
Germany	5,584	*8.2%*	5,681	6,739	8,948	8,419	8,215	11,534	13,179	*8.5%*	13.1%
Japan	6,652	*9.8%*	7,611	8,160	9,886	9,923	10,492	10,393	11,792	*7.6%*	8.5%
United Kingdom	4,882	*7.2%*	4,431	4,977	6,579	7,478	8,779	9,124	10,695	*6.9%*	11.9%
France	3,664	*5.4%*	3,579	3,910	5,962	5,830	5,645	7,178	7,952	*5.1%*	11.7%
Canada	1,869	*2.7%*	2,055	2,196	2,484	3,080	3,433	3,992	4,551	*2.9%*	13.6%
Italy	3,326	*4.9%*	2,688	2,674	3,160	3,281	3,134	3,093	3,365	*2.2%*	0.2%
Netherlands	1,340	*2.0%*	1,488	1,701	2,460	2,346	2,259	2,973	3,349	*2.2%*	14.0%
Switzerland	1,082	*1.6%*	1,105	1,367	1,714	1,582	1,483	2,119	2,367	*1.5%*	11.8%
Australia	891	*1.3%*	1,123	1,336	1,456	1,764	2,021	1,996	2,285	*1.5%*	14.4%

e. Top 10 IT Services Markets (ranked by 1999 spending)

Country	1992 Spending (US$M)	1992 % of World	1993 Spending (US$M)	1994 Spending (US$M)	1995 Spending (US$M)	1996 Spending (US$M)	1997 Spending (US$M)	1998 Spending (US$M)	1999 Spending (US$M)	1999 % of World	92-99 CAGR
United States	73,257	*39.9%*	82,417	88,818	98,091	107,260	124,013	139,165	154,113	*48.1%*	11.2%
Japan	32,709	*17.8%*	34,500	37,506	46,394	41,964	39,585	38,116	39,196	*12.2%*	2.6%
Germany	14,598	*7.9%*	14,656	15,134	16,413	16,977	15,900	18,014	19,880	*6.2%*	4.5%
United Kingdom	9,200	*5.0%*	9,099	9,525	10,667	11,486	13,831	16,170	18,553	*5.8%*	10.5%
France	11,847	*6.4%*	11,872	12,097	15,656	16,319	15,943	14,144	15,243	*4.8%*	3.7%
Canada	6,371	*3.5%*	6,821	7,267	7,411	7,743	8,637	9,561	10,504	*3.3%*	7.4%
Italy	6,670	*3.6%*	6,030	5,806	6,096	7,016	6,950	7,838	8,841	*2.8%*	4.1%
Netherlands	2,902	*1.6%*	2,818	3,063	2,943	2,983	2,929	4,612	5,244	*1.6%*	8.8%
Australia	1,933	*1.1%*	2,386	2,667	2,624	3,068	3,818	4,312	4,952	*1.5%*	14.4%
Sweden	2,918	*1.6%*	2,732	2,722	2,939	3,445	3,465	3,918	4,531	*1.4%*	6.5%

Source: The Digital Planet, 2000 (www.wits.org/dplanet)

94. The distribution of ICT spending reflects the current openness of markets to imports, but it does not foreshadow the potential for market openings. In particular, some large markets like Brazil or China offer high potential as ICT export destinations. Market size is a more relevant indicator of growth potential (see Table 12).

Table 12. Technology, Media and Telecommunications (TMT) market size/potential – country rank

Country	Rank	Relative Weighting
USA	1	1.86
Japan	2	0.80
China	3	0.60
Germany	4	0.41
UK	5	0.30
South Korea	6	0.22
France	7	0.22
Canada	8	0.21
Italy	9	0.20
Brazil	10	0.15
Remaining 32 countries	--	*2.02*

Methodology: the relative weightings were derived by adding up each country's market share in each segment of TMT.

Source: Morgan Stanley Dean Witter (2001), MSDW Internet Research, World Bank, IDC, Kagan Associates, Faulkner & Gray 2000 Global Card Directory, DRI/McGraw Hill.

Does the new economy create a virtuous circle bringing more countries into trade, or a vicious circle excluding countries that are victims of the digital divide?

95. This study has already shown that a digital divide exists between businesses, since not all firms face the same barriers to the uptake of new technologies, depending in particular on their size and lines of business (both being related)[16]. Does such a divide exist between countries? Here, there are two opposing opinions: the first holds that the new economy clears technical, geographic and time barriers to trade and enables developing countries to become better integrated into trade; in contrast, the second view holds that the lack of infrastructure excludes developing countries even more from the new networks and trade.

96. The above analysis has partially answered the question of the digital divide. That divide exists, and Africa's regression in international trade statistics proves it. How can a country reap the benefits of the Internet and ICTs if it has only limited access to electricity and telephones? Nevertheless, the new economy and the digital divide on the whole do not *per se* aggravate trade inequalities. On the contrary, this paper has shown that trade opportunities for the developing countries are greater in ICT-related areas than in other spheres of international trade. Thus the developing countries have a better trade showing in areas related to the new economy. In other words, some countries are still excluded from trade, and their exclusion is made even more visible by the digital divide, and yet the number of those excluded has been dropping steadily thanks to the new technologies. The developing countries have high catch-up potential, and may move directly into the new technologies without passing through all the intermediate stages that the OECD countries have experienced.

97. This finding seems to run counter to another accepted view, that the developing countries have no comparative advantage in the most advanced technologies. It appears that the developing countries have an interest in trading ICT products. It further appears that those developing countries which are best placed in the ICT segment also rank highest in terms of overall integration in trade (apart from the Philippines which, though among the top 15 ICT exporters, ranks only 31st for merchandise exports). But it is hard to establish a link between results for ICT trade and trade overall. ICT imports, not exports, disseminate these products in the economy and generate positive externalities. While these countries are also among the main importers of ICTs, it would be reductive to ascribe their dynamism in trade to ICT dissemination alone. Only the direct effects of ICT trade can hence be analysed. Also, trade diversification is necessary to make a country less vulnerable to a contraction in ICT investment.

98. The inequalities of access to the new technologies are blatant, even within the OECD area. Notable strides have been made, however, and they point to wider dissemination of the new technologies and related trade.

16 . See figures 25 to 27 and related paragraphs.

IV. IMPLICATIONS OF THE NEW ECONOMY FOR HOW GOODS AND SERVICES ARE TRADED

99. If the new economy has underpinned a qualitative and quantitative change in trade, as well as active participation in trade by a greater number of countries, it is essentially because it affects the way in which businesses operate on the international trade scene. Many references have been made previously to these new vectors of international trade, but special attention should be paid to the development of e-commerce. E-commerce is not the only innovation in commercial methods made possible by the new economy, as illustrated, for example, by the growing number of telephone centres for remote selling. But e-commerce is probably the method most likely to revolutionise trade.

100. Here too, preconceived notions about e-commerce need to be held up against empirical data. But data on e-commerce are still rare and not very reliable—first, because such business is still in its infancy, and second, because from a technical standpoint it is difficult to gauge flows related to e-commerce[17]. At the border, goods and services are not classified according to the way the orders were placed. Similarly, while the volume of communications can be quantified, it is impossible to ascertain their content and their potential connections with commercial transactions. Businesses alone would be able to provide data on their use of the Internet for commercial purposes. Again, not even these businesses themselves can always assess the impact of their on-line promotion, unless an order is placed over the Internet.

The trade impact of e-commerce

101. E-commerce can affect international trade at all levels—before and after the actual commercial transaction[18].

1. E-commerce heightens competition between companies. Indeed, consumers can access information more easily, compare prices and products offered for sale and thus ascertain the best available value for money. As a result, businesses have to be more efficient, improve the quality of products and customer service and adopt more competitive pricing policies. In other words, the consumer's gain is at the producer's expense, and this decline in margin has to be offset by new outlets. Monopoly rents arising from a lack of local competition or information are therefore bound to disappear. Conversely, too much information can ultimately cloud market signals and be conducive to local shopping.

2. Companies themselves benefit from greater competition, because e-commerce is mainly among businesses (B-to-B). This helps effective inventory management and brings production costs down through competition between input suppliers.

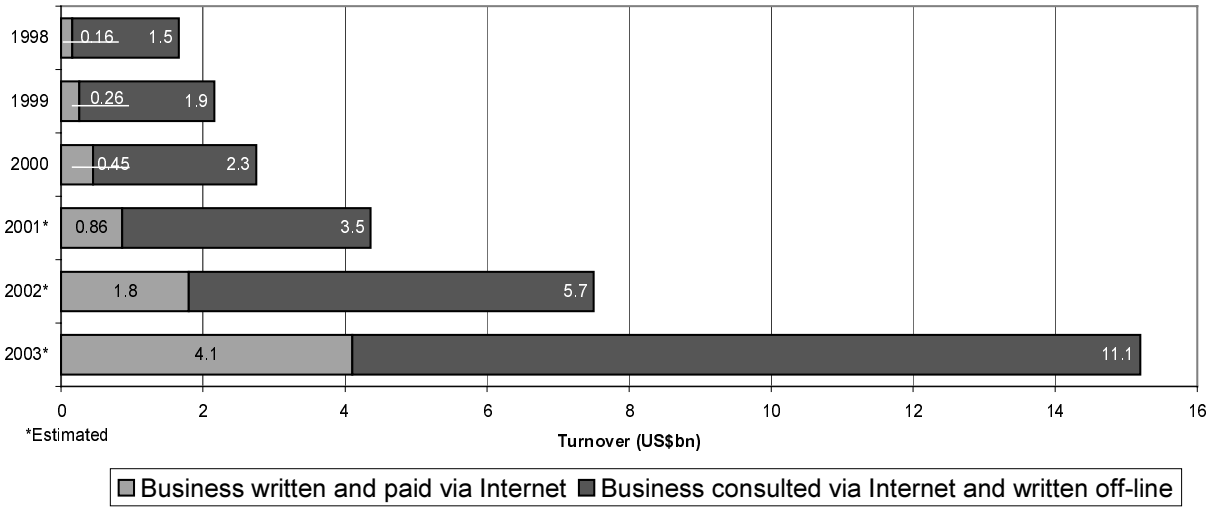
17 . Although work is underway in the OECD to obtain more reliable data.

18 . Most of the following channels of influence on trade are common to all the new economy components (see telephone and other means of communication).

3. Prices are determined by supply and demand. However, there is no such thing as perfect price flexibility in markets. E-commerce can enhance that flexibility and, in so doing, enhance overall market efficiency. In particular, more and more auction sites are springing up on the Internet. The simultaneous connection of potential buyers and sellers plays the role of Adam Smith's "invisible hand". When supply exceeds demand, prices are revised downward (e.g., travel discounters), and vice versa. At the level of each individual, a product's price can differ depending on how many times the person has been connected, or the number of orders already placed on the site. Customer files thus become an essential asset in e-commerce-related business.

4. The Internet provides a new advertising medium. E-commerce is not necessarily a substitute for traditional buying and selling, but visits to web sites have in some industries already become a major component of the decision to purchase. According to Cételem, 46% of web surfers use the Internet to gather information and then proceed to make their purchases in traditional stores[19]. In the realm of real estate, for example, homebuyers are increasingly beginning their searches at specialised web sites. The same holds true in the tourism sector, which is expected to account for 35% of Internet purchases in Europe in 2001[20]. Another example: Internet consultations are on the rise for insurance, though on-line advertising largely assists conclusion of business off-line (see Figure 32).

Figure 32. Insurance on the Internet, United States



Source: Forrester in *Connectis*, 28 February 2001.

5. Commercial transactions are being transformed as well. Purchase orders are placed electronically or by telephone. Similarly, telepayment is transforming methods of payment. As shown in a recent European Union report, telepayment-related fraud now constitutes the

19 . Web source (http://www.cetelem.com).

20. Datamonitor estimate (http://www.datamonitor.com).

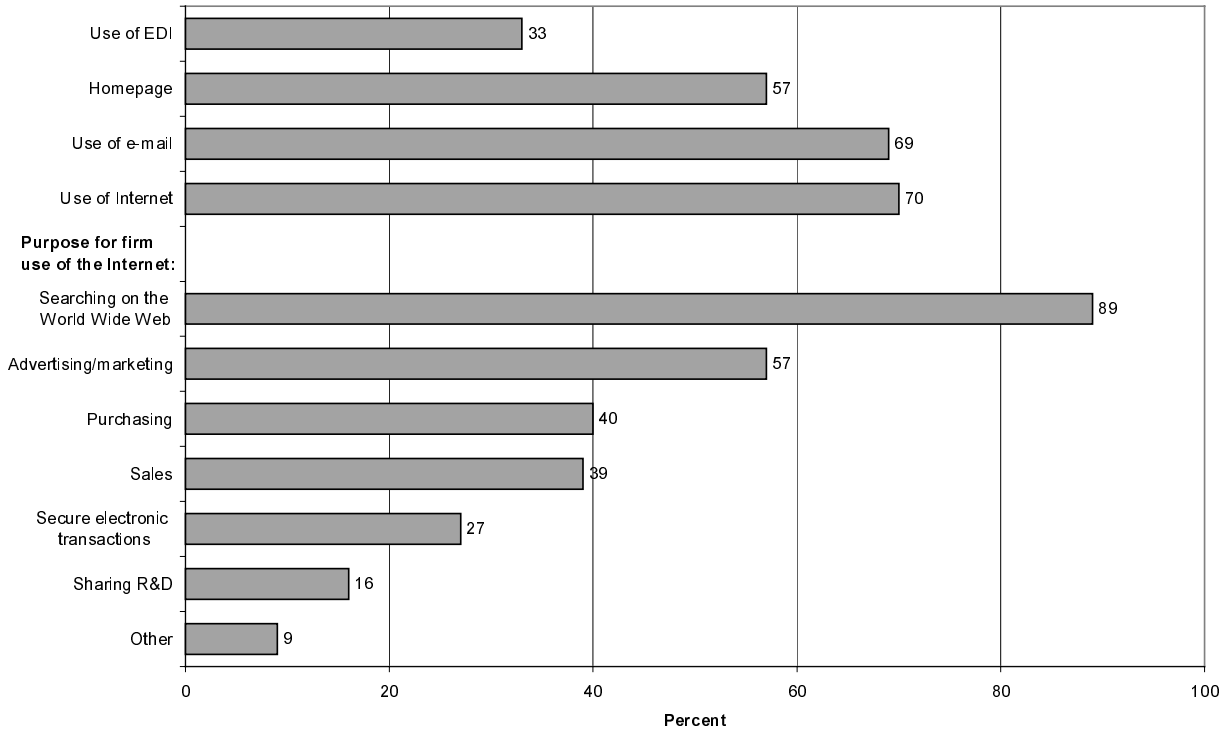
main threat to the growth of e-commerce[21]. This represents both a technical and a legal challenge.

6. Delivery of purchased goods and services can be dematerialised. Customers can download products directly to their personal computers without anyone else's intervention. Such is the case, for example, with electronic editions of newspapers, books or music. But this facilitation of trade poses intellectual property problems. By virtue of the first-sale doctrine, a person who acquires ownership of a product by lawful means may do with that product as he or she chooses. But what happens when dissemination of a product, even if it is free of charge, becomes possible on a very large scale and is subject to no constraints whatsoever? This is the dilemma of the dissemination of music via the Internet.

7. After-sales services can also be provided over the Internet or by telephone. This can take the form of training or technical assistance, or of updates to previously sold products. Closer monitoring of customers is therefore possible—and furthermore, it can be done on a continuous basis, 24 hours a day.

102. These effects are difficult to measure empirically. Even so, there are some national data available on corporate use of the Internet that can be used to ascertain the level at which the web has the greatest impact on commerce (see the example of Canada, Figure 33). The lack of harmonisation of selected criteria preclude any general conclusions.

Figure 33. Firm use[1] of Internet in the manufacturing sector, Canada, 1998 (%)



Note: 1. Establishment-weighted
Source: Statistics Canada (1998).

21. Action Plan presented by the Commission on 19 February 2001.

The structure and extent of e-commerce

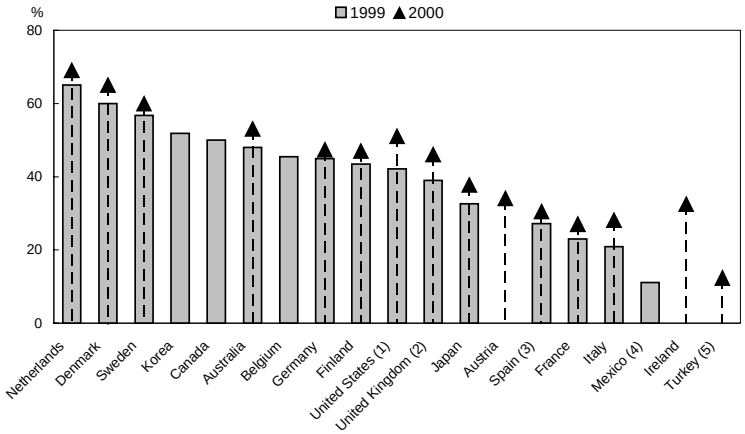
103. Beyond the difficulties involved in quantifying e-commerce, it must be emphasised that e-commerce does not necessarily entail cross-border trade. Moreover, while e-commerce does create new trade opportunities, there may also be a substitution effect. As a result, trade growth will not necessarily be as swift as the growth of e-commerce.

The development of e-commerce

104. A number of elements are essential to the development of e-commerce. Some of these elements are not measurable empirically, such as an adequate legal or technical framework facilitating such trade. For some elements, however, an empirical approach is still possible.

105. First of all, the population must have Internet access. This access in turn requires a personal computer, and then connection to the network. But within the OECD area there are sharp differences in the rates of home computer ownership (see Figure 34). In terms of network connections, the differences are even sharper. There is therefore an apparent rift between North America and Northern Europe, on the one hand, and the rest of the OECD countries, on the other. It must be borne in mind, however, that between 35 and 45% of all Internet use occurs in the workplace [Tehan (2000)]. It is therefore difficult to measure the development potential of e-commerce from private Internet access alone[22].

Figure 34. Households with access to a home computer, 1999 and 2000 (Percentages)



Note: 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.

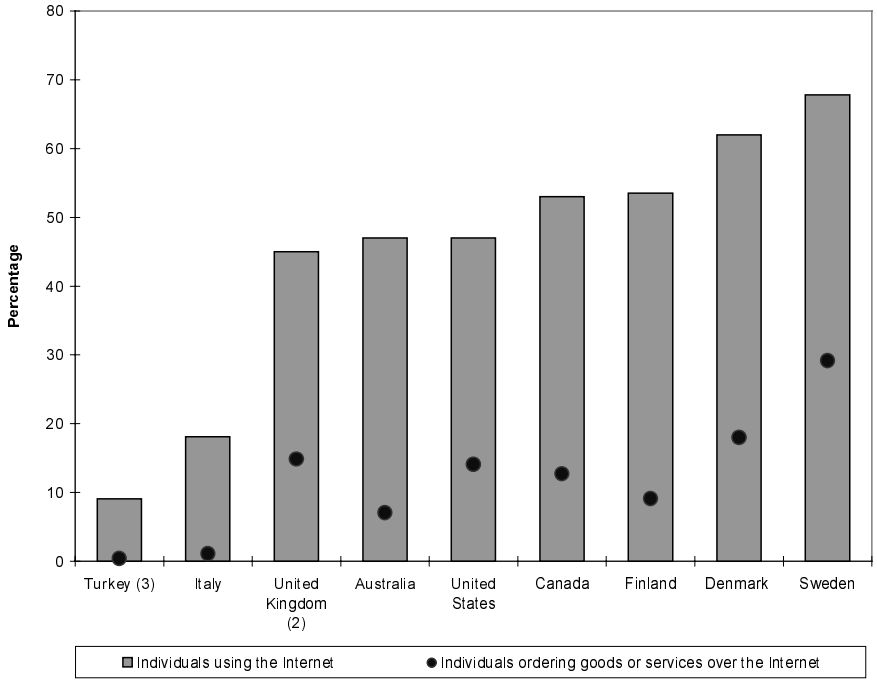
Source: OECD (2001*a*).

22. Moreover, businesses do not, or do not often, monitor their employees' use of Internet access in the workplace, out of respect for individual freedoms.

106. Second, the cost of connection needs to be moderate. Moreover, this cost has a direct impact on the number of connections, and it will affect how the people connected use the Internet. If a connection is unlimited, Internet use is far more intense. Lengthy visits on the web are needed for comparison shopping, decision-making and on-line purchasing. It is therefore not surprising that e-commerce is most developed in countries where connection costs are lowest. The fact that certain countries are lagging behind in the area of e-commerce is probably due to obstacles to the opening up of local telecommunications markets.

107. Last, a certain Internet culture needs to be developed within the target population. This culture develops naturally with easy access to the web. A high rate of computerisation (including Internet access) at schools and universities is therefore needed to foster the future development of e-commerce. It would appear that some countries are far more receptive to e-commerce than others. Thus, use of the Internet varies widely amongst OECD countries (see Figure 35).

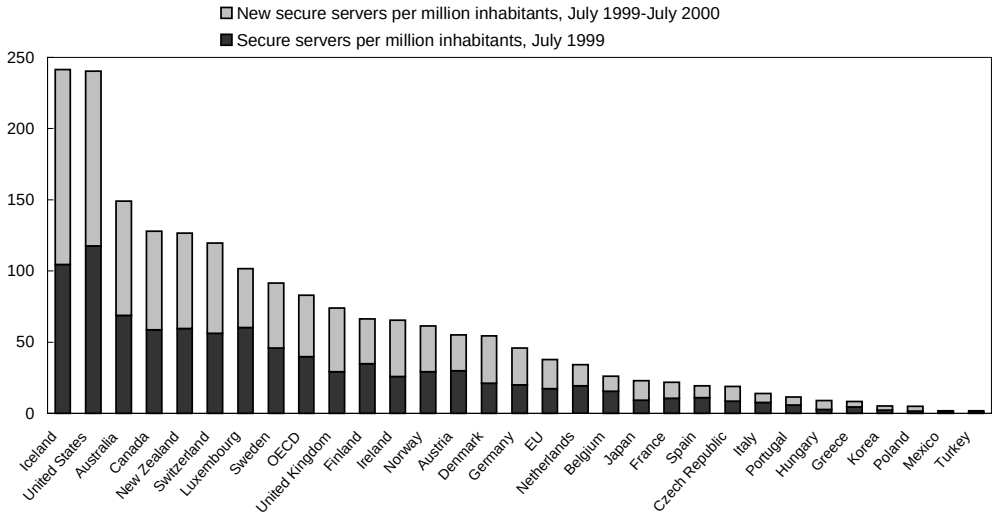
Figure 35. Percentage of individuals using and ordering goods and services over the Internet, 2000[1]



Notes: 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 (2001*a*).

108. In all, e-commerce is unevenly developed in the OECD countries. The level of this development can be measured via the number of secured servers by countries. Such servers reflect the dissemination of e-commerce, because they enable secure payment and thus on-line commercial transactions. Countries that are above the OECD average are Iceland, the United States, Australia, Canada, New Zealand, Switzerland, Luxembourg and Sweden (see Figure 36).

Figure 36. Internet commerce developments measured by the number of secure Web servers



Source: OECD (2001*a*).

109. More precise measures of e-commerce are less reliable, as shown by the different estimates supplied by the various research institutes. The US Department of Commerce estimates that retail e-commerce sales in the United States totalled $8 686 billion in fourth-quarter 2000, up by 67.1% (± 4.3%) from fourth-quarter 1999. At those two dates, e-commerce respectively accounted for 1.0% and 0.6% of retail sales in the United States. For the full year 2000, e-commerce amounted to $25.8 billion in the United States, or 0.8% of retail sales[23]. In Japan, the Ministry for Economic Affairs, Commerce and Industry, in co-operation with Accenture and the E-commerce Promotion Council, projects that the country's e-commerce (B-to-B and B-to-C) will increase by 450% by 2005.

The structure of e-commerce

110. The structure of e-commerce can be approached in a number of different ways—first, from a geographic standpoint; second, by making distinctions amongst sellers and buyers; and lastly, according to the types of products or services being traded.

111. The geographic distribution of e-commerce reflects the inequalities of Internet access and of the dissemination of culture over the Internet. Using a combination of criteria based on a country's commercial environment and connectivity, the Economist Intelligence Unit ranked the various countries according to their degree of preparation for the advent of e-commerce[24]. It emerges from this that the United States comes out on top, followed by Sweden, Finland and Norway. Japan is ranked only 21st. In point of fact, the United States currently accounts for the bulk of global e-commerce. For example, according to the Gartner Group, the North American market accounted for 55% of the year-end holiday sales transacted in 2000, versus 36% for Europe and Asia/Pacific combined[25].

112. A classification of commerce by buyers and sellers makes distinctions between B-to-B, B-to-C and C-to-C trade. It would appear that the bulk of e-commerce today is transacted between companies (see

23. Estimates of 16 February 2001 (http://www.census.gov.).

24. Web source (http://www.ebusinessforum.com).

25. Web source (http://www.gartner.com).

Table 13). However, auction sites (C-to-C) are always amongst the most frequently visited in each country[26].

Table 13. E-commerce turnover, third quarter 2000 (US$ billions)

	United Kingdom	France	Spain	Germany	Sweden	United States
B-to-B turnover	2.03	1.36	0.33	2.74	0.41	47.63
B-to-C turnover	0.34	0.2	0.05	0.41	0.06	7.12
E-commerce turnover	2.37	1.56	0.38	3.15	0.47	54.75

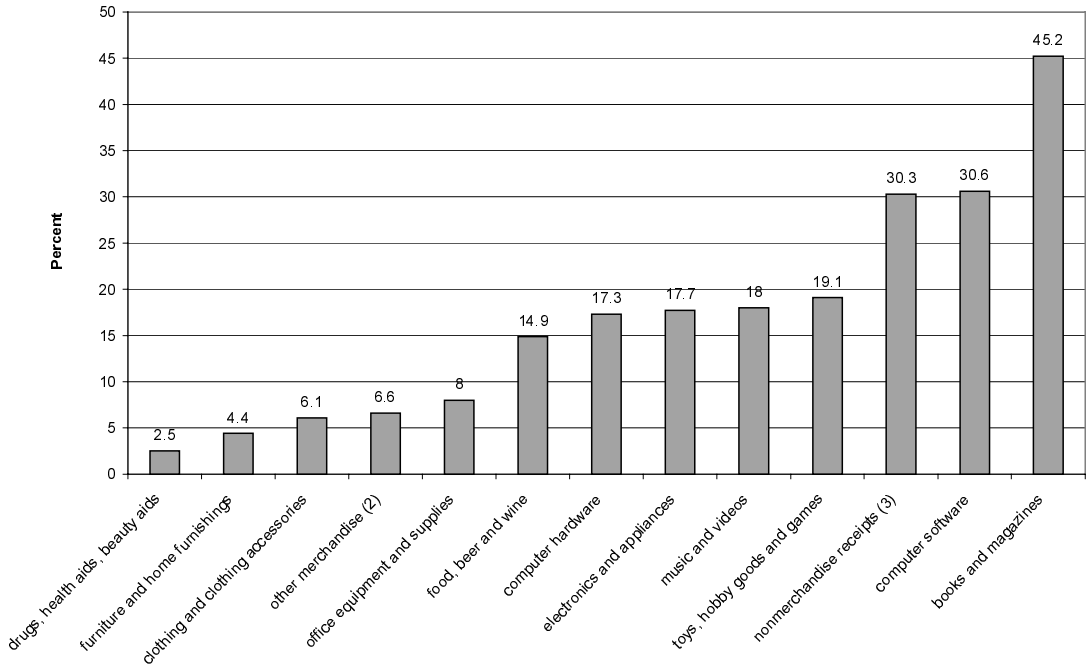
Source: Net Profit in *Connectis*, 28 February 2001.

113. Lastly, the impact of e-commerce can be measured by products. While some products, like computer software packages, are especially suited to e-commerce, it is difficult to predict which products will be commercial successes on the Net (See Figure 37). An analysis of the most frequently visited web sites does however give a clearer picture of how the Internet is used for commercial purposes. It would seem, then, that electronic "shopping carts" differ from one country to another, just as traditional shopping carts do. While growth prospects for e-commerce, by product, differ widely all over the world, three major categories of sites dominate everywhere: finance (including banking, insurance and credit), tourism (travel, transport) and music/literature (see Table 14).

26. See Table 14.

Figure 37. U.S. electronic shopping and mail-order houses sales[1], 1999

e-commerce as a percentage of total sales



Notes:

1. This industry comprises businesses primarily engaged in retailing all types of merchandise through catalogs, television, and the Internet. Data are preliminary, and therefore subject to revision.
2. Includes other merchandise such as jewelry, sporting goods, collectibles, souvenirs, auto parts and accessories, hardware, and lawn and garden equipment and supplies.
3. Includes nonmerchandise receipts such as auction commissions, shipping and handling, customer training, customer support, and online advertising.

Source : U.S. Census Bureau (1999).

Table 14. Most visited Websites (November 2000)

Sites	United Kingdom	France	Spain	Germany	Sweden	United States
1	Amazon.co.uk Music, books	Fnac.com Music, books	Servicaixa.com Banking	Amazon.de Music, books	Foreingssparbanken.com Banking	Amazon.com Music, books
2	Amazon.com Music, books	Sncf.com Travel	Elcorteingles.es Retailing	Ebay.de Auctions	Torget.se Retailing	Ebay.com Auctions
3	Egg.com Banking, loans, insurance	Alapage.com Music, books	Ibazar.es Auctions	Deutschebahn.de Travel	Sebank.se Banking	Americangreeting.com Retailing
4	Argos.co.uk Retailing	Boursorama.com Finance, stock market	Aucland.es Auctions	Consors.de Finance, stock market	Posten.se Postal services	Bizrate.com Retailing
5	Lloydstsb.com Banking, loans, insurance	Ibazar.fr Auctions	Invertia.com Finance	Bol.de Music, books	Nb.se Bank	Mypoints.com Gift points
6	Tesco.com Supermarket	Amazon.fr Music, books	Amazon.com Music, books	Teledata.de Software	di.se stockbroking	Mapquest.com Travel
7	Barclays.co.uk Banking, loans, insurance	Kelkoo.com Retailing	Travel-club.com Travel, tourism	Comdirect.de Finance, stock market	Handelsbanken.se Banking	Half.com Music, books
8	Lastminute.com Travel, tourism	Credit-agricole.fr Banking, loans, insurance	Bbvnet.com Banking	Quelle.de Retailing	Sj.se Travel, tourism	Travelocity.com Travel, tourism
9	Railtrack.co.uk Travel	Degriftour.fr Travel, tourism	Bol.com Music, books	Tchibo.de Retailing	Ppm.nu Savings, pensions	Toysrus.com Toys
10	Beeb.com Media	Redoute.fr Mail order retailing	Cajamadrid.es Banking	Ricardo.de Auctions	Ginza.se music	Expedia.com Travel, tourism

Source: MMXI Europe in *Connectis*, 28 February 2001.

V. CONCLUSION

114. The new economy has been praised to the skies and then universally denigrated. Its popularity rating seems to have gone up and down in line with the value of technology shares on the main stock markets. But the new economy is a structural development, since the dissemination of ICTs will have a lasting effect on the economic behaviour of producers and consumers across all sectors of the economy, and in trade and investment in particular. Why is opinion so fickle about the new economy?

115. To begin with, the new economy is in its infancy. Assessing its significance, investors and economists often give through very varied projections. Their analyses have often unreasonably amplified, if not the significance of the new economy-related changes, then at least the time scale for such changes. There is accordingly a need to take an empirical approach, to take stock of the true effects of the new economy. That has been the purpose of this paper, focusing on trade and investment flows in particular.

116. Second, opinion has often misunderstood the new economy, given the absence of any clear and precise definition. The new economy is too frequently confined just to the Internet economy and e-commerce. That would explain why the difficulties encountered by a good number of start-ups have been assimilated, in public opinion, to the withering of the new economy. But this paper has asserted that the dissemination of ICTs affected the old economy first and foremost. So the significance of the new economy cannot be gauged from start-ups, but rather from the transformations observed in the more traditional sectors of the economy. At the same time, this paper shows how difficult it is to measure the positive externalities empirically. At most it has demonstrated a link between the scale of ICT spending, the openness of economies, and the development of trade.

117. Last, the new economy is surrounded by numerous accepted ideas, which are confusing public opinion. The digital divide can help illustrate the problem. For many people, the dissemination of ICTs is favourable above all to the advanced countries, which have a comparative advantage in producing and trading these products. So the new economy is said to widen further the perceived inequalities on the international trade scene. Yet this paper shows that a number of developing countries are proving relatively more successful in ICT trade than in other sectors. That would point to better integration in the world economy, through trade in ICTs and the ensuing repercussions for development.

118. Research for this paper was often thwarted by the absence of data at country level, or deficiencies therein. That is particularly true in investment and services. Similarly, with regard to e-commerce, the absence of reliable data is unhelpful to an empirical approach. Work underway at the OECD will hopefully help to remedy the lacunae.

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