*Chapter 6*

# MULTINATIONAL ENTERPRISES AND PRODUCTIVITY GROWTH: INSIGHT AT THE FIRM LEVEL

*Multinational enterprises* (MNEs) *account for a large and growing share of employment and production in* OECD *countries – particularly in the manufacturing sector. Recent developments in the kinds of data accessible to economists have provided more powerful tools for investigating the effects of* MNEs *on* OECD *economies. This chapter reviews a selection of recent work that uses these new data sources to examine the contribution* MNEs *make to productivity growth in their home countries and abroad. It draws extensively on papers presented at an* OECD *workshop on this topic and draws some implications for current issues confronting policy makers, such as outsourcing, the formation of globally competitive firms and the desire to improve regional performance by attracting overseas activities back home.*

## Introduction

Multinational enterprises (MNEs) have played a significant role in economic growth and development for years, if not for centuries. Recently, as concerns about their effects and those of their foreign affiliates on both their home and host economies have mounted, the role they play has taken centre stage in general public debate (O'Rourke and Williamson, 2000). In home countries, the establishment of foreign affiliates by domestic companies is often interpreted as an outsourcing of jobs and production that results in domestic losses; in host countries, the establishment of foreign-owned plants is sometimes viewed as raising dependence on foreign technology and contributing to outflows of knowledge and economic benefits. Public debate on these issues can be emotional and political in nature, and often relies on anecdotes relating to a small number of firms. The broader economic effects of MNEs on home and host economies are in fact not well understood and have not been sufficiently analysed. This is to a large degree attributable to a paucity of data, which has limited the ability to analyse MNEs rigorously.

A better understanding of the contribution of various types of MNEs to productivity growth is important because many countries provide incentives to attract and retain foreign affiliates of MNEs on the assumption that they boost productivity, directly and indirectly, through transfer of technology, introduction of advanced management practices and increased competition. Likewise, some governments help industries to consolidate and restructure so as to create globally competitive MNEs with domestically based parents. For their part, firms may threaten to relocate activities abroad to gain improvements in various elements of the business environment, such as labour markets, corporate tax rates or regulations. Implicit in government policy is the belief that the parent and/or affiliates of MNEs are important to economic growth and productivity. Many analyses support this view, but some recent work indicates the limits of these benefits. MNEs can lower productivity if they hire highly skilled workers away from domestic plants (Aitken and Harrison, 1999) or target foreign direct investment (FDI) to weak domestic industries in order to capture their markets, which does little to boost aggregate productivity growth (Keller and Yeaple, 2003).

Recent developments in the kinds of data accessible to economists have provided more powerful tools for further investigating the effects of MNEs on OECD economies. The availability of firm-level data on the activities of MNEs, as opposed to the investment flows associated with them, has made it possible to measure better the contributions of MNEs to employment, innovation and productivity growth and compare these with those of with uni-national firms. This chapter reviews a selection of recent work that uses these new data sources to examine the contribution MNEs make to productivity growth in their home countries and abroad. It draws extensively on papers presented at an OECD workshop on this topic and draws some implications for current issues confronting policy makers, such as outsourcing, the formation of globally competitive firms and the desire to improve regional performance by attracting overseas activities back home.[1] In doing so, the chapter illustrates the value of these new data for a deeper analysis of important economic questions.

## The changing role of MNEs in OECD economies

As aggregate statistics show, MNEs account for a large and growing share of employment and production in OECD countries – particularly in the manufacturing sector (OECD, 2001a). In 2001, the share of manufacturing output under the control of foreign affiliates of MNEs ranged from just under 3% in Japan to more than 70% in Hungary and Ireland, with most countries falling between 20% and 50% (Figure 6.1a). MNEs accounted for close to 50% of manufacturing employment in Ireland and Hungary

Figure 6.1. **Contribution of foreign affiliates to turnover and employment in manufacturing, 2001**


1. 2002.
2. 2000.
3. 1999.
4. 1997.

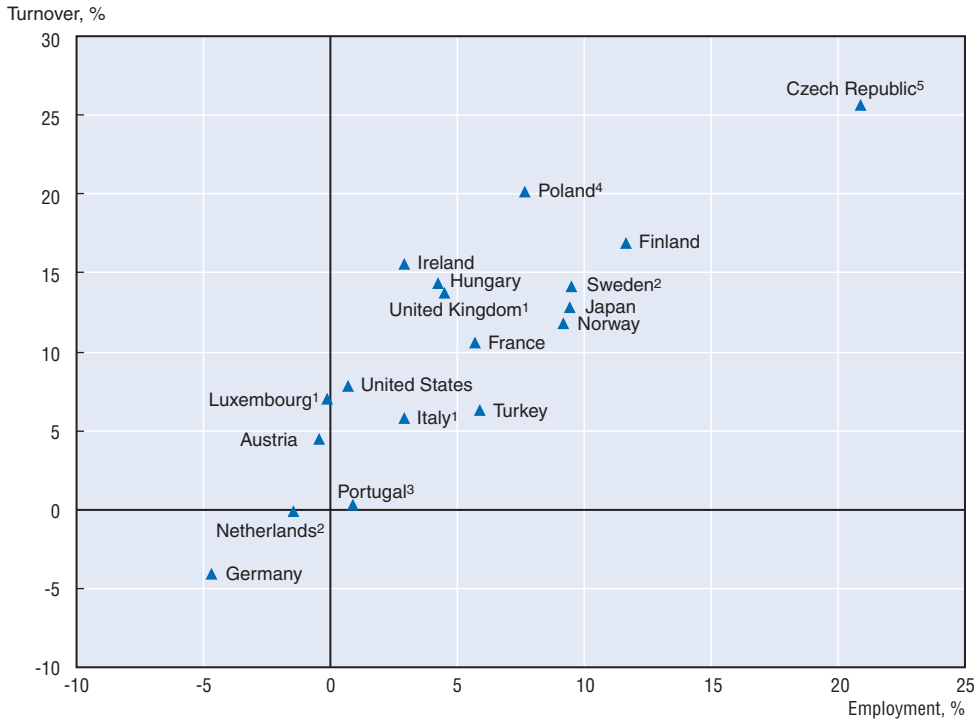
*Source:* OECD AFA Database, July 2004.

in 2001 and between 15% and 30% in most other OECD economies, except Germany where the share was less than 6% (Figure 6.1b).

In general, the role of MNEs is growing. Between 1995 and 2001, the shares of foreign affiliates in manufacturing turnover rose in all countries for which data are available except Germany and the Netherlands (Figure 6.2). Turnover under foreign control grew more quickly than that under domestic control, in many cases by a factor of three or more. Manufacturing employment in foreign affiliates also rose in all countries except Austria, Germany, Luxembourg and the Netherlands during this time; it fell in domestically controlled firms in all countries except Norway, Sweden and Ireland. In general, employment growth in foreign affiliates reflects not job creation in new, foreign-owned plants, but changes in the classification of jobs owing to acquisitions and changes in ownership. Labour productivity in foreign affiliates has also increased, with gains clustering between 5% and 10% a year in most OECD countries between 1995 and 2001.

MNEs also play a growing role in the service sector, but their presence is not as large as in manufacturing. The share of service sector turnover under foreign control is considerably lower than in manufacturing, ranging from less than 1% in Japan to 34% in Hungary, with most of the larger OECD economies posting shares of 17% or less in 2001 (Figure 6.3*a*). Only in Norway, Italy and Finland did the share of foreign affiliates in services exceed that in manufacturing. The penetration of foreign affiliates in service sector employment is also lower than in manufacturing; their share of employment reached 19% in Belgium in 2002 but remains below 10% in most of the larger OECD economies for which data are available (Figure 6.3*b*).

Figure 6.2. **Growth in turnover and employment foreign affiliates in manufacturing, 1995-2001**
Average annual growth rate




1. 1995-1999.
2. 1995-2000.
3. 1996-2001.
4. 1997-2001.
5. 1997-2002.

*Source:* OECD AFA Database, July 2004.

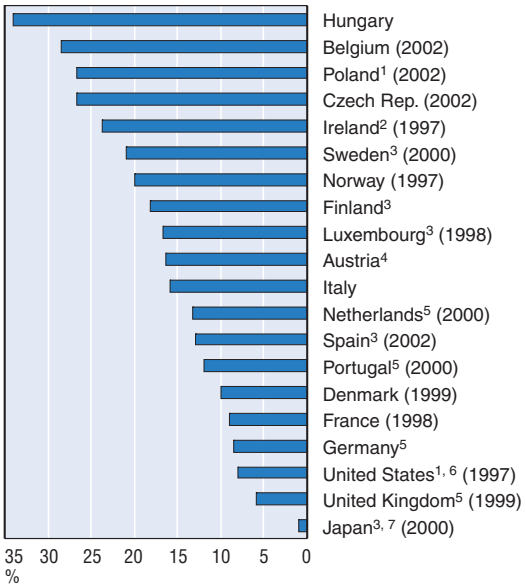
Foreign affiliates account for a growing share of business R&D. Although R&D remains less internationalised than production, total R&D expenditures of foreign affiliates increased between 1991 and 2001 by more than 50% in the OECD area. In 2001, foreign affiliates accounted for 15% to 20% of total manufacturing R&D in France, Germany and the United States; between 30% and 40% in Canada, the Netherlands, Spain, Sweden and the United Kingdom; and more than 70% in Hungary and Ireland (Figure 6.4). Not surprisingly, R&D investments by foreign affiliates are highly sector-specific, with the ICT, chemicals (including pharmaceuticals) and transport sectors accounting for the vast majority. While patterns of R&D investment by foreign affiliates correspond to patterns of manufacturing investment, the location of business R&D is influenced not only by the need to tailor products to local markets but also by a desire to tap into local sources of scientific and technical knowledge. Nevertheless, the R&D intensity (R&D as a share of turnover) of foreign affiliates is below that of firms indigenous to the host country in all countries except Hungary and Ireland, and by a wide margin in most cases (OECD, 2003).

### Firm-level insight into the contribution of MNEs to productivity growth

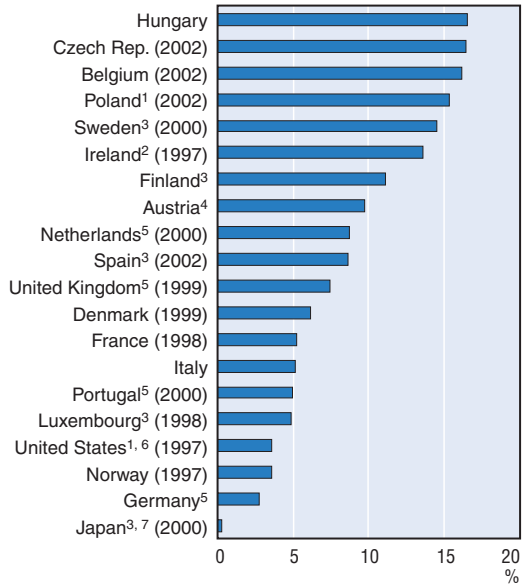
While aggregate statistics highlight the significant – and growing – role of MNEs in OECD economies, they provide insufficient insight into their contribution to productivity growth. This requires the ability to break productivity growth down into its constituent parts and compare the performance of MNEs to unaffiliated domestic firms and ideally to compare foreign affiliates operating in a country with

Figure 6.3. **Contribution of foreign affiliates to turnover and employment in services, 2001**

*a.* Share of foreign affiliates in turnover




*b.* Share of foreign affiliates in employment




1. Excluding banks (ISIC 651).
2. Excluding hotels and restaurants (ISIC 55), finance and insurance (ISIC 65 to 67) and other services (ISIC 80 to 93).
3. Excluding finance and insurance (ISIC 65 to 67).
4. Excluding financial intermediation (ISIC 65) for turnover.
5. Excluding finance and insurance (ISIC 65 to 67) and other services (ISIC 80 to 93).
6. Based on data by industry of sales.
7. Excluding real estate (ISIC 70).

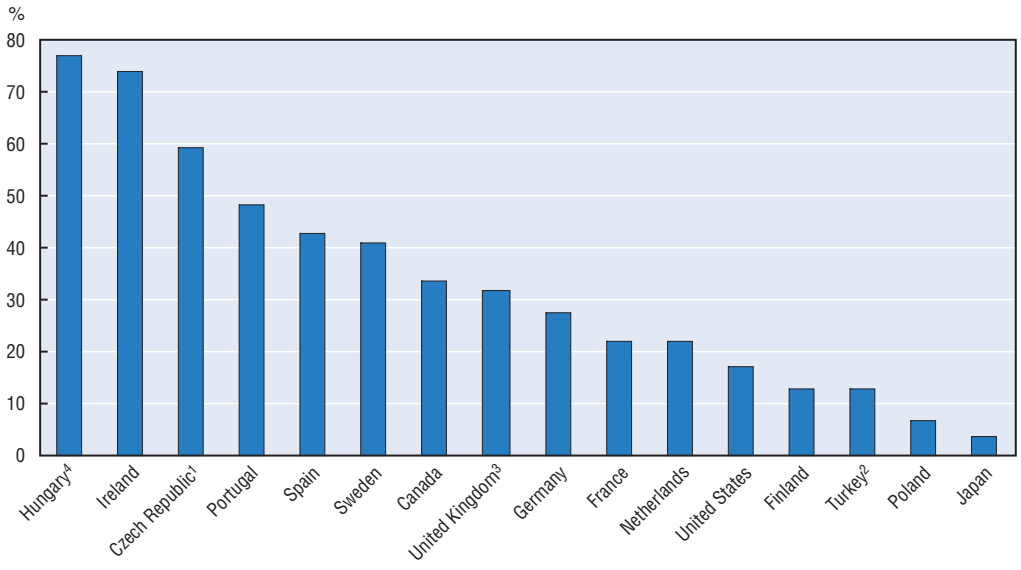
*Source:* OECD FATS Database, July 2004.

domestically based MNEs (*i.e.* parents with affiliates abroad). In turn, this requires two fundamental improvements in the data used to analyse the relative contribution of MNEs to productivity growth:

- F*irm-level micro-data* that allow researchers to differentiate foreign affiliates operating in a country and parents of MNEs based in that country from unaffiliated (uni-national) domestic firms. This level of detail makes it possible to use various statistical techniques that otherwise cannot be applied.
- A*ctivities data* that show the economic activity associated with MNEs, including value added, output, investment, employment and R&D.[2] As compared to better-known data on FDI, which take a balance-of-payments approach and thus represent financial flows, activities data are more akin to structural business statistics and can be linked with other firm-level surveys.

The growing access of researchers to firm-level micro-data on the activities of MNEs provides the basis for previously unattainable empirical insight into the relative contribution of MNEs to productivity growth. Such work brings analytical rigour to poorly understood, politicised subjects such as globalisation and new modes of production such as outsourcing, as well as to efforts to develop regional research areas. While the data and techniques used in recent research differ, limiting the degree to which the findings are comparable, the similarity of results supports the formation of some stylised facts that are important for understanding the role of MNEs in OECD economies. This recent empirical work[3] provides insight in three areas: *i*) the impact of MNEs on productivity, broadly and relative to other forms of corporate organisation; *ii*) the role of MNEs in technology transfer, which in turn leads to productivity gains; and *iii*) the role of MNEs as a catalyst for enterprise dynamics (*e.g.* firm entry, exit, mergers, acquisitions) that generate improvements in productivity. Key conclusions of this work are summarised below.

Figure 6.4. **Share of foreign affiliates in manufacturing R&D**
Percentage of total business R&D




1. 2002.
2. 2000.
3. 1999.
4. 1997.

*Source:* OECD AFA Database, July 2004.

### *Productivity*

Research that differentiates between the relative performance of MNEs and uni-national (or unaffiliated) domestic firms finds that MNEs outperform domestic firms in terms of productivity growth. These result hold even when taking into account a number of so-called fixed effects, such as age of the firm or the industry in which the firm operates. Recent research from the US Federal Reserve Board (Corrado *et al.*, 2003), for example, broke down aggregate productivity growth over time by MNEs and non-MNEs, by form of organisation (*e.g.* corporate vs. non-corporate) and by sector. This technique made possible a breakdown of US productivity performance over the 1990s – a period of significant interest both because of the rise in (non-farm private business) average annual labour productivity growth (Table 6.1) and because other work has attributed a large portion of this increase to investments in information and communication technologies (ICTs) (Sichel and Oliner, 2000). The latter finding spurred interest in whether or not a new economy, driven by new technologies and new business models, was emerging in the United States (OECD, 2000, 2001b).

This research, which compares MNEs in the United States (US parents and foreign affiliates in the United States) to wholly domestically oriented firms, confirms the importance of ICTs as well as the role of complementary factors such as firm organisation. The results indicate that the improvement in US productivity in the second half of the 1990s was not a phenomenon restricted to US firms and was not solely the result of small, innovative high-technology start-ups; in fact, both foreign affiliates and parents of US-based multinationals made important contributions to US productivity over the period. The research found that:

- MNEs *account for about* 30% *of* US *non-farm private business gross product*, a share that has remained relatively unchanged since 1977. This overall stability, however, masks the fact that the share for

Table 6.1. **Labour productivity growth of US non-farm private businesses, by sector**
Average annual rate of change (%)

| | 1977-2000 | 1977-89 | 1989-95 | 1995-2000 |
|---|---|---|---|---|
| Non-farm private business | 1.6 | 1.0 | 1.4 | 3.0 |
| Non-financial corporations | 1.5 | 1.1 | 1.6 | 2.6 |
| MNEs | 3.2 | 2.6 | 2.2 | 5.7 |
| Parents | 3.3 | 2.8 | 2.4 | 5.4 |
| Affiliates of foreign companies | 2.5 | 1.0 | 1.8 | 7.0 |
| Domestically oriented | 0.7 | 0.4 | 1.2 | 0.7 |
| Financial corporations | 1.2 | –0.6 | 2.1 | 4.6 |
| Non-farm non-corporate businesses | 1.6 | 1.1 | 0.7 | 3.9 |

*Source*: Corrado *et al.* (2003).

US parents declined from 27% to 23% over the period, while the share of foreign affiliates increased from 4.7% to 6.4%. Furthermore, since 1997 the sectoral composition of MNE activity in the United States has shifted from manufacturing to services, particularly to wholesale and retail trade, and transportation, communication and public utilities services.[4] The share of gross product attributed to manufacturing declined from 60.5% to 48.5% of total MNE activity during this time period.

- MNE*s in the United States had consistently better labour productivity performance than aggregate non-farm private businesses*. From 1995 to 2000, MNEs averaged 2.7 points higher labour productivity (Table 6.1). When compared to domestically oriented firms (non-farm, non-financial corporations), the difference is even more striking: productivity growth of MNEs outpaced that of unaffiliated firms by 5 percentage points during the second half of the 1990s. Affiliates of foreign firms saw average productivity growth of 7% a year over the second half of the 1990s – the best of any organisational form – more than three times higher than in previous periods (1977-89 and 1989-95).

- MNE*s accounted for nearly all of the pick-up in* US *non-financial corporate labour productivity in the late* 1990*s*. When the aggregate, non-financial corporate productivity growth results are broken down into the shares attributable to different organisational forms and thus reflect their relative weights in the US economy, almost 90% is attributed to MNEs. US-based parents of MNEs accounted for more than two-thirds of this total.

- ICT *manufacturing and services account for most of the pick-up in* MNE *productivity growth between the early and late* 1990*s*. Productivity growth rates for MNEs increased by 1.4 percentage points between the first and second half of the 1990s. MNEs engaged in manufacturing accounted for just less than half of this growth, and nearly all of the increase in manufacturing (0.5 of 0.6 percentage points) was due to the manufacture of ICT equipment (Table 6.2). This contribution was surpassed by that from MNEs whose primary activity was in non-manufacturing industries, which accounted for 0.8 of the 1.4 point increase in the average rate of MNE productivity growth between the early and late 1990s. Domestically oriented, uni-nationals, in contrast, saw their productivity growth rates decline from the first to the second half of the 1990s.[5]

Complementary work in the United Kingdom illustrates that these trends are not limited to the United States. Work comparing the relative productivity performance of three types of firms – US-owned affiliates operating in the United Kingdom, UK-owned MNEs, and foreign affiliates of firms headquartered in third countries – found that the performance of US affiliates operating in the United Kingdom was superior to that of UK-owned MNEs and to affiliates of all other foreign, non-US affiliates combined (Criscuolo and Martin, 2004). UK firms that were not part of an MNE came a distant fourth in

Table 6.2. **Labour productivity growth in US non-financial corporations, by sector and industry**
Percentage points, annual rate

| | 1977-2000 | 1977-89 | 1989-95 | 1995-2000 |
|---|---|---|---|---|
| Non-financial corporations | 1.5 | 1.1 | 1.6 | 2.6 |
| | | *Contributions to growth* | | |
| MNEs | 1.2 | 0.9 | 0.8 | 2.2 |
| Manufacturing | 0.8 | 0.6 | 0.7 | 1.3 |
| IT equipment | 0.5 | 0.4 | 0.4 | 0.9 |
| Other manufacturing | 0.4 | 0.3 | 0.3 | 0.5 |
| Non-manufacturing | 0.4 | 0.2 | 0.1 | 0.9 |
| Domestically oriented | 0.4 | 0.3 | 0.8 | 0.5 |

*Source*: Corrado *et al.* (2003).

relative productivity growth. These findings hold even when controlling for capital intensity, material usage, industry, size and age effects.

The UK analysis indicates that the superior productivity performance of US MNEs (as seen in the US study) was not simply a matter of home country advantage. Nor was it due to the ability of US parents to exert a positive influence on a foreign affiliate through shared assets emanating from the broader enterprise (*e.g.* R&D), or to inherent advantages of being global (*e.g.* cheaper options in hedging against exchange risks). The productivity performance of US MNEs was driven by a greater ability to acquire more productive plants. US firms acquired affiliates that were on average 10% more productive than affiliates acquired by other MNEs. Unanswered questions include whether or not the superior choices of US MNEs resulted from greater cash reserves and/or access to better financial markets which allowed them to out bid rivals for these affiliates.

Other national analyses find further evidence that MNEs exert considerable influence on productivity growth and domestic employment. Work on Belgium (De Backer and Sleuwaegen, 2003) found that foreign affiliates operating in Belgium had marginally higher labour productivity than Belgian MNEs, and that both types of MNEs outperformed uni-national, Belgian firms by about 50% (Table 6.3). Possible reasons for the difference include better access of MNEs to technology, larger scale economies and overall greater efficiency. Research in Japan analysed the relative performance of Japanese-based MNEs (parents) in the manufacturing sector (Matsuura, 2003) *versus* other firms in Japan. This work confirmed that even after controlling for firm characteristics like firm age, R&D intensity, size and the industry in which the firm operates, MNEs achieved labour productivity levels that are 5% to 10% higher than those of firms that lack a foreign affiliate. Contrary to the belief that the MNE productivity premium may have been due to the outsourcing of jobs to

Table 6.3. **Differences in labour productivity in Belgium by type of firm**
Millions of BEF per worker

| | Foreign subsidiaries | Belgian firms | Of *which*: Belgian MNEs | Belgian uni-nationals |
|---|---|---|---|---|
| 1990 | 2 350 | 1 739 | 2 230 | 1 608 |
| 1991 | 2 246 | 1 643 | 2 205 | 1 628 |
| 1992 | 2 464 | 1 742 | 2 245 | 1 654 |
| 1993 | 2 374 | 1 696 | 1 978 | 1 646 |
| 1994 | 2 628 | 1 793 | 2 314 | 1 701 |
| 1995 | 2 707 | 1 808 | 2 527 | 1 741 |

*Source*: De Backer and Sleuwaegen (2003).

low-cost foreign affiliates, the study found that MNEs actually had a higher rate of employment increase at home than non-MNEs.

### *Technology*

Technology is a key driver of productivity growth, and MNEs play a significant role in research and technology development. MNEs tend to be active in technology-intensive industries that require R&D to remain competitive, and they undertake R&D to tailor their products to local markets. Increasingly, firms have sought to undertake R&D abroad to tap into skilled human capital and to absorb research undertaken in the host country. As a result, MNEs are increasingly seen as conduits for the transfer of technology both into the host country and back to the home country. It is widely believed that MNEs make an indirect contribution to host country productivity growth through their production and use of technology that spills over to other businesses in the host country, stimulating their productivity. Previous empirical work has not successfully linked MNE spillovers to local productivity (Mohnen, 2001) perhaps because little is known about the nature and type of technology transferred or produced locally. More recent firm-level analysis sheds additional light on these phenomena.

Firm-level analyses provides additional insight into the role of MNEs in technology diffusion. New studies indicate that successful technology transfer from foreign affiliates to other local firms requires careful attention to inter-firm linkages and cultural differences. A study using Belgian data,[6] for example, found that foreign affiliates are indeed more likely to be active innovators and that nearly two-thirds cite international links as a crucial source of their innovation activities. Nevertheless, the researchers found that access to this channel did not necessarily result in a transfer or spillover of the technology obtained to other local firms. Rather, MNEs tried to limit this leakage through various strategies, including minimising the mobility of personnel by paying higher wages and engaging in FDI or alliances rather than licensing the technology to a local firm. While limited to Belgium and based on an early version of Europe's Community Innovation Survey (CIS), this work suggests that policies that target MNEs in the hope of transferring technology to the local economy need to pay attention to co-operation between foreign subsidiaries and local firms and to capacity building in local firms, so that the country becomes more attractive in terms of exchange of technology and know-how. Other Belgian research (De Backer and Sleuwaegen, 2003) suggests that the greater the "cultural distance" between a foreign affiliate and its host country, the more likely the affiliate is to transfer technology from the parent to compensate for this disadvantage and make them competitive with local firms. This implies that firms from more distant countries would be most interesting to host countries because of the potential technology spillovers to domestic firms.

Sectoral differences also come into play in determining technological spillovers from MNEs. Analysis based on micro-data (Keller and Yeaple, 2003) of the impact of technology spillovers from foreign affiliates on US productivity growth estimated that 14% of US productivity growth between 1987 and 1996 was attributable to technology spillovers emanating from foreign affiliates in the United States. While imports also generated positive technology spillovers, these were found to be weaker than those found for FDI. Not surprisingly, the analysis found that high-technology firms were more likely to generate spillovers than low-technology industries. The results are substantially higher than previous estimates and suggest that this activity is "… large enough to matter substantially in economic terms, that is for productivity growth and welfare" (Keller and Yeaple, 2003, p. 26). The main reason for the difference from previous work is the classification of foreign affiliates in the industries in which they operate in the United States, rather than according to the main activity of the parent enterprise.

While the host country is expected to benefit from spillovers from MNEs conducting R&D on their soil, the MNE's home country can also benefit when new ideas acquired and developed by foreign affiliates are repatriated. There has been less empirical work to date on this reverse flow, but recent firm-level research (Griffith *et al.*, 2004) has looked at the impact of foreign affiliates of UK MNEs based in the United States on UK productivity. It concludes that UK MNEs whose affiliates in the United States were engaged in inventive activities (producing patents) prior to the upsurge in US R&D spending during the 1990s achieved superior productivity. The impact was most pronounced in those industries in which R&D grew faster in the United States than in the United Kingdom and in which the technology

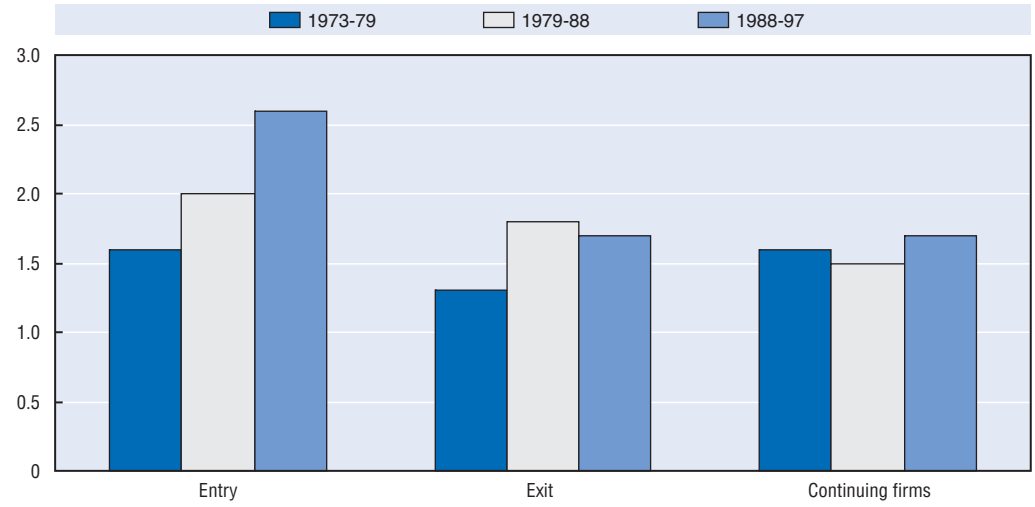
gap between US and UK firms was largest. More generally, the study found that "… total factor productivity in British manufacturing would have been 5 per cent lower in the absence of the growth of US R&D stock in the 1990s" (Griffith *et al.*, 2004, p. 4). From these results, the researchers draw the policy implication that the United Kingdom benefits from R&D labs established in the United States that act as listening posts for new ideas which are then transferred back to the United Kingdom and lead to productivity gains. This suggests that policies aimed at encouraging US-based foreign R&D activity to relocate back to the parent firm's home country may be counterproductive and reduce the ability of domestic firms to benefit from foreign spillovers.

### *Enterprise dynamics*

MNEs can also influence productivity growth by contributing to enterprise dynamics in the host country. Competition and the churning of businesses reward efficient firms and force out inefficient ones, boosting overall productivity. This can manifest itself in a number of ways, including through the creation of new firms (foreign affiliates), takeover of existing firms (mergers and acquisitions) and closure of inefficient firms. Previous OECD analysis has demonstrated that entry and exit of firms is an important driver of productivity growth, as new firms often use a more efficient mix of labour and capital than existing firms and obsolete firms exit industry sectors (OECD 2001b).

Firm-level research focused on Canada (Baldwin and Gu, 2002) highlights the importance of MNEs in contributing to productivity growth in this way. A study of the contribution of enterprise dynamics to manufacturing labour productivity growth over three time periods (1973-79, 1979-88 and 1988-97) found the impact of plant entry and exit on productivity growth to be significant but decreasing over time: plant turnover contributed a quarter of productivity growth in 1973-79, 20% in 1979-88, and 15-20% in 1988-97. Breaking down the results by type of ownership revealed that almost all of the impact of plant turnover on productivity growth was due to the entry and exit of plants controlled by multi-plant firms (large firms). These multi-plant firms accounted for 85% of total Canadian productivity growth during the 1973-79 period and 90% of the growth in 1979-88 and 1988-97. Foreign-owned plants were particularly important. While accounting for a relatively small share of all plants (6% of entrants, 8% of exits), foreign-controlled plants accounted for 20% to 28% of employment and 40% of output associated

Figure 6.5. **Relative productivity of foreign-controlled to domestically controlled plants**
Ratio of productivity of foreign-controlled to domestically controlled plants




*Source:* Baldwin and Gu (2002).

with plant turnover. As a consequence, foreign-controlled plants accounted for 60% of the contribution to productivity growth attributable to enterprise dynamics between 1988 and 1997. Moreover, their productivity increased relative to that of domestic entrants over the period (Figure 6.5). The productivity of foreign-owned plants was 1.6 times that of domestic entrants in the 1970s, a figure that had increased to 2.6 times by the 1990s. As a result, about 12%, or 0.35 percentage points, of the annual average growth in labour productivity was due to the opening and closing of plants by foreign-controlled firms.

These results indicate that while the overall impact of enterprise dynamics on Canadian labour productivity may have weakened, the decline is attributable to domestic plants. Entry and exit of foreign-controlled plants have exerted a growing influence on productivity growth over time. The authors attribute this effect to trade liberalisation adjustments that have been taking place over a quarter of a century and have led to the entry of foreign-controlled plants that are relatively more productive than both the previous cohort of foreign-controlled plants and domestically controlled plants.

The entry of a MNE into a domestic economy can contribute to performance not only through its direct contribution to overall productivity gains, but also through indirect effects. The presence of a foreign affiliate, for example, can create business opportunities for other new entrants that supply the foreign affiliate, as well as for other new entrants that benefit from the overall increase in income and spending resulting from the affiliate. The additional supply can also lower prices in the final goods market, encouraging further domestic entry. Work on the Irish economy (Breathnach and Ströbl, 2003)suggests that the influx of foreign affiliates in Irish manufacturing has increased the population of domestic entrants by 30%. A 1% increase in the number of foreign affiliates increased total entry by 6.1%. These results may be influenced by the structure of the Irish economy, which did not contain significant domestic competition in many of the high-technology sectors that have attracted considerable foreign investment. If domestic competition had been higher, foreign entry could have displaced some domestic production. Nevertheless, the results provide some measure of the contribution of MNEs to domestic entry in emerging markets.

**Conclusions and implications**

Recent empirical work that makes use of firm-level data and data on the activities of MNEs underscores their importance to OECD economies. A few of the stylised facts that emerge include:

- MNE*s are important contributors to productivity growth*. Both MNE parents based in a specific country and affiliates operating in host countries are responsible for a large and growing share of all productivity growth. Their contribution consistently outpaces that of uni-national or unaffiliated domestic firms. Nevertheless, the variance observed across countries in the impact of MNEs on productivity gains relative to those registered by domestic firms without any foreign affiliates is large because of different concepts of productivity, different time periods and different effects (*e.g.* impact of entry versus contribution of technology spillovers).
- MNE*s are important conduits for technology*. Technological know-how can spill over to host countries, but such spillovers are far from automatic and their importance varies, depending on the nature of the firms involved and the sectors in which they operate. Spillovers can move in both directions, helping not only domestic firms that benefit from foreign affiliates, but also the foreign affiliates who absorb know-how from the host country and transfer it back to the home country of the parent.
- MNE*s contribute to productivity growth by stimulating enterprise dynamics*. Through the creation of new businesses, the takeover of existing firms and the shutting down of companies, they contribute to competition and the winnowing out of inefficient and low-productivity firms. The importance of MNEs in this productivity-improving churning process appears to be growing over time.

These results have clear implications for current issues confronting policy makers: concerns about the benefits of foreign affiliates accruing mostly to the parent country; outsourcing as the source of local

job losses and reductions in productivity; and the notion of attracting affiliates of MNEs operating aboard back home so as to build a regional research area. As illustrated, foreign affiliates can have a significant positive impact on their host countries. A large share of the US gain in productivity in the second half of the 1990s was attributable not to domestic US firms or US parents of MNEs but to foreign affiliates operating in the United States. Similarly, in Canada, foreign-controlled plants accounted for most of the productivity growth attributable to enterprise dynamics between 1988 and 1997. In Ireland they contributed to the creation of domestic firms. While R&D spillovers may not be automatic, as was the case in Belgium, close attention to patterns of co-operation and efforts to build local technological capacity can improve them.

At the same time, foreign affiliates can generate benefits for their home countries, thereby compensating for some of the apparent disadvantages of outsourcing. Some of the current debate about outsourcing is fuelled by concerns that, unlike previous episodes in which outsourced work was low-wage or dangerous, the current phase is characterised by the transfer of professional work, such as software development, and of strategic activities like R&D. As recent analyses show, such outsourcing not only results in an outward movement of activity from the home country, but also generates benefits as knowledge from abroad flows into the home country. This is readily apparent from the work on the United Kingdom which highlights the benefits to the parent firm (and the UK economy) of their R&D affiliates abroad.

In this sense, efforts to attract back or repatriate foreign affiliates, especially those seen as strategic (*e.g.* R&D laboratories) so as to bolster national or regional performance may not be an effective way to strengthen domestic economies. Foreign affiliates play an important role in acquiring and transmitting foreign knowledge that can be sent back to the parent enterprise and other affiliates in the group. By appropriating results of R&D conducted by others abroad, foreign affiliates may contribute more to

### Box 6.1. Improving statistics on MNEs

A problem inherent in efforts to understand the behaviour of MNEs is the fact that statistical agencies are nationally bound while MNEs operate in a number of countries. As a consequence, it is difficult to have a complete overview of an MNE's operations. Potential solutions to this problem have been discussed at various international statistical meetings, such as the 2003 meeting of the Conference of European Statisticians in June 2003. At that meeting, proposals included the broader adoption of a US-style approach to measuring foreign affiliates, whereby inward as well as outward investments are measured and questions are asked about relationships between affiliates (vertical vs. horizontal links), intra-firm trade and the distribution of assets (Lynch and Clayton, 2003). While adopting this approach would certainly improve the overall level and quality of MNE data, it would be an expensive undertaking and confidentiality restrictions might limit the compilation of the micro-data, making it impossible to observe the worldwide affairs of an individual enterprise.

Another proposal (Barnabe, 2003) concerns a pilot project in which a few MNEs would agree to have multiple national statistical offices send information to the national statistical office in which the MNE is headquartered. The experiment would allow statistical agencies to refine their data collection efforts to better match the realities of MNE accounting systems, and align their surveys on the information systems that these firms use. While potentially saving national statistical offices money, the system could also reduce the reporting burden on MNEs, although it would require willingness on their part to allow international sharing of confidential micro-data.

A more modest but important step would be further harmonisation of existing data and methods and promoting the greater adoption of the activities approach to measuring multinational enterprises. Recent efforts by a working group under the auspices of the OECD in collaboration with Eurostat and other international organisations have resulted in the production of a handbook that provides guidance to compilers of statistics and recommends the creation of a common core set of reference indicators (see *Handbook on Economic Globalisation Indicators*, OECD, forthcoming).

national or regional performance than if they were located in their home country. Such affiliates are located abroad to tap into knowledge created in foreign centres of excellence. Breaking links to such centres may undermine MNEs' overall innovation activities. A more effective strategy may be to build up local centres of excellence that can attract affiliates of foreign MNEs and encourage domestic firms to maintain a local R&D presence. The way to entice companies to invest in R&D in a particular region is to make the local area a strong supplier of knowledge or other critical resources.[7]

As with any new work, firm-level analysis of MNEs provides additional insight but raises many new questions. One area meriting further research is why the productivity performance of MNEs is superior to that of uni-national or unaffiliated firms. The evidence on the relevant factors is mixed and is not measured in a standard manner. Another issue concerns ownership – affiliates of US MNEs in the United Kingdom appear to perform better than the affiliates of firms from other countries. Is this true in other countries? If so, why? Furthermore, additional research is needed on the role of MNEs in the service sector. Much of the research to date looks exclusively at the manufacturing sector. Given the large share of services in all OECD economies, the productivity of service sector firms must increase if there is to be aggregate improvement. Lastly, there is growing interest in better understanding of the use of offshore outsourcing by MNEs as a means to improve their worldwide productivity. This requires an overall micro-level view of the firm which is difficult to achieve with current data. Additional efforts to improve firm-level statistics on MNEs will be needed to make progress in this area (Box 6.1).

## NOTES

1. The OECD Workshop on Multinational Enterprises and Productivity Growth was held in Paris on 5 November 2003 and included contributions from researchers from Belgium, Canada, Japan, the Netherlands, Spain, the United Kingdom and the United States.
2. OECD working groups in co-operation with Eurostat have been engaged in developing MNE activity data since 1992 and have developed two databases, one for manufacturing and another for services that compile this type of data on a sectoral basis.
3. This chapter is largely based on the OECD Workshop mentioned in note 1.
4. From this base, labour productivity growth rates for non-financial corporations were calculated for the period1977-2000 and then broken down into sub-periods as well as by corporate status.
5. These findings confirm earlier work (Oliner and Sichel, 2001), which showed that ICT-producing sectors and service industries that made use of ICT were the main engines of productivity improvement in the United States during the 1990s. The new work reviewed here reveals that these gains were predominately achieved by MNEs.
6. This work linked MNE micro-data to results from the Community Innovation Survey. See Veugelers and Cassiman, 2002).
7. As Griffith *et al.* (2004) indicate, this phenomenon means that methods that aim to aggressively induce European firms to relocate their foreign R&D labs back in Europe so as to help achieve the target of 3% R&D intensity as set out in the Barcelona Objective could be counterproductive for improving economic performance.

## REFERENCES


Aitken, B. and A. Harrison (1999), "Do Domestic Firms Benefit from Foreign Investment? Evidence from Venezuela,"*American Economic Review*, 89, pp. 605-618.

Baldwin, J. and W. Gu (2002), "Plant Turnover and Productivity Growth in Canadian Manufacturing", STI Working Paper 2002/2, OECD, Paris, *www.oecd.org/sti/working-papers*.

Barnabe, R. (2003), "Seeing the Whole Elephant: A Proposed Experiment on Measuring the Activities of Multinational Enterprises", CES/2003/13. Available at: *www.unece.org/stats/documents/*2003.06.*ces.htm*.

Breathnach, M. and E. Ströbl (2003), "Multinationals and Indigenous Plant Start-ups in Irish Manufacturing", DSTI/EAS/IND/SWP/AH(2003)7.

Corrado, C., P. Lengermann and L. Slifman (2003), "The Contribution of MNCs to US Productivity Growth", DSTI/EAS/IND/SWP/AH(2003)2.

Criscuolo, C. and R. Martin (2003), "Multinationals and US Productivity Leadership: Evidence from Great Britain", STI Working Paper 2004/5, OECD, Paris, *www.oecd.org/sti/working-papers*.

De Backer, K. and L. Sleuwaegen, "A Closer Look at the Productivity Advantage of Foreign Affiliates", DSTI/EAS/IND/SWP/AH(2003)4.

Griffith, R., R. Harrison and J. Van Reenen (2004), "How Special is the Special Relationship? Using the Impact of US R&D Spillovers on UK Firms as a Test of Technology Sourcing", 9 May, mimeo.

Keller W. and S. Yeaple (2003), "Multinational Enterprises, International Trade, and Productivity Growth: Firm-level Evidence from the United States", NBER Working Paper 9504, *www.nber.org/papers/w*9504.

Lynch, R. and T. Clayton (2003), "Globalisation – New Needs for Statistical Measurement", CES/2003/17 forthcoming in *Statistical Journal of the United Nations*. Available at: *www.unece.org/stats/documents/*2003.06.*ces.htm*.

Matsuura, T. (2003), "The Effects of FDI on Employment and Productivity: Evidence from Japanese Micro data", DSTI/EAS/IND/SWP/AH(2003)6.

Mohnen, P., (2001), "International R&D Spillovers and Economic Growth", in M. Pohjola (ed.) *Information Technology, Productivity and Economic Growth*, Oxford University Press, Oxford.

O'Rourke, K.H. and J.G. Williamson (2000), "When Did Globalization Begin", National Bureau of Economic Research, Working Paper 7632, Cambridge, Massachusetts, April. Also available at *www.nber.org/papers/w*7632.

OECD (2000), *A New Economy? The Changing Role of Innovation and Information Technologies*, OECD, Paris.

OECD (2001a), *Measuring Globalisation*, Vols. 1 and 2, OECD, Paris.

OECD (2001b), *The New Economy: Beyond the Hype*, OECD, Paris.

OECD (2003), *Science, Technology and Industry Scoreboard* 2003, OECD, Paris.

Oliner, S.D. and D.E. Sichel (2000), "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?", *Journal of Economic Perspectives*, Fall, 14, pp. 3-22.

Veugelers, R. and B. Cassiman (2002), "Foreign Subsidiaries as Channel of International Technology Diffusion: Some Direct Firm-level Evidence from Belgium", CEPR Discussion Paper 2337, Revised version November, forthcoming in *The European Economic Review*.

*Statistical Annex*

# MAIN OECD DATABASES USED

**Databases maintained by the Directorate for Science, Technology and Industry (DSTI)**

## *Industrial structure and performance*

**STAN:** The database for **Industrial Analysis** includes annual measures of output, labour input, investment and international trade which allow users to construct a wide range of indicators focused on areas such as productivity growth, competitiveness and general structural change. The industry list provides sufficient details to enable users to highlight high-technology sectors and is compatible with those used in related OECD databases. STAN is primarily based on member countries' annual National Accounts by activity tables and uses data from other sources, such as national industrial surveys/censuses, to estimate any missing detail. Since many of the data points in STAN are estimated, they do not represent the official member country submissions.

The latest version of STAN is based on the International Standard Industrial Classification (ISIC) Rev. 3 and covers all activities (including services). Further details on STAN are available on the Internet at: *www.oecd.org/sti/stan*.

P*ublication*: STAN is available on line on SourceOECD (*www.sourceoecd.org*), updated on a "rolling" basis (*i.e.* new tables are posted as soon as they are ready) to maximise timeliness. In May 2004, a CDROM was published providing a snapshot of the STAN industrial database together with related databases covering R&D Expenditure and Bilateral Trade by industry (ANBERD and BTD) as well as a set of derived indicators (*http://oecdpublications.gfi-nb.com/cgi-bin/*OECDB*ookShop.storefront*/EN/*product*/922004063C3).

## *Science and technology*

**R&D and TBP:** The **R&D** database contains the full results of the OECD surveys on **R&D expenditure and personnel** from the 1960s. The **TBP** database presents information on the **technology balance of payments**. These databases serve, *inter alia*, as the raw material for both the ANBERD and MSTI databases.

P*ublication*: OECD (2004), *Research and Development Statistics*: 2003 E*dition*. Annual on CD-ROM (a printed edition is also available every two years).

**MSTI:** The **Main Science and Technology Indicators** database provides a selection of the most frequently used annual data on the scientific and technological performance of OECD member countries and eight non-member economies (Argentina, China, Israel, Romania, Russian Federation, Singapore, Slovenia, Chinese Taipei). The indicators, expressed in the form of ratios, percentages, growth rates, cover resources devoted to R&D, patent families, technology balance of payments and international trade in highly R&D-intensive industries.

P*ublication*: OECD (2004), *Main Science and Technology Indicators* 2004/1. Biannual. Also available on CD-ROM.

**ANBERD:** The **Analytical Business Enterprise Research and Development** database is an estimated database constructed with a view to creating a consistent data set that overcomes the problems of international comparability and time discontinuity associated with the official business enterprise R&D data provided to the OECD by its member countries. ANBERD contains R&D expenditures for the period 1987-2001, by industry (ISIC Rev. 3), for 19 OECD countries.

P*ublication*: OECD (forthcoming), *Research and Development Expenditure in Industry*, 1987-2002. Annual. Also available on line and on the CD-Rom STAN Structural Analysis databases (*http://oecdpublications.gfi-nb.com/cgi-bin/*OECDB*ookShop.storefront*/EN/*product*/922004063C3).

**Patent database:** This database contains patents filed at the largest national patent offices – European Patent Office (EPO); US Patent and Trademark Office (USPTO); Japanese Patent Office (JPO) – and other national or regional offices. Each patent is referenced by: patent numbers and dates (publication, application and priority); names and countries of residence of the applicants and of the inventors; and technological categories, using the national patent classification as well as the International Patent Classification (IPC). The compiled indicators mainly refer to single patent counts in a selected patent office, as well as counts of "triadic" patent families (patents filed at the EPO, the USPTO and the JPO to protect a single invention).

The series are published on a regular basis in OECD, *Main Science and Technology Indicators*.

### *Globalisation and international trade*

**AFA:** The **Activities of Foreign Affiliates** database presents detailed data on the performance of foreign affiliates in the manufacturing industry of OECD countries (inward and outward investment). The data indicate the increasing importance of foreign affiliates in the economies of host countries, particularly in production, employment, value added, research and development, exports, wages and salaries. AFA contains 18 variables broken down by partner country and by industrial sector (based on ISIC Rev. 3) for 22 OECD countries.

*Publication*: OECD, *Measuring Globalisation: The Role of Multinationals in* OECD *Economies*, 2001 Edition. Vol. I: Manufacturing. Biennial. Also available on line on SourceOECD (*www.sourceoecd.org*).

**FATS:** This database gives detailed data on the **activities of foreign affiliates** in the **service** sector of OECD countries (inward and outward investment). The data indicate the increasing importance of foreign affiliates in the economies of host countries and of affiliates of national firms implanted abroad. FATS contains five variables (production, employment, value added, imports and exports) broken down by country of origin (inward investments) or implantation (outward investments) and by industrial sector (based on ISIC Rev. 3) for 19 OECD countries.

*Publication*: OECD, *Measuring Globalisation: The Role of Multinationals in* OECD *Economies*, 2001 Edition. Vol. II: Services. Biennial. Soon available on line.

**Bilateral Trade (BTD):** This database for industrial analysis includes detailed trade flows by manufacturing industry between a set of OECD *declaring* countries and a selection of *partner* countries and geographical regions. Data are presented in thousands of USD at current prices, and cover the period 1988-2001. The data have been derived from the OECD database *International Trade by Commodities Statistics* (ITCS – formerly *Foreign Trade Statistics* or FTS). Imports and exports are grouped according to the country of origin and the country of destination of the goods. The data have been converted from product classification schemes to an activity classification scheme based on ISIC Rev.3, that matches the classification currently used for the OECD's STAN, Input-Output tables and ANBERD databases.

*Publication*: OECD, *Bilateral Trade Database*, 2002. Also available on CD-ROM with STAN and ANBERD databases (*http://oecdpublications.gfi-nb.com/cgi-bin/*OECDBookShop.storefront/EN/*product*/922004063C3).

### *Information and communication technology* (ICT)

**Telecommunications:** This database is produced in association with the biennial *Communications Outlook*. It provides time-series data covering all OECD countries for the period 1980-2001. It contains both telecommunication and economic indicators.

*Publication*: OECD (2003), *Telecommunications Database* 2003. Only available on diskette and CD-ROM.

**ICT:** Work is under way to develop a database on ICT supply and ICT usage statistics. Statistics on employment, value added, production, wages and salaries, number of enterprises, R&D, imports and exports for the ICT sector are been collected following the OECD ICT sector definition based on ISIC Rev. 3.

*Publication*: OECD (2002), *Measuring the Information Economy*, 2002. Freely available as a Web book with "clickable" access to the data used in charts and figures at: *www.oecd.org/sti/measuring-infoeconomy*.

**Current country coverage of main DSTI databases used in this publication**

| | Industry | Science and technology | | | | | Globalisation | | | ICT |
|---|---|---|---|---|---|---|---|---|---|---|
| | STAN | R&D | TBP | MSTI | ANBERD | Patents | AFA | FATS | BTD | Telecom. |
| Australia | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Austria | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Belgium | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Canada | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Czech Republic | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Denmark | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Finland | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| France | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Germany | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Greece | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hungary | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Iceland | | ✓ | | ✓ | | ✓ | | | ✓ | ✓ |
| Ireland | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Italy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Japan | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Korea | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Luxembourg | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Mexico | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Netherlands | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| New Zealand | ✓ | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ |
| Norway | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Poland | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Portugal | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Slovak Republic | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Spain | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Sweden | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Switzerland | | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ |
| Turkey | | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| United Kingdom | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| United States | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

**Other OECD databases**

**ADB:** Analytical DataBase (Economics Department).

**ANA:** Annual National Accounts (Statistics Directorate).

**Education database** (Directorate for Education).

**ITCS:** International Trade in Commodities Statistics (Statistics Directorate).

**International Direct Investment** (Directorate for Financial, Fiscal and Enterprise Affairs).

**LFS:** Labour Force Statistics (Statistics Directorate).

**SSIS:** Structural Statistics for Industry and Services (Statistics Directorate).

**Services:** Value Added and Employment (Statistics Directorate).

Further details on OECD statistics are available on the Internet at: *www.oecd.org/statistics/*.

## STANDARD STATISTICAL NOTES USED IN THIS PUBLICATION FOR SCIENCE AND TECHNOLOGY INDICATORS

*a*) Break in series with previous year.
*b*) Estimate.
*c*) Defence excluded (all or mostly).
*d*) Including R&D in the social sciences and humanities.
*e*) Excluding R&D in the social sciences and humanities.
*f*) Federal or central government only.
*g*) Excludes data for the R&D content of general payment to the higher education sector for combined education and research.
*h*) Excludes most or all capital expenditure.
*i*) Total intramural R&D expenditure instead of current intramural R&D expenditure.
*j*) Overestimated or based on overestimated data.
*k*) Underestimated or based on underestimated data.
*l*) Included elsewhere.
*m*) Includes other classes.
*n*) Provisional.
*o*) At current exchange rate and not at current purchasing power parities.
*p*) Unrevised breakdown not adding to the revised total.
*q*) Does not correspond exactly to the OECD recommendations.
*r*) Including extramural R&D expenditure.

## STANDARD INDUSTRY AGGREGATION BY TECHNOLOGY LEVEL

(*based on* ISIC Revision3)

The *high-technology* industries (HT) are defined as the sum of:

- Pharmaceuticals (2423),
- Office and computing machinery (30),
- Radio, TV and communication equipment (32),
- Medical, precision and optical equipment (33),
- Aircraft and spacecraft (353).

The *medium-high-technology* industries (MHT) are defined as the sum of:

- Chemicals excluding pharmaceuticals (24 excl. 2423),
- Machinery and equipment (29),
- Electrical machinery and apparatus (31),
- Motor vehicles and trailers (34),
- Railroad and transport equipment (352+359).

The *medium-low-technology* industries (MLT) are defined as the sum of:

- Coke, refined petroleum products and nuclear fuel (23),
- Rubber and plastic products (25),
- Other non-metallic mineral products (26),
- Basic metals (27),
- Fabricated metal products except machinery and equipment (28),
- Building and repairing of ships and boats (351).

The *low-technology industries* (LT) are defined as the sum of:

- Food products, beverages and tobacco (15-16),
- Textiles, textile products, leather and footwear (17-19),
- Wood, pulp, paper, paper products, printing and publishing (20-22),
- Manufacturing n.e.c. and recycling (36-37).

# ANNEX TABLES

**Table 1. Breakdown of GDP per capita into its components, 1990-2003**

United States = 100

| | GDP per capita (US=100) | | Effect of labour force participation (%) | | | | | | | | | | GDP per person employed (US=100) | | GDP per hour worked (US=100) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total effect | | Working-age population[1] to total population | | Labour force to working-age population | | Unemployment | | Working hours | | | | | |
| | (1) | | (2) | | (3) | | (4) | | (5) | | (6) | | (7) | | (8)=(1)-(2) | |
| | 1990 | 2003 | 1990 | 2003 | 1990 | 2003 | 1990 | 2003 | 1990 | 2003 | 1990 | 2003 | 1990 | 2003 | 1990 | 2003 |
| Australia[2] | 73 | 78 | -1 | 1 | -10 | -10 | 9 | 11 | -1 | 0 | 1 | 1 | 75 | 77 | 73 | 77 |
| Austria | 82 | 79 | - | - | -10 | -9 | 14 | 14 | 1 | 0 | - | -13 | 77 | 74 | - | 87 |
| Belgium | 78 | 76 | -26 | -30 | -10 | -12 | -6 | 1 | -1 | -2 | -9 | -17 | 95 | 89 | 104 | 106 |
| Canada | 83 | 83 | -3 | 3 | -12 | -10 | 14 | 15 | -2 | -1 | -2 | -2 | 83 | 79 | 86 | 81 |
| Czech Republic | 48 | 43 | 1 | 2 | -7 | -3 | 7 | 3 | 1 | -1 | - | 3 | 47 | 44 | - | 41 |
| Denmark | 79 | 80 | -11 | -14 | -10 | -12 | 17 | 16 | -1 | 0 | -17 | -19 | 73 | 75 | 90 | 93 |
| Finland | 78 | 73 | -1 | -9 | -10 | -10 | 12 | 9 | 2 | -2 | -5 | -6 | 74 | 77 | 79 | 82 |
| France | 79 | 77 | -25 | -30 | -12 | -13 | 0 | 5 | -3 | -3 | -10 | -19 | 94 | 88 | 104 | 106 |
| Germany | 96 | 70 | -14 | -19 | -9 | -9 | 8 | 10 | 1 | -2 | -14 | -18 | 95 | 72 | 110 | 90 |
| Greece | 49 | 54 | -12 | -10 | -9 | -10 | -5 | -1 | -1 | -2 | 3 | 4 | 64 | 67 | 61 | 63 |
| Hungary[3] | 35 | 39 | -3 | -9 | -5 | -4 | 1 | -5 | 1 | 0 | - | - | 38 | 48 | - | - |
| Iceland | 87 | 80 | 10 | 12 | -15 | -12 | 23 | 21 | 3 | 2 | 0 | 0 | 77 | 69 | 77 | 68 |
| Ireland | 56 | 90 | -21 | -13 | -13 | -11 | -5 | 5 | -6 | 1 | 4 | -8 | 80 | 94 | 77 | 102 |
| Italy | 75 | 70 | -31 | -29 | -9 | -9 | -9 | -6 | -4 | -3 | -9 | -12 | 97 | 88 | 106 | 100 |
| Japan[2] | 81 | 74 | 12 | 3 | -7 | -8 | 9 | 12 | 3 | 0 | 7 | 0 | 76 | 71 | 69 | 71 |
| Korea | 32 | 47 | -4 | -1 | -3 | -3 | -2 | 1 | 1 | 1 | - | - | 36 | 48 | - | - |
| Luxembourg | 108 | 137 | -14 | -13 | -10 | -18 | -9 | 2 | 6 | 4 | - | - | 122 | 150 | - | - |
| Mexico | 27 | 26 | -47 | -35 | -32 | -27 | -17 | -10 | 2 | 2 | - | 1 | 74 | 61 | - | 60 |
| Netherlands | 77 | 80 | -46 | -37 | -8 | -9 | -12 | 1 | 0 | 3 | -26 | -31 | 97 | 86 | 123 | 117 |
| New Zealand | 60 | 62 | -7 | 1 | -2 | 0 | -3 | 0 | -2 | 1 | -1 | 0 | 66 | 61 | 67 | 61 |
| Norway | 78 | 96 | -21 | -27 | -13 | -16 | 13 | 20 | 0 | 1 | -22 | -32 | 77 | 92 | 99 | 123 |
| Poland | 26 | 31 | -4 | -7 | -4 | -2 | - | -2 | - | -6 | - | 3 | - | 41 | - | 38 |
| Portugal | 46 | 49 | -2 | -3 | -7 | -6 | 4 | 7 | 0 | 0 | 1 | -4 | 49 | 48 | 48 | 53 |
| Slovak Republic[4] | 28 | 35 | -5 | -6 | -4 | -3 | 1 | 2 | -3 | -5 | - | 0 | 33 | 41 | - | 41 |
| Spain | 57 | 62 | -24 | -10 | -9 | -8 | -10 | 3 | -5 | -4 | 0 | 0 | 81 | 72 | 81 | 72 |
| Sweden | 81 | 75 | -6 | -13 | -14 | -13 | 19 | 12 | 3 | 1 | -14 | -13 | 74 | 75 | 87 | 88 |
| Switzerland | 107 | 82 | 8 | 3 | -11 | -10 | 27 | 23 | 5 | 1 | -12 | -11 | 86 | 68 | 98 | 80 |
| Turkey | 20 | 18 | -8 | -10 | -5 | -3 | -2 | -6 | -1 | -1 | - | - | 28 | 29 | - | - |
| United Kingdom | 71 | 78 | -4 | -5 | -11 | -12 | 11 | 12 | 0 | 1 | -3 | -6 | 72 | 77 | 75 | 83 |
| United States | 100 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 |
| **Total OECD** | **69** | **81** | **-28** | **-9** | **-10** | **2** | **-3** | **2** | **1** | **-1** | **-17** | **-13** | **81** | **77** | **97** | **90** |
| **EU-25[4]** | **65** | **69** | **-11** | **-4** | **-9** | **-6** | **1** | **4** | **-4** | **-2** | **-** | **-** | **76** | **73** | **-** | **-** |
| **EU-15** | **76** | **75** | **-20** | **-15** | **-10** | **-7** | **1** | **6** | **-1** | **-2** | **-10** | **-12** | **86** | **78** | **96** | **90** |

1. 15-64 years. 2. 2002 instead of 2003. 3. 1991 instead of 1990. 4. 1994 instead of 1990.

*Source:* OECD, GDP from National Accounts database; other data from *OECD Economic Outlook* 75, 2004.
Complementary estimates for hours worked from *OECD Employment Outlook*, 2004.

StatLink: http://dx.doi.org/10.1787/515628628843

## Table 2. Income and productivity levels in the OECD, 1950-2002

| | GDP per capita (US=100) | | | | | | GDP per hour worked (US=100) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1950 | 1973 | 1980 | 1990 | 2000 | 2003 | 1950 | 1973 | 1980 | 1990 | 2000 | 2003 |
| Australia[1] | 77 | 76 | 75 | 73 | 74 | 78 | 72 | 69 | 72 | 73 | 77 | 77 |
| Austria | 42 | 73 | 81 | 82 | 79 | 79 | - | - | - | - | 90 | 87 |
| Belgium | 60 | 76 | 81 | 78 | 73 | 76 | 59 | 85 | 102 | 104 | 108 | 106 |
| Canada | 81 | 86 | 91 | 83 | 80 | 83 | 85 | 86 | 88 | 86 | 84 | 81 |
| Czech Republic | 50 | 57 | 58 | 48 | 39 | 43 | - | - | - | - | 37 | 41 |
| Denmark | 80 | 91 | 87 | 79 | 79 | 80 | 60 | 81 | 89 | 90 | 95 | 93 |
| Finland | 46 | 69 | 74 | 78 | 72 | 73 | 35 | 60 | 64 | 79 | 84 | 82 |
| France | 55 | 78 | 82 | 79 | 73 | 77 | 46 | 77 | 88 | 104 | 103 | 106 |
| Germany | 42 | 74 | 78 | 96 | 70 | 70 | 39 | 76 | 88 | 110 | 92 | 90 |
| Greece | 24 | 56 | 57 | 49 | 47 | 54 | - | - | - | 61 | 60 | 63 |
| Hungary[2] | 39 | 51 | 43 | 35 | 33 | 39 | - | - | - | - | - | - |
| Iceland | - | 72 | 87 | 87 | 79 | 80 | - | 59 | 74 | 77 | 69 | 68 |
| Ireland | 38 | 43 | 49 | 56 | 79 | 90 | - | 46 | 58 | 77 | 96 | 102 |
| Italy | 41 | 70 | 78 | 75 | 70 | 70 | 43 | 83 | 97 | 106 | 108 | 100 |
| Japan | 20 | 67 | 71 | 81 | 73 | - | 15 | 47 | 55 | 69 | 72 | 72 |
| Korea | 9 | 15 | 20 | 32 | 43 | 47 | 7 | 10 | 16 | - | - | - |
| Luxembourg | - | 98 | 92 | 108 | 137 | 137 | - | - | - | - | - | - |
| Mexico | 27 | 31 | 35 | 27 | 26 | 26 | 31 | 42 | - | - | 63 | 60 |
| Netherlands | 67 | 83 | 84 | 77 | 76 | - | 59 | 92 | 106 | 123 | 116 | 117 |
| New Zealand | 94 | 79 | 68 | 60 | 58 | 62 | - | 81 | 71 | 67 | 63 | 61 |
| Norway | 63 | 74 | 91 | 78 | 101 | 96 | 57 | 79 | 101 | 99 | 133 | 123 |
| Poland | 29 | 36 | 35 | 26 | 29 | 31 | - | - | - | - | 35 | 38 |
| Portugal | 22 | 44 | 43 | 46 | 48 | 49 | 19 | 40 | - | 48 | 53 | 53 |
| Slovak Republic | 38 | 43 | 44 | - | 30 | 35 | - | - | - | - | 35 | 41 |
| Spain | 28 | 57 | 56 | 57 | 57 | 62 | 25 | 56 | 69 | 81 | 75 | 72 |
| Sweden | 69 | 78 | 78 | 81 | 75 | 75 | 58 | 79 | 83 | 87 | 90 | 88 |
| Switzerland | 100 | 114 | 106 | 107 | 84 | 82 | 86 | 96 | 101 | 98 | 86 | 80 |
| Turkey | 15 | 17 | 17 | 20 | 19 | 18 | - | - | - | - | - | - |
| United Kingdom | 72 | 72 | 69 | 71 | 71 | 78 | 61 | 64 | 70 | 75 | 81 | 83 |
| *United States* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* | *100* |

1. 2002 instead of 2003. 2. 1991 instead of 1990.

*Source*: Previous annex; *OECD Science, Technology and Industry Scoreboard,* 2003.

StatLink: http://dx.doi.org/10.1787/482201516226

**Table 3. Gross R&D expenditures, 1981-2003**

Millions constant USD (1995 PPPs)

| | 1981 | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| Australia[1, 2] | 2 362 | 5 141 | 6 570 | 7 107 | - | - | - |
| Austria | 1 457 | 2 488 [b] | 2 821 [b] | 3 855 [b] | 4 019 [b,n] | 4 098 [b,n] | 4 131 [b,n] |
| Belgium[3] | 2 605 [a] | 3 350 [b] | 3 762 | 5 110 | 5 488 | - | - |
| Canada | 5 843 | 9 373 | 11 250 | 15 373 | 16 529 | 16 072 [n] | 16 065 [b,n] |
| Czech Republic | - | 2 324 [c,q] | 1 257 [a] | 1 760 | 1 771 | 1 800 | - |
| Denmark[4] | 945 | 1 773 | 2 159 | 2 854 | 3 272 | 3 471 | - |
| Finland | 904 [a] | 1 938 [a] | 2 218 | 4 162 | 4 221 | 4 374 | - |
| France | 17 870 [a] | 27 961 | 28 461 | 30 646 [a] | 31 994 | 31 923 [n] | - |
| Germany | 27 895 | 41 987 [a] | 39 412 [b] | 47 838 [b] | 48 518 | 48 934 [b] | 48 426 [b] |
| Greece[4] | 205 [a] | 484 | 671 [a] | 1 056 | 1 106 [b] | - | - |
| Hungary | - | 981 [c,q] | 684 [c] | 908 [c] | 1 116 [c] | 1 249 [c] | - |
| Iceland | 29 | 68 | 93 | 207 [b] | 237 | 238 [b] | - |
| Ireland | 251 | 487 [b] | 822 [b] | 1 184 [b] | 1 253 [b] | - | - |
| Italy | 7 914 [r] | 13 880 [a] | 11 892 | 13 975 | 14 830 | - | - |
| Japan | 38 752 [b,j] | 74 412 [b,j] | 75 659 [b,j] | 90 184 | 93 007 | 94 172 | - |
| Korea | - | 7 563 [e] | 12 919 [e] | 17 374 [e] | 19 721 [e] | 20 858 [e] | - |
| Luxembourg | - | - | - | 318 | - | - | - |
| Mexico | - | - | 1 935 | 3 037 | 3 194 | - | - |
| Netherlands | 4 304 | 6 076 | 6 650 | 7 649 | 7 670 | - | - |
| New Zealand[4] | - | 524 | 605 | 712 | 873 [a] | - | - |
| Norway[4] | 937 | 1 512 | 1 765 [a] | 2 055 | 2 296 | 2 358 [b] | - |
| Poland | - | - | 1 881 [a] | 2 472 | 2 407 | 2 244 | - |
| Portugal[5, 1] | 271 | 780 | 751 | 1 279 [b] | 1 371 | 1 512 [b] | - |
| Slovak Republic | - | 868 [b,c,q] | 405 [c] | 340 [k] | 346 [k] | 326 [k] | - |
| Spain | 1 754 | 4 944 | 5 010 | 6 998 | 7 314 | 8 090 | - |
| Sweden[4] | 3 234 [a,k] | 4 883 [k] | 6 294 [a,k] | 7 715 [k] | 9 503 [k] | - | - |
| Switzerland[1, 2] | 3 233 [b] | 4 739 | 4 971 | 5 255 | - | - | - |
| Turkey | - | 1 538 | 1 284 | 2 627 | - | - | - |
| United Kingdom | 19 201 [a] | 21 673 | 22 498 | 24 816 | 25 530 | 26 207 | - |
| United States | 114 530 [h] | 176 578 [h] | 184 079 [h] | 243 271 [h] | 246 187 [h] | 245 430 [h,n] | 248 064 [b,h,n] |
| **Total OECD** | **254 691 [b]** | **414 522 [a,b]** | **438 558 [a,b]** | **553 399 [b]** | **569 275 [b]** | **574 708 [b,n]** | **-** |
| **EU-25** | **-** | **-** | **138 328 [b]** | **166 859 [b]** | **172 704 [b]** | **175 929 [b,n]** | **-** |
| **EU-15** | **88 551 [b]** | **132 558 [a,b]** | **133 421** | **160 547 [b]** | **166 123 [b]** | **169 525 [b,n]** | **-** |
| China | - | 13 824 [k] | 18 022 [k] | 45 002 [a] | 52 399 | 65 485 | - |
| Israel | - | 1 937 [c] | 2 630 [c] | 5 613 [c] | 5 937 [c,n] | 5 516 [c,n] | - |
| Russian Federation | - | 23 032 | 7 475 | 10 537 | 12 277 | 13 651 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 1983 instead of 1981.
4. 1999 instead of 2000.
5. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/367403882784

**Table 4. GERD intensity, 1981-2003**

As a percentage of GDP

| | 1981 | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| Australia[1, 2] | 0.94 | 1.52 | 1.66 | 1.54 | - | - | - |
| Austria | 1.13 | 1.47 [b] | 1.56 [a,b] | 1.86 [b] | 1.92 [b,n] | 1.93 [b,n] | 1.94 [b,n] |
| Belgium[3] | 1.56 [a] | 1.62 [b] | 1.72 | 2.04 | 2.17 | - | - |
| Canada | 1.24 | 1.60 | 1.72 | 1.92 | 2.03 | 1.91 [n] | 1.87 [b,n] |
| Czech Republic | - | 2.02 [c,q] | 1.01 [a] | 1.33 | 1.30 | 1.30 | - |
| Denmark[4] | 1.06 | 1.64 | 1.84 | 2.19 | 2.40 | 2.52 | - |
| Finland | 1.18 [a] | 2.04 [a] | 2.28 | 3.40 | 3.41 | 3.46 | - |
| France | 1.93 [a] | 2.37 | 2.31 | 2.18 [a] | 2.23 | 2.20 [n] | - |
| Germany | 2.43 | 2.52 [a] | 2.25 [b] | 2.49 [b] | 2.51 | 2.52 [b] | 2.50 [b] |
| Greece[4] | 0.17 [a] | 0.36 | 0.49 [a] | 0.67 | 0.65 [b] | - | - |
| Hungary | - | 1.06 [c,q] | 0.73 [a,c] | 0.80 [c] | 0.95 [c] | 1.02 [c] | - |
| Iceland | 0.64 | 1.17 | 1.57 | 2.75 [b] | 3.06 | 3.09 [b] | - |
| Ireland | 0.68 | 0.93 [b] | 1.28 [b] | 1.15 [b] | 1.15 [b] | - | - |
| Italy | 0.88 [r] | 1.23 [a] | 1.00 | 1.07 | 1.11 | - | - |
| Japan | 2.12 [j] | 2.76 [j] | 2.69 [j] | 2.99 | 3.07 | 3.12 | - |
| Korea | - | 1.92 [e] | 2.50 [e] | 2.65 [e] | 2.92 [e] | 2.91 [e] | - |
| Luxembourg | - | - | - | 1.71 | - | - | - |
| Mexico | - | - | 0.31 | 0.37 | 0.39 | - | - |
| Netherlands | 1.79 | 1.97 | 1.99 [a] | 1.90 | 1.89 | - | - |
| New Zealand[4] | - | 0.98 | 0.96 | 1.02 | 1.18 [a] | - | - |
| Norway[4] | 1.18 | 1.64 | 1.70 [a] | 1.65 | 1.60 | 1.67 | - |
| Poland | - | - | 0.65 [a] | 0.66 | 0.64 | 0.59 [b] | - |
| Portugal[5, 1] | 0.30 | 0.61 | 0.57 [a] | 0.80 [b] | 0.85 | 0.93 [b] | - |
| Slovak Republic | - | 2.13 [c,q] | 0.93 [c] | 0.65 [k] | 0.64 [k] | 0.58 [k] | - |
| Spain | 0.41 | 0.84 | 0.81 [a] | 0.94 | 0.95 | 1.03 | - |
| Sweden[4] | 2.22 [a,k] | 2.72 [k] | 3.35 [a,k] | 3.65 [k] | 4.27 [k] | - | - |
| Switzerland[1, 2] | 2.12 [b] | 2.59 | 2.67 | 2.57 | - | - | - |
| Turkey | - | 0.53 | 0.38 | 0.64 | - | - | - |
| United Kingdom | 2.38 [a] | 2.07 | 1.95 | 1.84 | 1.86 | 1.88 | - |
| United States | 2.34 [h] | 2.72 [h] | 2.51 [h] | 2.72 [h] | 2.74 [h] | 2.67 [h,n] | 2.62 [b,h,n] |
| **Total OECD** | **1.93 [b]** | **2.22 [a,b]** | **2.09 [a,b]** | **2.24 [b]** | **2.28 [b]** | **2.26 [b,n]** | **-** |
| **EU-25** | **-** | **-** | **1.72 [b]** | **1.80 [b]** | **1.83 [b]** | **1.83 [b,n]** | **-** |
| **EU-15** | **1.67 [b]** | **1.90 [a,b]** | **1.80** | **1.88 [b]** | **1.92 [b]** | **1.93 [b,n]** | **-** |
| China | - | 0.74 [k] | 0.60 [k] | 1.00 [a] | 1.07 | 1.23 | - |
| Israel | - | 2.50 [c] | 2.74 [c] | 4.72 [c] | 5.04 [c,n] | 4.72 [c,n] | - |
| Russian Federation | - | 1.43 | 0.85 | 1.05 | 1.16 | 1.24 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 1983 instead of 1981.
4. 1999 instead of 2000.
5. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

*StatLink*: http://dx.doi.org/10.1787/036108151783

**Table 5. GERD by source of funds, 1981-2003**

As a percentage of total national R&D expenditures

| | Business enterprise | | | | | | Government | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 20.2 [p] | 44.0 | 47.8 | 46.3 [-] | - | - | 72.8 [p] | 50.2 | 45.8 | 45.7 [-] | - | - |
| Austria | 50.2 | 50.3 [b] | 45.3 [b] | 39.9 [b,n] | 40.3 [b,n] | 40.8 [b,n] | 46.9 | 46.5 [b] | 47.3 [b] | 41.1 [b,n] | 40.9 [b,n] | 40.4 [b,n] |
| Belgium[4] | 64.8 [a] | 64.8 [b] | 67.1 | 64.3 | - | - | 33.4 [a] | 31.3 [b] | 23.1 | 21.4 | - | - |
| Canada | 40.8 | 38.2 | 45.7 | 48.3 | 45.3 [n] | 44.3 [n] | 50.6 | 45.7 [b] | 35.9 [b] | 30.5 [b] | 33.3 [b,n] | 34.0 [b,n] |
| Czech Republic | - | - | 63.1 | 52.5 | 53.7 | - | - | - | 32.3 | 43.6 | 42.1 | - |
| Denmark | 42.5 [a] | 51.4 | 45.2 | 61.5 [s] | - | - | 53.5 | 39.7 | 39.6 | 28.0 [s] | - | - |
| Finland | 54.5 [a] | 56.3 [a] | 59.5 | 70.8 | 69.5 | - | 43.4 [a] | 40.9 [a] | 35.1 | 25.5 | 26.1 | - |
| France | 40.9 [a] | 42.5 | 48.4 | 54.2 | - | - | 53.4 [a] | 48.8 | 41.9 | 36.9 | - | - |
| Germany | 56.9 | 61.7 [a] | 60.0 [b] | 65.7 | 65.6 [b] | 65.1 [b] | 41.8 | 35.9 [a] | 37.9 [b] | 31.4 | 31.5 [b] | 32.1 [b] |
| Greece | 21.4 [a] | 21.8 | 25.5 [a] | 29.7 [b] | - | - | 78.6 [a] | 57.7 | 53.9 [a] | 46.9 [b] | - | - |
| Hungary | - | 56.0 [c,q,s] | 38.4 [c,s] | 34.8 [c,s] | 29.7 [c,s] | - | - | 40.0 [c,q,s] | 53.1 [c,s] | 53.6 [c,s] | 58.6 [c,s] | - |
| Iceland | 5.7 | 24.5 | 34.6 | 46.2 | - | - | 85.6 | 69.7 | 57.3 | 34.0 | - | - |
| Ireland[3] | 37.7 | 60.6 [b] | 72.3 [b,p] | 66.0 [b] | - | - | 56.5 | 27.9 [b] | 22.5 [b,p] | 22.6 [b] | - | - |
| Italy | 50.1 [r] | 44.4 [a] | 41.7 | - | - | - | 47.2 [r] | 49.6 [a] | 53.0 | - | - | - |
| Japan | 67.7 [j] | 77.4 [j] | 72.3 [j] | 73.0 | 73.9 | - | 24.9 [k] | 16.4 [k] | 20.9 [k] | 18.5 [b] | 18.2 [b] | - |
| Korea | - | - | 76.3 | 72.5 [e] | 72.2 [e] | - | - | - | 19.0 | 25.0 [e] | 25.4 [e] | - |
| Luxembourg[3] | - | - | - | 91.0 [-] | - | - | - | - | - | 7.7 [-] | - | - |
| Mexico | - | - | 17.6 | 29.8 | - | - | - | - | 66.2 | 59.1 | - | - |
| Netherlands | 46.3 | 47.8 | 46.0 | 51.8 | - | - | 47.2 | 48.6 | 42.2 | 36.2 | - | - |
| New Zealand | - | 27.4 | 33.7 | 37.1 [a] | - | - | - | 61.8 | 52.3 | 46.4 [a] | - | - |
| Norway | 40.1 | 44.5 | 49.9 [a] | 51.7 | - | - | 57.2 | 49.5 | 44.0 [a] | 39.8 | - | - |
| Poland | - | - | 36.0 [a] | 30.8 | 31.0 | - | - | - | 60.2 [a] | 64.8 | 61.1 | - |
| Portugal[5, 1] | 30.0 | 20.2 | 19.5 | 31.5 | - | - | 61.9 | 59.4 | 65.3 [a] | 61.0 | - | - |
| Slovak Republic | - | 68.3 [c,q] | 60.4 [c] | 56.1 [j] | 53.6 [j] | - | - | 31.7 [c,q] | 37.8 [c] | 41.3 | 44.1 | - |
| Spain | 42.8 | 48.1 | 44.5 | 47.2 | 48.9 | - | 56.0 | 45.7 | 43.6 [a] | 39.9 | 39.1 | - |
| Sweden | 54.9 [a] | 61.9 | 65.5 [a] | 71.9 | - | - | 42.3 [a] | 34.0 | 28.8 [a] | 21.0 | - | - |
| Switzerland[1, 2, 3] | 75.1 [b] | 67.4 | 67.5 | 69.1 [-] | - | - | 24.9 [b] | 28.4 | 26.9 | 23.2 [-] | - | - |
| Turkey[3] | - | 28.5 | 32.9 | 42.9 [-] | - | - | - | 70.1 | 62.4 | 50.6 [-] | - | - |
| United Kingdom | 42.1 [a] | 49.6 | 48.2 | 47.3 | 46.7 | - | 48.1 [a,b] | 35.0 | 32.8 | 28.5 | 26.9 | - |
| United States | 49.4 [h] | 57.2 [h] | 60.2 [h] | 67.3 [h] | 64.4 [h,n] | 63.1 [h,n] | 47.8 [h] | 38.9 [h] | 35.4 [h] | 27.8 [h] | 30.2 [h,n] | 31.2 [h,n] |
| **Total OECD** | **51.7** [b] | **58.7** [a,b] | **59.4** [a,b] | **63.6** [b] | **62.3** [b,n] | **-** | **44.1** [b] | **35.7** [a,b] | **34.0** [a,b] | **28.9** [b] | **29.9** [b,n] | **-** |
| **EU-25** | **-** | **-** | **51.9** [b] | **55.4** [b] | **-** | **-** | **-** | **-** | **39.4** [b] | **34.7** [b] | **-** | **-** |
| **EU-15** | **48.7** [b] | **52.0** [a,b] | **52.2** | **56.0** [b] | **-** | **-** | **46.7** [b] | **41.1** [a,b] | **39.1** | **34.1** [b] | **-** | **-** |
| China[3] | - | - | - | 57.6 [s] | - | - | - | - | - | 33.4 [s] | - | - |
| Israel[3] | - | 43.5 [c] | 47.7 [c] | 69.6 [c,n] | - | - | - | 36.9 [c] | 35.9 [c] | 24.7 [c] | - | - |
| Russian Federation | - | - | 33.6 | 33.6 | 33.1 | - | - | - | 61.5 | 57.2 | 58.4 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1983 instead of 1981.
5. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/442056514762

**Table 5. GERD by source of funds, 1981-2003 (cont'd)**

As a percentage of total national R&D expenditures

| | Other national sources | | | | | | Abroad | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 2.1 [p] | 3.9 | 4.4 | 4.8 [-] | - | - | 1.0 [p] | 1.8 | 2.1 | 3.3 [-] | - | - |
| Austria | 0.4 | 0.3 [b] | 0.4 [b] | 0.3 [b,n] | 0.3 [b,n] | 0.3 [b,n] | 2.5 | 3.0 [b] | 7.1 [b] | 18.7 [b,n] | 18.5 [b,n] | 18.5 [b,n] |
| Belgium[4] | 0.8 [a] | 1.0 [b] | 2.3 | 2.5 | - | - | 1.0 [a] | 3.0 [b] | 7.5 | 11.8 | - | - |
| Canada | 4.8 | 6.7 [b] | 6.9 [b] | 8.4 [b] | 9.4 [b,n] | 10.0 [b,n] | 3.8 | 9.4 | 11.6 | 12.9 | 12.0 [n] | 11.7 [n] |
| Czech Republic | - | - | 1.3 | 1.7 | 1.5 | - | - | - | 3.3 | 2.2 | 2.7 | - |
| Denmark | 2.0 [a] | 4.6 | 4.3 | 2.6 [s] | - | - | 2.1 | 4.4 | 11.0 | 7.8 [s] | - | - |
| Finland | 1.1 [a] | 1.5 [a] | 1.0 | 1.2 | 1.2 | - | 1.0 [a] | 1.3 [a] | 4.5 | 2.5 | 3.1 | - |
| France | 0.7 [a] | 0.7 | 1.7 | 1.7 | - | - | 5.0 [a] | 8.0 | 8.0 | 7.2 | - | - |
| Germany | 0.4 | 0.5 [a] | 0.3 [b] | 0.4 | 0.4 [b] | 0.4 [b] | 1.0 | 2.0 [a] | 1.8 [b] | 2.5 | 2.5 [b] | 2.4 [b] |
| Greece | - | 0.7 | 2.5 [a] | 2.0 [b] | - | - | - | 19.9 | 18.2 [a] | 21.4 [b] | - | - |
| Hungary | - | 0.1 [c,q,s] | 0.5 [c,s] | 0.4 [c,s] | 0.3 [c,s] | - | - | 1.8 [c,q,s] | 4.9 [c,s] | 9.2 [c,s] | 10.4 [c,s] | - |
| Iceland | 4.4 | 1.7 | 3.7 | 1.6 | - | - | 4.3 | 4.1 | 4.4 | 18.3 | - | - |
| Ireland[3] | 1.1 | 2.2 [b] | 1.9 [b,p] | 2.6 [b] | - | - | 4.8 | 9.4 [b] | 8.5 [b,p] | 8.9 [b] | - | - |
| Italy | 0.0 [r] | - | - | - | - | - | 2.7 [r] | 6.1 [a] | 5.3 | - | - | - |
| Japan | 7.3 [b,k] | 6.1 [b,k] | 6.7 [b,k] | 8.1 [b] | 7.6 [b] | - | 0.1 [b,k] | 0.1 [b,k] | 0.1 [b,k] | 0.4 | 0.4 | - |
| Korea | - | - | 4.7 | 2.1 [e] | 2.0 [e] | - | - | - | 0.0 | 0.5 [e] | 0.4 [e] | - |
| Luxembourg[3] | - | - | - | - | - | - | - | - | - | 1.3 [-] | - | - |
| Mexico | - | - | 9.5 | 9.8 | - | - | - | - | 6.7 | 1.3 | - | - |
| Netherlands | 1.3 | 1.8 | 2.6 | 1.1 [a] | - | - | 5.2 | 1.9 | 9.3 | 11.0 | - | - |
| New Zealand | - | 8.2 | 10.1 | 9.9 [a] | - | - | - | 2.5 | 3.9 | 6.6 [a] | - | - |
| Norway | 1.4 | 1.3 | 1.2 [a] | 1.4 | - | - | 1.4 | 4.6 | 4.9 [a] | 7.1 | - | - |
| Poland | - | - | 2.1 [a] | 2.0 | 3.2 | - | - | - | 1.7 [a] | 2.4 | 4.8 | - |
| Portugal[5, 1] | 4.8 | 5.4 | 3.3 | 2.4 | - | - | 3.3 | 15.0 | 11.9 [a] | 5.1 | 4.9 [b] | - |
| Slovak Republic | - | - | 0.1 [c] | 0.8 [j] | 0.3 [j] | - | - | - | 1.6 [c] | 1.9 [j] | 2.1 [j] | - |
| Spain | 0.1 [l] | 0.6 | 5.2 [a] | 5.3 | 5.2 | - | 1.1 | 5.6 | 6.7 | 7.7 | 6.8 | - |
| Sweden | 1.4 [a] | 2.7 | 2.2 [a] | 3.8 | - | - | 1.5 [a] | 1.5 | 3.4 [a] | 3.4 | - | - |
| Switzerland[1, 2, 3] | - | 2.3 | 2.5 | 3.4 [-] | - | - | - | 1.9 | 3.1 | 4.3 [-] | - | - |
| Turkey[3] | - | 1.3 | 2.7 | 5.3 [-] | - | - | - | 0.2 | 2.0 | 1.2 [-] | - | - |
| United Kingdom | 3.0 [a] | 3.5 | 4.5 | 5.8 | 5.9 | - | 6.9 [a] | 11.9 | 14.5 | 18.4 | 20.5 | - |
| United States | 2.8 [h] | 3.9 [h] | 4.4 [h] | 5.0 [h] | 5.4 [h,n] | 5.7 [h,n] | - | - | - | - | - | - |
| **Total OECD** | **2.9** [b] | **3.5** [a,b] | **4.0** [a,b] | **4.6** [b] | **4.8** [b,n] | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **EU-25** | **-** | **-** | **1.9** [b] | **2.2** [b] | **-** | **-** | **-** | **-** | **6.7** [b] | **7.6** [b] | **-** | **-** |
| **EU-15** | **1.1** [b] | **1.3** [a,b] | **1.8** [b] | **2.2** [b] | **-** | **-** | **3.5** [b] | **5.6** [a,b] | **6.9** | **7.8** [b] | **-** | **-** |
| China[3] | - | - | - | - | - | - | - | - | - | 2.7 [s] | - | - |
| Israel[3] | - | 13.1 [c] | 12.0 [c] | 2.8 [c,n] | - | - | - | 6.5 [c] | 4.4 [c] | 2.8 [c,n] | - | - |
| Russian Federation | - | - | 0.3 | 0.5 | 0.4 | - | - | - | 4.6 | 8.6 | 8.0 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1983 instead of 1981.
5. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

**Table 6. GERD by two main sources of funds, as a percentage of GDP, 1981-2003**

| | Industry | | | | | | Government | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 0.19 [p] | 0.67 | 0.79 | 0.71 [-] | - | - | 0.69 [p] | 0.76 | 0.76 | 0.70 [-] | - | - |
| Austria | 0.57 | 0.74 [b] | 0.70 [a,b] | 0.77 [b,n] | 0.78 [b,n] | 0.79 [b,n] | 0.53 | 0.68 [b] | 0.74 [a,b] | 0.79 [b,n] | 0.79 [b,n] | 0.78 [b,n] |
| Belgium[4] | 1.01 [a] | 1.05 [b] | 1.15 | 1.40 | - | - | 0.52 [a] | 0.51 [b] | 0.40 | 0.47 | - | - |
| Canada | 0.51 | 0.61 | 0.79 | 0.98 | 0.86 [n] | 0.83 [b,n] | 0.63 | 0.73 [b] | 0.62 [b] | 0.62 [b] | 0.64 [b,n] | 0.64 [b,n] |
| Czech Republic | - | - | 0.64 | 0.68 | 0.70 | - | - | 0.59 [c,k,q] | 0.33 [c,k,q] | 0.57 | 0.55 | - |
| Denmark | 0.45 | 0.84 | 0.83 | 1.48 [s] | - | - | 0.57 | 0.65 | 0.73 | 0.67 [s] | - | - |
| Finland | 0.64 [a] | 1.15 | 1.36 | 2.41 | 2.40 | - | 0.51 [a] | 0.83 [a] | 0.80 | 0.87 | 0.90 | - |
| France | 0.79 | 1.01 | 1.12 | 1.21 | - | - | 1.03 [a] | 1.16 | 0.97 | 0.82 | - | - |
| Germany | 1.38 | 1.55 [a] | 1.35 | 1.65 | 1.66 [b] | 1.63 [b] | 1.01 | 0.90 [a] | 0.85 | 0.79 | 0.80 [b] | 0.80 [b] |
| Greece | 0.04 | 0.08 | 0.12 [a] | 0.19 | - | - | 0.14 [a] | 0.21 | 0.26 [a] | 0.31 | - | - |
| Hungary | - | 0.59 [m,q,s] | 0.28 [a,s] | 0.33 [s] | 0.30 [s] | - | - | 0.42 [c,m,q] | 0.39 [a,c,s] | 0.51 [c,s] | 0.60 [c,s] | - |
| Iceland | 0.04 | 0.29 | 0.54 | 1.41 | - | - | 0.54 | 0.82 | 0.90 | 1.04 | - | - |
| Ireland[3] | 0.26 | 0.56 [b] | 0.92 [b,p] | 0.76 [b] | - | - | 0.38 | 0.26 [b] | 0.29 [b,p] | 0.26 [b] | - | - |
| Italy | 0.44 [r] | 0.54 [a] | 0.42 | - | - | - | 0.42 [r] | 0.61 [a] | 0.53 | - | - | - |
| Japan | 1.44 [j] | 2.14 [j] | 1.95 [j] | 2.24 | 2.31 | - | 0.53 [b] | 0.45 [b] | 0.56 [b] | 0.57 [b] | 0.57 [b] | - |
| Korea | - | - | 1.91 | 2.12 [e] | 2.10 [e] | - | - | - | 0.48 | 0.73 [e] | 0.74 [e] | - |
| Luxembourg[3] | - | - | - | 1.56 [-] | - | - | - | - | - | 0.13 [-] | - | - |
| Mexico | - | 0.10 [b,j,q] | 0.05 | 0.12 | - | - | - | 0.21 [f,q] | 0.20 | 0.23 | - | - |
| Netherlands | 0.83 | 0.94 | 0.91 [a] | 0.98 | - | - | 0.84 | 0.95 | 0.84 [a] | 0.68 | - | - |
| New Zealand | - | 0.27 | 0.32 | 0.44 [a] | - | - | - | 0.61 | 0.50 | 0.55 [a] | - | - |
| Norway | 0.47 | 0.73 | 0.85 [a] | 0.83 | - | - | 0.67 | 0.81 | 0.75 | 0.64 | - | - |
| Poland | - | - | 0.23 | 0.20 | 0.18 [b] | - | - | - | 0.39 [a] | 0.41 | 0.36 [b] | - |
| Portugal[5, 1] | 0.09 | 0.12 | 0.11 [a] | 0.27 | - | - | 0.18 | 0.36 | 0.37 [a] | 0.52 | - | - |
| Slovak Republic | - | 1.46 [q] | 0.56 | 0.36 | 0.31 | - | - | 0.68 [c,q] | 0.35 [c] | 0.26 [k] | 0.25 [k] | - |
| Spain | 0.18 | 0.40 | 0.36 [a] | 0.45 | 0.50 | - | 0.23 | 0.38 | 0.35 [a] | 0.38 | 0.40 | - |
| Sweden | 1.22 [a,k] | 1.69 [k] | 2.20 [k] | 3.07 [k] | - | - | 0.94 [a,k] | 0.93 [k] | 0.96 [a,k] | 0.90 [k] | - | - |
| Switzerland[1, 2, 3] | 1.59 [b] | 1.75 | 1.80 | 1.77 [-] | - | - | 0.53 [b] | 0.74 | 0.72 | 0.60 [-] | - | - |
| Turkey[3] | - | 0.15 | 0.13 | 0.28 [-] | - | - | - | 0.37 | 0.24 | 0.32 [-] | - | - |
| United Kingdom | 1.00 | 1.03 | 0.94 | 0.88 | 0.88 | - | 1.15 [a,b] | 0.72 | 0.64 | 0.53 | 0.50 | - |
| United States | 1.16 [h] | 1.56 [h] | 1.51 [h] | 1.85 [h] | 1.72 [h,n] | 1.65 [b,h,n] | 1.12 [h] | 1.06 [h] | 0.89 [h] | 0.76 [h] | 0.81 [h,n] | 0.82 [b,h,n] |
| **Total OECD** | **1.00** [b] | **1.30** [a,b] | **1.24** [a,b] | **1.45** [b] | **1.41** [b,n] | **-** | **0.85** [b] | **0.79** [a,b] | **0.71** [a,b] | **0.66** [b] | **0.68** [b,n] | **-** |
| **EU-25** | **-** | **-** | **0.89** [b] | **1.01** [b] | **-** | **-** | **-** | **-** | **0.68** [b] | **0.63** [b] | **-** | **-** |
| **EU-15** | **0.81** [b] | **0.99** [a,b] | **0.94** | **1.07** [b] | **-** | **-** | **0.78** [b] | **0.78** [a,b] | **0.70** | **0.65** [b] | **-** | **-** |
| China[3] | - | - | - | 0.58 [s] | - | - | - | - | - | 0.33 [s] | - | - |
| Israel[3] | - | 1.09 | 1.31 | 3.29 [n] | - | - | - | 0.92 [c] | 0.98 [c] | 1.17 [c] | - | - |
| Russian Federation | - | - | 0.29 | 0.39 | 0.41 | - | - | - | 0.52 | 0.67 | 0.73 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1983 instead of 1981.
5. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/846033432367

**Table 7. R&D expenditures by sector of performance, 1981-2003**

As a percentage of total national R&D expenditures

| | Business enterprise | | | | | | Higher education | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 25.0 [b] | 44.2 | 48.2 | 47.5 [-] | - | - | 28.6 | 26.2 | 26.3 | 26.8 [-] | - | - |
| Austria[4] | 55.9 | - | - | 63.6 | - | - | 32.8 | - | - | 29.7 | - | - |
| Belgium[5] | 70.6 [a] | 66.5 [b] | 71.3 | 73.7 | - | - | 19.2 [a] | 26.2 [b] | 23.9 | 19.2 | - | - |
| Canada | 48.1 | 49.7 | 58.1 | 59.6 | 55.2 [n] | 53.7 [n] | 26.7 | 30.6 | 26.8 | 29.3 | 32.8 [n] | 34.9 [n] |
| Czech Republic | - | 69.4 [c,q] | 65.1 [c,q] | 60.2 | 61.1 | - | - | 1.6 [c,q] | 8.5 [c,q] | 15.7 | 15.6 | - |
| Denmark | 49.7 | 58.5 | 57.4 | 68.7 | 69.3 | - | 26.7 | 22.6 | 24.5 | 18.8 | 23.1 [a] | - |
| Finland | 54.7 [a] | 57.0 [a] | 63.2 | 71.1 | 69.9 | - | 22.2 [a] | 22.1 [a] | 19.5 | 18.1 | 19.2 | - |
| France | 58.9 [a] | 61.5 | 61.0 | 63.2 [a] | 62.2 [n] | - | 16.4 [a] | 15.1 | 16.7 | 18.9 | 19.5 [n] | - |
| Germany | 69.0 | 69.4 [a] | 66.3 [b] | 69.9 | 69.4 [b] | 69.1 [b] | 17.1 | 16.2 [a] | 18.2 [b] | 16.4 | 16.9 [b] | 17.1 [b] |
| Greece | 22.5 [a] | 26.1 | 29.5 [a] | 32.7 [b] | - | - | 14.5 [a] | 33.8 | 44.3 [a] | 44.9 [b] | - | - |
| Hungary | - | 41.4 [c,q,s] | 43.4 [c,s] | 40.1 [c,s] | 35.5 [c,s] | - | - | 20.3 [c,q,s] | 24.8 [c,s] | 25.7 [c,s] | 25.2 [c,s] | - |
| Iceland | 9.6 | 21.8 | 31.9 | 58.9 | 57.2 [b] | - | 26.0 | 29.4 | 27.5 | 18.8 | 16.1 [b] | - |
| Ireland | 43.6 | 63.6 [b] | 70.0 [b] | 69.7 [b] | - | - | 16.0 | 23.2 [b] | 20.4 [b] | 22.4 [b] | - | - |
| Italy | 56.4 [r] | 55.8 [a] | 53.4 | 49.1 | - | - | 17.9 [r] | 21.5 [a] | 25.5 | 32.6 | - | - |
| Japan | 66.0 [b,j] | 75.4 [b,j] | 70.3 [b,j] | 73.7 | 74.4 | - | 17.6 [b,k] | 12.1 [b,k] | 14.5 [b,k] | 14.5 | 13.9 | - |
| Korea | - | - | 73.7 | 76.2 [e] | 74.9 [e] | - | - | - | 8.2 | 10.4 [e] | 10.4 [e] | - |
| Luxembourg[3] | - | - | - | 92.6 [-] | - | - | - | - | - | 0.3 [-] | - | - |
| Mexico | - | - | 20.8 | 30.3 | - | - | - | - | 45.8 | 30.4 | - | - |
| Netherlands | 53.3 | 49.7 | 52.1 | 58.3 | - | - | 23.2 | 29.7 | 28.8 | 27.0 | - | - |
| New Zealand | - | 26.8 | 27.0 | 36.5 [a] | - | - | - | 28.6 | 30.7 | 30.3 [a] | - | - |
| Norway | 52.9 | 54.6 | 56.7 [a] | 59.7 | 57.4 | - | 29.0 | 26.7 | 26.0 [a] | 25.7 | 26.8 | - |
| Poland | - | - | 38.7 [a] | 35.8 | 21.4 | - | - | - | 26.3 [a] | 32.7 | 33.5 | - |
| Portugal[6, 1] | 31.2 | 21.7 | 20.9 [a] | 31.8 | 34.4 [b] | - | 20.6 | 43.0 | 37.1 [a] | 36.7 | 35.6 [b] | - |
| Slovak Republic | - | 74.6 [c,q] | 53.9 [c] | 67.3 [j] | 64.3 [j] | - | - | 3.9 [c,q] | 5.9 [c] | 9.0 [j] | 9.1 [j] | - |
| Spain | 45.5 | 56.0 | 48.2 | 52.4 | 54.6 [a] | - | 23.0 | 22.2 | 32.0 | 30.9 [b] | 29.8 | - |
| Sweden | 63.7 [a,j] | 68.5 | 74.3 [a] | 77.6 | - | - | 30.0 [a,j] | 27.4 [j] | 21.9 [a,h,j] | 19.4 [j] | - | - |
| Switzerland[1, 2, 3] | 74.2 [b] | 70.1 | 70.7 | 73.9 [-] | - | - | 19.9 [b] | 25.0 | 24.3 | 22.9 [-] | - | - |
| Turkey[3] | - | 21.1 | 23.6 | 33.4 [-] | - | - | - | 71.1 | 69.0 | 60.4 [-] | - | - |
| United Kingdom | 63.0 [a] | 67.1 | 65.0 | 66.8 [a] | 67.0 | - | 13.6 [a] | 16.7 | 19.2 | 21.8 | 22.6 | - |
| United States | 71.2 [h] | 72.5 [h] | 71.8 [h] | 73.0 [h] | 70.2 [h,n] | 68.9 [h,n] | 13.2 [h] | 14.5 [h] | 15.2 [h] | 14.5 [h] | 15.9 [h,n] | 16.8 [h,n] |
| **Total OECD** | **66.2** [b] | **68.8** [a,b] | **67.2** [a,b] | **69.3** [b] | **68.0** [b,n] | **-** | **16.0** [b] | **16.3** [a,b] | **17.5** [a,b] | **17.4** [b] | **18.1** [b,n] | **-** |
| **EU-25** | **-** | **-** | **61.6** [b] | **64.0** [b] | **63.6** [b,n] | **-** | **-** | **-** | **20.8** [b] | **21.5** [b] | **-** | **-** |
| **EU-15** | **62.3** [b] | **63.4** [a,b] | **62.1** [b] | **64.7** [b] | **64.4** [b,n] | **-** | **17.6** [a,b] | **18.8** [a,b] | **20.8** [a,b] | **21.4** [b] | **-** | **-** |
| China | - | 39.8 [k,s] | 43.7 [k,s] | 60.4 | 61.2 | - | - | 8.6 [j,s] | 12.1 [j,s] | 9.8 | 10.1 | - |
| Israel | - | 55.7 [c] | 58.7 [c] | 75.3 [c,n] | 73.0 [c,n] | - | - | 26.6 [c,e] | 25.6 [c,e] | 16.1 [c,e,n] | 17.5 [c,e,n] | - |
| Russian Federation | - | 77.5 | 68.5 | 70.3 | 69.9 | - | - | 5.7 [h] | 5.4 | 5.2 | 5.4 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

*StatLink*: http://dx.doi.org/10.1787/458542005788

**Table 7. R&D expenditures by sector of performance, 1981-2003 (cont'd)**

As a percentage of total national R&D expenditures

| | Government | | | | | | Private non-profit | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 45.1 | 28.1 | 23.5 | 22.9 [-] | - | - | 1.3 | 1.6 | 2.1 | 2.7 [-] | - | - |
| Austria[4] | 9.0 | - | - | 6.4 | - | - | 2.3 | - | - | 0.3 | - | - |
| Belgium[5] | 5.6 [a] | 6.1 [b] | 3.5 | 6.0 | - | - | 4.6 [a] | 1.2 [b] | 1.4 | 1.1 | - | - |
| Canada | 24.4 | 18.7 | 14.4 | 10.9 | 11.7 [n] | 11.2 [n] | 0.8 | 1.0 | 0.7 | 0.2 | 0.2 [n] | 0.2 [n] |
| Czech Republic | - | 29.0 [c,q] | 26.5 [c,q] | 23.7 | 23.0 | - | - | - | 0.1 | 0.5 | 0.3 | - |
| Denmark | 22.7 | 17.7 | 17.0 | 11.7 | 7.0 [a] | - | 0.9 | 1.2 | 1.1 | 0.7 | 0.6 | - |
| Finland | 22.6 [a] | 20.2 [a] | 16.7 | 10.2 | 10.4 | - | 0.6 [a] | 0.7 [a] | 0.6 | 0.6 | 0.6 | - |
| France | 23.6 [a] | 22.7 | 21.0 | 16.5 | 17.0 [n] | - | 1.1 [a] | 0.8 | 1.3 | 1.4 | 1.4 [n] | - |
| Germany | 13.4 | 14.4 [a] | 15.5 [b,m] | 13.7 [m] | 13.7 [b,m] | 13.8 [b,m] | 0.5 | 0.5 [b] | - | - | - | - |
| Greece | 63.1 [a] | 40.1 | 25.5 [a] | 22.1 [b] | - | - | - | - | 0.7 [a] | 0.4 [b] | - | - |
| Hungary | - | 24.5 [c,q,s] | 25.6 [c,s] | 25.9 [c,s] | 32.9 [c,s] | - | - | - | - | - | - | - |
| Iceland | 60.7 | 44.5 | 37.5 | 20.1 | 24.5 [b] | - | 3.7 | 4.4 | 3.2 | 2.3 | 2.2 [b] | - |
| Ireland | 39.3 | 11.6 [b] | 9.0 [b] | 7.9 [b] | - | - | 1.1 | 1.7 [b] | 0.8 [b] | - | - | - |
| Italy | 25.7 [r] | 22.7 [a] | 21.1 | 18.4 | - | - | - | - | - | - | - | - |
| Japan | 12.0 [b,k] | 8.1 [b,k] | 10.4 [b,k] | 9.5 | 9.5 | - | 4.5 [b,k] | 4.4 [b,k] | 4.8 [b,k] | 2.3 [a] | 2.1 | - |
| Korea | - | - | 17.0 | 12.4 [e] | 13.4 [e] | - | - | - | 1.2 | 1.1 [e] | 1.3 [e] | - |
| Luxembourg[3] | - | - | - | 7.1 [-] | - | - | - | - | - | - | - | - |
| Mexico | - | - | 33.0 | 39.1 | - | - | - | - | 0.4 | 0.2 | - | - |
| Netherlands | 20.8 | 18.3 | 18.1 | 14.2 | - | - | 2.8 | 2.3 [a,m] | 1.0 | 0.6 | - | - |
| New Zealand | - | 44.6 | 42.2 | 33.2 [a] | - | - | - | - | - | - | - | - |
| Norway | 17.7 | 18.8 | 17.3 [a] | 14.6 | 15.8 | - | 0.5 | - | - | - | - | - |
| Poland | - | - | 35.0 [a] | 31.3 | 44.9 | - | - | - | 0.1 | 0.2 | 0.3 | - |
| Portugal[6, 1] | 43.6 | 22.1 | 27.0 | 20.8 | 19.8 [b] | - | 4.6 | 13.2 | 15.0 [a] | 10.8 | 10.2 [b] | - |
| Slovak Republic | - | 21.5 [c,q] | 40.2 [c] | 23.7 [c] | 26.6 [c] | - | - | - | - | 0.0 | 0.0 | - |
| Spain | 31.6 | 21.3 | 18.6 | 15.9 | 15.4 | - | - | 0.5 | 1.1 | 0.8 | 0.2 | - |
| Sweden | 6.1 [a,f] | 4.1 [f] | 3.7 [a,f] | 2.8 [f] | - | - | 0.3 [a] | 0.1 | 0.2 [a] | 0.1 | - | - |
| Switzerland[1, 2, 3] | 5.9 [b] | 3.7 [f] | 2.5 [f] | 1.3 [a,f] | - | - | 3.2 [a,h] | 1.2 | 2.5 | 1.9 [-] | - | - |
| Turkey[3] | - | 7.9 | 7.4 | 6.2 [-] | - | - | - | - | - | - | - | - |
| United Kingdom | 20.6 [a] | 14.5 [a] | 14.6 | 9.9 [a] | 8.9 | - | 2.9 [a] | 1.8 | 1.3 | 1.5 | 1.5 | - |
| United States | 12.5 [f] | 9.8 [f] | 9.4 [f] | 7.9 [f] | 8.8 [f,n] | 9.1 [f,n] | 3.1 [h] | 3.3 [h] | 3.6 [h] | 4.7 [h] | 5.1 [h,n] | 5.3 [h,n] |
| **Total OECD** | **15.2** [b] | **12.4** [a,b] | **12.5** [a,b] | **10.5** [b] | **11.0** [b,n] | **-** | **2.6** [b] | **2.6** [a,b] | **2.7** [a,b] | **2.8** [b] | **2.9** [b,n] | **-** |
| **EU-25** | **-** | **-** | **16.8** [b] | **13.6** [b] | **13.7** [b,n] | **-** | **-** | **-** | **0.9** [b] | **0.9** [b] | **0.8** [b,n] | **-** |
| **EU-15** | **18.8** [b] | **16.9** [a,b] | **16.2** [b] | **13.1** [b] | **13.0** [b,n] | **-** | **1.4** [b] | **0.9** [a,b] | **0.9** [b] | **0.9** [b] | **0.8** [b,n] | **-** |
| China | - | 49.6 [j,s] | 42.1 [j,s] | 29.7 | 28.7 | - | - | - | - | - | - | - |
| Israel | - | 10.8 [c] | 9.9 [c] | 5.2 [c,n] | 5.8 [c,n] | - | - | 6.9 [c] | 5.8 [c] | 3.4 [c,n] | 3.8 [c,n] | - |
| Russian Federation | - | 16.8 | 26.1 | 24.3 | 24.5 | - | - | 0.0 [h] | 0.0 | 0.2 | 0.2 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

**Table 8. GERD by sector of performance, 1981-2003**

As a percentage of GDP

| | Business enterprise | | | | | | Higher education | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 0.2 [b] | 0.7 | 0.8 | 0.7 | - | - | 0.3 | 0.4 | 0.4 | 0.4 | - | - |
| Austria[4] | 0.6 | - | - | 1.1 [b, n] | - | - | 0.4 | - | - | 0.5 [b,n] | - | - |
| Belgium[5] | 1.1 [a,a] | 1.1 [b] | 1.2 | 1.6 | - | - | 0.3 [a] | 0.4 [b] | 0.4 | 0.4 | - | - |
| Canada | 0.6 | 0.8 | 1.0 | 1.2 | 1.1 [n] | 1.0 [b, n] | 0.3 | 0.5 | 0.5 | 0.6 | 0.6 [n] | 0.7 [b,n] |
| Czech Republic | - | 1.4 [c, q] | 0.7 [c, q] | 0.8 | 0.8 | - | - | 0.0 [c,q] | 0.1 [c,q] | 0.2 | 0.2 | - |
| Denmark | 0.5 | 1.0 | 1.1 | 1.6 | 1.7 | - | 0.3 | 0.4 | 0.5 | 0.5 | 0.6 [a] | - |
| Finland | 0.6 [a] | 1.2 [a] | 1.4 | 2.4 | 2.4 | - | 0.3 [a] | 0.5 [a] | 0.4 | 0.6 | 0.7 | - |
| France | 1.1 [a] | 1.5 | 1.4 | 1.4 [a] | 1.4 [n] | - | 0.3 [a] | 0.4 | 0.4 | 0.4 | 0.4 [n] | - |
| Germany | 1.7 | 1.7 [a,a] | 1.5 [b] | 1.8 | 1.7 [b] | 1.7 [b] | 0.4 | 0.4 [a] | 0.4 [b] | 0.4 | 0.4 [b] | 0.4 [b] |
| Greece | 0.0 [a] | 0.1 | 0.1 [a] | 0.2 [b] | - | - | 0.0 [a] | 0.1 | 0.2 [a] | 0.3 [b] | - | - |
| Hungary | - | 0.4 [c, q, s] | 0.3 [a, c, s] | 0.4 [c, s] | 0.4 [c, s] | - | - | 0.2 [c,q,s] | 0.2 [a,c,s] | 0.2 [c,s] | 0.3 [c,s] | - |
| Iceland | 0.1 | 0.3 | 0.5 | 1.8 | 1.8 [b] | - | 0.2 | 0.3 | 0.4 | 0.6 | 0.5 [b] | - |
| Ireland | 0.3 | 0.6 [b] | 0.9 [b] | 0.8 [b] | - | - | 0.1 | 0.2 [b] | 0.3 [b] | 0.3 [b] | - | - |
| Italy | 0.5 [r] | 0.7 [a] | 0.5 | 0.5 | - | - | 0.2 [r] | 0.3 [a] | 0.3 | 0.4 | - | - |
| Japan | 1.4 [b, j] | 2.1 [b, j] | 1.9 [b, j] | 2.3 | 2.3 | - | 0.4 [b,j,k] | 0.3 [b,j,k] | 0.4 [b,j,k] | 0.4 | 0.4 | - |
| Korea | - | - | 1.8 [e] | 2.2 [e] | 2.2 [e] | - | - | - | 0.2 [e] | 0.3 [e] | 0.3 [e] | - |
| Luxembourg[3] | - | - | - | 1.6 | - | - | - | - | - | 0.0 | - | - |
| Mexico | - | - | 0.1 | 0.1 | - | - | - | - | 0.1 | 0.1 | - | - |
| Netherlands | 1.0 | 1.0 | 1.0 [a] | 1.1 | - | - | 0.4 | 0.6 | 0.6 [a] | 0.5 | - | - |
| New Zealand | - | 0.3 | 0.3 | 0.4 [a] | - | - | - | 0.3 | 0.3 | 0.4 [a] | - | - |
| Norway | 0.6 | 0.9 | 1.0 [a] | 1.0 | 1.0 | - | 0.3 | 0.4 | 0.4 [a] | 0.4 | 0.4 | - |
| Poland | - | - | 0.3 [a] | 0.2 | 0.1 [b] | - | - | - | 0.2 [a] | 0.2 | 0.2 [b] | - |
| Portugal[6, 1] | 0.1 | 0.1 | 0.1 [a] | 0.3 | 0.3 [b] | - | 0.1 | 0.3 | 0.2 [a] | 0.3 | 0.3 [b] | - |
| Slovak Republic | - | 1.6 [c, q] | 0.5 [c,c] | 0.4 [j, k] | 0.4 [j, k] | - | - | 0.1 [c,q] | 0.1 [c] | 0.1 [j,k] | 0.1 [j,k] | - |
| Spain | 0.2 | 0.5 | 0.4 [a] | 0.5 | 0.6 [a] | - | 0.1 | 0.2 | 0.3 [a] | 0.3 [b] | 0.3 | - |
| Sweden | 1.4 [a, j, k] | 1.9 [k] | 2.5 [a, k] | 3.3 [k] | - | - | 0.7 [a,j,k] | 0.7 [j,k] | 0.7 [a,h,j,k] | 0.8 [j,k] | - | - |
| Switzerland[1, 2, 3] | 1.6 [b] | 1.8 | 1.9 | 1.9 | - | - | 0.4 [b] | 0.6 | 0.6 | 0.6 | - | - |
| Turkey[3] | - | 0.1 | 0.1 | 0.2 | - | - | - | 0.4 | 0.3 | 0.4 | - | - |
| United Kingdom | 1.5 [a] | 1.4 | 1.3 | 1.2 [a] | 1.3 | - | 0.3 [a] | 0.3 | 0.4 | 0.4 | 0.4 | - |
| United States | 1.7 [h] | 2.0 [h] | 1.8 [h] | 2.0 [h] | 1.9 [h, n] | 1.8 [b, h, n] | 0.3 [h] | 0.4 [h] | 0.4 [h] | 0.4 [h] | 0.4 [h,n] | 0.4 [h,n] |
| **Total OECD** | **1.3** [b] | **1.5** [a, b] | **1.4** [a, b] | **1.6** [b] | **1.5** [b, n] | **-** | **0.3** [b] | **0.4** [a,b] | **0.4** [a,b] | **0.4** [b] | **0.4** [b,n] | **-** |
| **EU-25** | **-** | **-** | **1.1** [b] | **1.2** [b] | **1.2** [b, n] | **-** | **-** | **-** | **0.4** [b] | **0.4** [b] | **-** | **-** |
| **EU-15** | **1.0** [b] | **1.2** [a, b] | **1.1** [b] | **1.2** [b] | **1.2** [b, n] | **-** | **0.3** [a,b] | **0.4** [a,b] | **0.4** [a,b] | **0.4** [b] | **-** | **-** |
| China | - | 0.3 [k, s] | 0.3 [k, s] | 0.6 | 0.8 | - | - | 0.1 [j,k,s] | 0.1 [j,k,s] | 0.1 | 0.1 | - |
| Israel | - | 1.4 [c] | 1.6 [c] | 3.8 [c, n] | 3.4 [c, n] | - | - | 0.7 [c,e] | 0.7 [c,e] | 0.8 [c,e,n] | 0.8 [c,e,n] | - |
| Russian Federation[1] | - | 0.6 | 0.6 | 0.8 | 0.9 | - | - | 0.0 [h] | 0.0 | 0.1 | 0.1 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

*StatLink*: http://dx.doi.org/10.1787/500804062506

**Table 8. GERD by sector of performance, 1981-2003 (cont'd)**

As a percentage of GDP

| | Government | | | | | | Private non-profit | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 0.4 | 0.4 | 0.4 | 0.4 | - | - | 0.0 | 0.0 | 0.0 | 0.0 | - | - |
| Austria[4] | 0.1 | - | - | 0.1 b,n | - | - | 0.0 | - | - | 0.0 | - | - |
| Belgium[5] | 0.1 a | 0.1 b | 0.1 | 0.1 | - | - | 0.1 a | 0.0 b | 0.0 | 0.0 | - | - |
| Canada | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 n | 0.2 b,n | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 n | 0.0 b,n |
| Czech Republic | - | 0.6 c,q | 0.3 c,q | 0.3 | 0.3 | - | - | - | - | 0.0 | 0.0 | - |
| Denmark | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 a | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - |
| Finland | 0.3 a | 0.4 a | 0.4 | 0.3 | 0.4 | - | 0.0 a | 0.0 a | 0.0 | 0.0 | 0.0 | - |
| France | 0.5 a | 0.5 | 0.5 | 0.4 | 0.4 n | - | 0.0 a | 0.0 | 0.0 | 0.0 | 0.0 n | - |
| Germany | 0.3 | 0.4 a | 0.3 b,m | 0.3 m | 0.3 b,m | 0.3 b,m | 0.0 | - | - | - | - | - |
| Greece | 0.1 a | 0.1 | 0.1 a | 0.1 b | - | - | - | - | 0.0 a | 0.0 b | - | - |
| Hungary | - | 0.3 c,q,s | 0.2 a,c,s | 0.2 c,s | 0.3 c,s | - | - | - | - | - | - | - |
| Iceland | 0.4 | 0.5 | 0.6 | 0.6 | 0.8 b | - | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 b | - |
| Ireland | 0.3 | 0.1 b | 0.1 b | 0.1 b | - | - | 0.0 | 0.0 b | 0.0 b | - | - | - |
| Italy | 0.2 r | 0.3 a | 0.2 | 0.2 | - | - | - | - | - | - | - | - |
| Japan | 0.3 b,j,k | 0.2 b,j,k | 0.3 b,j,k | 0.3 | 0.3 | - | 0.1 b,j,k | 0.1 b,j,k | 0.1 b,j,k | 0.1 a | 0.1 | - |
| Korea | - | - | 0.4 e | 0.4 e | 0.4 e | - | - | - | 0.0 e | 0.0 e | 0.0 e | - |
| Luxembourg[3] | - | - | - | 0.1 | - | - | - | - | - | - | - | - |
| Mexico | - | - | 0.1 | 0.2 | - | - | - | - | 0.0 | 0.0 | - | - |
| Netherlands | 0.4 | 0.4 | 0.4 a | 0.3 | - | - | 0.0 | 0.0 a,m | 0.0 a | 0.0 | - | - |
| New Zealand | - | 0.4 | 0.4 | 0.4 a | - | - | - | - | - | - | - | - |
| Norway | 0.2 | 0.3 | 0.3 a | 0.2 | 0.3 | - | 0.0 | - | - | - | - | - |
| Poland | - | - | 0.2 a | 0.2 | 0.3 b | - | - | - | - | 0.0 | 0.0 b | - |
| Portugal[6, 1] | 0.1 | 0.1 | 0.2 a | 0.2 | 0.2 b | - | 0.0 | 0.1 | 0.1 a | 0.1 | 0.1 b | - |
| Slovak Republic | - | 0.5 c,q | 0.4 c | 0.2 k,c | 0.2 k,c | - | - | - | - | - | 0.0 k | - |
| Spain | 0.1 | 0.2 | 0.2 a | 0.2 | 0.2 | - | - | 0.0 | 0.0 a | 0.0 | 0.0 | - |
| Sweden | 0.1 a,f,k | 0.1 f,k | 0.1 a,f,k | 0.1 f,k | - | - | 0.0 a,k | 0.0 k | 0.0 a,k | 0.0 k | - | - |
| Switzerland[1, 2, 3] | 0.1 b | 0.1 f | 0.1 f | 0.0 a,f | - | - | - | 0.0 | 0.1 | 0.0 | - | - |
| Turkey[3] | - | 0.0 | 0.0 | 0.0 | - | - | - | - | - | - | - | - |
| United Kingdom | 0.5 a | 0.3 a | 0.3 | 0.2 a | 0.2 | - | 0.1 a | 0.0 | 0.0 | 0.0 | 0.0 | - |
| United States | 0.3 f,h | 0.3 f,h | 0.2 f,h | 0.2 f,h | 0.2 f,h,n | 0.2 b,f,h,n | 0.1 h | 0.1 h | 0.1 h | 0.1 h | 0.1 h,n | 0.1 h,n |
| **Total OECD** | **0.3 b** | **0.3 a,b** | **0.3 a,b** | **0.2 b** | **0.2 b,n** | **-** | **0.1 b** | **0.1 a,b** | **0.1 a,b** | **0.1 b** | **0.1 b,n** | **-** |
| **EU-25** | **-** | **-** | **0.3 b** | **0.2 b** | **0.3 b,n** | **-** | **-** | **-** | **0.0 b** | **0.0 b** | **0.0 b,n** | **-** |
| **EU-15** | **0.3 b** | **0.3 a,b** | **0.3 b** | **0.3 b** | **0.3 b,n** | **-** | **0.0 b** | **0.0 a,b** | **0.0 b** | **0.0 b** | **0.0 b,n** | **-** |
| China | - | 0.4 j,k,s | 0.3 j,k,s | 0.3 | 0.4 | - | - | - | - | - | - | - |
| Israel | - | 0.3 c | 0.3 c | 0.3 c,n | 0.3 c,n | - | - | 0.2 c | 0.2 c | 0.2 c,n | 0.2 c,n | - |
| Russian Federatior | - | 0.1 | 0.2 | 0.3 | 0.3 | - | - | 0.0 h | 0.0 | 0.0 | 0.0 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

**Table 9. Business R&D expenditures, 1981-2003**

| | Millions constant USD (1995 PPPs) | | | | | | | As a percentage of total OECD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 |
| Australia | 591 [b] | 1 067 [b] | 1 896 | 3 306 | 3 718 | - | - | 0.4 | 0.5 | 0.7 | 1.1 | 0.9 | - |
| Austria[1] | 814 | 949 [b] | - | - | 2 214 | - | - | 0.5 | 0.4 | - | - | 0.6 | - |
| Belgium | 1 664 | 2 020 | 2 228 [b] | 2 681 | 4 042 | 4 170 [n] | - | 1.0 | 0.9 | 0.8 | 0.9 | 1.0 | 1.1 |
| Canada | 2 811 | 3 958 | 4 660 | 6 536 | 9 850 | 8 875 [n] | 8 630 [b,n] | 1.7 | 1.7 | 1.6 | 2.2 | 2.5 | 2.3 |
| Czech Republic | - | - | 1 613 [c,q] | 818 [a] | 1 066 | 1 100 | - | - | - | 0.6 | 0.3 | 0.3 | 0.3 |
| Denmark | 470 | 671 | 1 038 | 1 239 | 2 248 | 2 404 | - | 0.3 | 0.3 | 0.4 | 0.4 | 0.6 | 0.6 |
| Finland | 494 | 797 | 1 105 | 1 402 | 3 001 | 3 056 | - | 0.3 | 0.4 | 0.4 | 0.5 | 0.8 | 0.8 |
| France | 10 528 | 12 974 | 17 191 | 17 356 | 20 217 [a] | 19 853 [n] | - | 6.2 | 5.7 | 6.0 | 5.9 | 5.1 | 5.1 |
| Germany | 19 239 | 23 586 | 29 116 [a] | 26 122 | 33 897 | 33 934 [b] | 33 464 [b] | 11.4 | 10.4 | 10.2 | 8.9 | 8.6 | 8.7 |
| Greece[2] | 46 | 95 | 126 | 198 | 361 [b] | - | - | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | - |
| Hungary | - | - | 406 [q] | 297 | 447 | 443 | - | - | - | 0.1 | 0.1 | 0.1 | 0.1 |
| Iceland | 3 | 6 | 15 | 29 | 139 | 136 [b] | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ireland | 109 | 160 | 310 | 575 | 873 | - | - | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | - |
| Italy | 4 461 [r] | 6 199 [r] | 7 746 [a] | 6 351 | 7 278 | 7 221 [n] | 7 313 [n] | 2.6 | 2.7 | 2.7 | 2.2 | 1.8 | 1.8 |
| Japan | 25 562 [j] | 37 894 [j] | 56 098 [j] | 53 174 [j] | 68 522 | 70 103 | - | 15.2 | 16.7 | 19.7 | 18.0 | 17.4 | 17.9 |
| Korea | - | - | - | 9 525 | 15 024 | 15 621 | - | - | - | - | 3.2 | 3.8 | 4.0 |
| Luxembourg[3] | - | - | - | - | 294 [-] | - | - | - | - | - | 0.1 | - | - |
| Mexico | - | - | 543 [b,j,q] | 402 | 968 | - | - | - | - | 0.2 | 0.1 | 0.2 | - |
| Netherlands | 2 292 | 2 866 | 3 018 | 3 466 | 4 468 | 4 203 [n] | - | 1.4 | 1.3 | 1.1 | 1.2 | 1.1 | 1.1 |
| New Zealand | - | - | 141 | 164 | 319 [a] | - | - | - | - | 0.0 | 0.1 | 0.1 | - |
| Norway | 495 | 834 | 825 | 1 001 [a] | 1 372 | 1 354 [b] | - | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| Poland | - | - | - | 728 [a] | 863 | 480 | - | - | - | - | 0.2 | 0.2 | 0.1 |
| Portugal[4, 2, 5] | 85 | 95 | 169 | 157 [a] | 436 | 521 [b] | - | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| Slovak Republic | - | - | 648 [b,c,q] | 219 [c] | 233 | 210 | - | - | - | 0.2 | 0.1 | 0.1 | 0.1 |
| Spain | 798 | 1 351 | 2 768 | 2 416 | 3 830 | 4 416 [a] | - | 0.5 | 0.6 | 1.0 | 0.8 | 1.0 | 1.1 |
| Sweden | 2 058 [a] | 3 024 | 3 344 [k] | 4 673 [a,k] | 7 376 [k] | - | - | 1.2 | 1.3 | 1.2 | 1.6 | 1.9 | - |
| Switzerland[2, 5, 6, 3] | 2 399 [b] | 3 482 [a] | 3 321 | 3 513 | 3 884 [-] | - | - | 1.4 | 1.5 | 1.2 | 1.1 | 1.0 | - |
| Turkey[2] | - | - | 324 | 303 | 879 [-] | - | - | - | - | 0.1 | 0.1 | 0.2 | - |
| United Kingdom | 12 089 | 13 045 | 14 533 | 14 615 | 17 053 [a] | 17 564 | - | 7.2 | 5.7 | 5.1 | 5.0 | 4.3 | 4.5 |
| United States | 81 589 [h] | 112 257 [h] | 127 965 [h] | 132 109 [h] | 179 673 [h] | 172 371 [h,n] | 170 945 [b,h,n] | 48.4 | 49.4 | 44.9 | 44.8 | 45.5 | 44.1 |
| **Total OECD** | **168 685** [b] | **227 013** [b] | **284 999** [a,b] | **294 874** [a,b] | **394 706** [b] | **390 610** [b,n] | **-** | **100** | **100** | **100** | **100** | **100** | **100** |
| **EU-25** | **-** | **-** | **-** | **85 141** [b] | **110 640** [b] | **111 945** [b,n] | **-** | **-** | **-** | **-** | **28.9** | **28.0** | **28.7** |
| **EU-15** | **55 136** [b] | **67 794** [b] | **84 074** [a,b] | **82 839** [b] | **107 593** [b] | **109 291** [b,n] | **-** | **32.7** | **29.9** | **29.5** | **28.1** | **27.3** | **28.0** |
| China | - | - | 5 505 [k,s] | 7 871 [k,s] | 31 668 | 40 066 | - | - | - | 1.9 | 2.7 | 8.0 | 10.3 |
| Israel | - | - | 1 079 [c] | 1 544 [c] | 4 470 [c,n] | 4 024 [c,n] | 3 916 [c,n] | - | - | 0.4 | 0.5 | 1.1 | 1.0 |
| Russian Federation[5] | - | - | 7 532 | 5 121 | 8 628 | 9 539 | - | - | - | 2.7 | 1.7 | 2.2 | 2.4 |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1998 instead of 2001. 2. 1986 instead of 1985. 3. 2000 instead of 2001. 4. 1982 instead of 1981. 5. 1992 instead of 1991. 6. 1996 instead of 1995.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/730082336242

**Table 10. BERD intensity, 1981-2003**

As a percentage of value added in industry

| | 1981 | 1985 | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Australia | 0.3 [b] | 0.5 [b] | 0.8 | 1.2 | 1.0 | 1.1 | - | - |
| Austria[1] | 0.9 | 1.0 [b] | - | - | 1.6 [-] | - | - | - |
| Belgium | 1.5 | 1.7 | 1.6 [b] | 1.8 | 2.2 | 2.4 | 2.5 [n] | - |
| Canada | 0.8 | 1.0 | 1.1 | 1.4 | 1.5 | 1.6 [b] | 1.4 [b,n] | 1.4 [b,n] |
| Czech Republic | - | - | 1.8 [c,q] | 0.9 [a] | 1.1 | 1.0 | 1.1 | - |
| Denmark[2] | 0.9 | 1.1 | 1.5 | 1.7 | 2.3 | 2.6 | 2.8 | - |
| Finland | 0.9 | 1.3 | 1.8 | 2.2 | 3.5 | 3.6 | 3.6 | - |
| France | 1.6 | 1.9 | 2.1 | 2.1 | 2.0 | 2.1 [a] | 2.0 [n] | - |
| Germany | 2.3 | 2.7 | 2.5 [a] | 2.1 | 2.5 [b] | 2.5 | 2.5 [b] | 2.5 [b] |
| Greece[3, 2] | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 [b] | - | - |
| Hungary | - | - | 0.6 [q] | 0.5 | 0.5 | 0.6 | 0.6 [b] | - |
| Iceland | 0.1 | 0.2 | 0.4 | 0.8 | 2.5 [b] | 2.8 [b] | 2.8 [b] | - |
| Ireland | 0.4 | 0.5 | 0.8 | 1.3 | 1.1 [b] | 1.1 | - | - |
| Italy | 0.6 [r] | 0.8 [r] | 1.0 [a] | 0.7 | 0.8 | 0.8 | 0.8 [n] | 0.8 [n] |
| Japan | 1.7 [j] | 2.3 [j] | 2.6 [j] | 2.4 [j] | 2.8 | 3.0 | 3.1 [b] | - |
| Korea | - | - | - | 2.2 | 2.4 | 2.8 | 2.7 | - |
| Luxembourg | - | - | - | - | 2.2 | - | - | - |
| Mexico | - | - | 0.1 [b,j,q] | 0.1 | 0.2 | 0.2 | - | - |
| Netherlands | 1.4 | 1.6 | 1.4 | 1.5 | 1.6 | 1.6 | 1.6 [n] | - |
| New Zealand[2] | - | - | 0.4 | 0.3 | 0.4 [b] | 0.6 [a,b] | - | - |
| Norway[2] | 0.9 | 1.3 | 1.3 | 1.5 [a] | 1.4 | 1.4 | 1.4 | - |
| Poland | - | - | - | 0.4 [a] | 0.3 | 0.3 | 0.2 [b] | - |
| Portugal[4, 3, 5] | 0.1 | 0.1 | 0.2 | 0.2 [a] | 0.4 [b] | 0.4 | 0.5 [b] | - |
| Slovak Republic | - | - | - | 0.7 [c] | 0.6 | 0.6 | 0.5 | - |
| Spain | 0.2 | 0.4 | 0.6 | 0.5 | 0.7 | 0.7 | 0.8 [a] | - |
| Sweden[2] | 2.2 [a] | 2.9 | 3.0 [k] | 3.8 [a,k] | 4.3 [k] | 5.2 [k] | - | - |
| Switzerland[3, 5, 6] | 1.6 [b] | 2.6 [a,b] | 2.9 [b] | 3.1 [b] | 3.1 | - | - | - |
| Turkey | - | - | 0.1 | 0.1 | 0.3 | - | - | - |
| United Kingdom | 2.1 | 2.0 | 2.0 | 1.8 | 1.8 | 1.8 [a] | 1.9 | - |
| United States | 2.2 [h] | 2.8 [h] | 2.8 [h] | 2.5 [h] | 2.8 [h] | 2.7 [h] | 2.6 [b,h,n] | 2.5 [b,h,n] |
| **Total OECD** | **1.7 [b]** | **2.1 [b]** | **2.1 [a,b]** | **2.0 [a,b]** | **2.2 [b]** | **2.2 [b]** | **2.1 [b,n]** | **-** |
| **EU-25** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **EU-15** | **1.4 [b]** | **1.7 [b]** | **1.7 [a,b]** | **1.6 [b]** | **1.8 [b]** | **1.8 [b]** | **1.8 [b,n]** | **-** |
| China | - | - | 0.3 [k,s] | 0.3 [k,s] | 0.7 [a] | 0.7 | 0.9 [b] | - |
| Israel | - | - | - | 2.5 [c] | 5.4 [c] | 6.0 [c,n] | 5.4 [b,c,n] | 5.1 [b,c,n] |
| Russian Federatior | - | - | 0.6 | 0.7 | 1.0 [b] | 1.1 | 1.1 [b] | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1998 instead of 2000.
2. 1999 instead of 2000.
3. 1986 instead of 1985.
4. 1982 instead of 1981.
5. 1992 instead of 1991.
6. 1996 instead of 1995.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/754616431240

**Table 11. Business R&D expenditures by source of funds, 1981-2003**

As a percentage of total national R&D expenditures

| | Industry | | | | | | Government | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia | 75.5 [b,p] | 92.7 | 92.9 | 88.7 | - | - | 8.4 [b,p] | 3.0 | 2.4 | 5.1 | - | - |
| Austria[1] | 88.4 | - | - | 64.4 | - | - | 7.4 | - | - | 5.5 | - | - |
| Belgium | 91.5 [a] | 91.4 [b] | 89.2 | 82.7 | 83.9 [n] | - | 8.3 [a] | 7.8 [b] | 4.3 | 5.7 | 5.9 [n] | - |
| Canada | 81.9 | 71.6 | 74.3 | 75.9 | 75.9 [n] | 75.9 [n] | 10.7 | 9.9 | 6.2 | 3.2 | 3.2 [n] | 3.2 [n] |
| Czech Republic | - | - | 92.2 | 84.3 | 84.0 | - | - | 6.6 [c,q] | 4.5 [c,q] | 12.2 | 12.1 | - |
| Denmark | 84.4 [a] | 86.0 | 76.9 | 87.4 | - | - | 12.4 | 7.9 | 6.1 | 3.1 | - | - |
| Finland | 94.9 [a] | 93.3 | 89.1 | 95.6 | 95.7 | - | 4.2 [a] | 5.5 | 5.6 | 3.4 | 3.2 | - |
| France | 68.2 | 66.2 | 76.1 | 82.9 [a] | - | - | 24.6 | 22.3 | 12.7 | 8.4 [a] | - | - |
| Germany | 81.7 | 87.0 [a] | 87.5 | 90.7 | 91.2 [b] | 91.0 [b] | 16.9 | 10.1 [a] | 10.2 | 6.7 | 6.2 [b] | 6.4 [b] |
| Greece | 95.4 | 74.0 | 76.1 | 80.2 [b] | - | - | 4.6 | 5.5 | 7.4 | 2.3 [b] | - | - |
| Hungary | - | 87.0 [q,s] | 78.3 [s] | 75.7 [s] | 69.4 [s] | - | - | 8.2 [q,s] | 16.2 [s] | 6.1 [s] | 7.2 [s] | - |
| Iceland | 53.3 | 84.5 | 95.5 | 73.1 | - | - | 38.3 | 9.6 | 3.3 | 1.4 | - | - |
| Ireland | 80.5 | 89.6 | 98.2 [p] | 92.8 | - | - | 13.7 | 3.7 | 4.9 [p] | 2.7 | - | - |
| Italy | 86.9 [r] | 77.2 [a] | 75.2 | 78.2 | 78.0 [n] | 78.2 [n] | 8.8 [r] | 13.2 [a] | 16.7 | 14.9 | 15.0 [n] | 14.4 [n] |
| Japan | 97.9 | 98.4 | 98.2 | 97.8 | 97.9 | - | 1.9 | 1.4 | 1.6 | 0.8 | 1.0 | - |
| Korea | - | - | 96.3 | 91.2 | 93.0 | - | - | - | 3.6 | 8.1 | 6.4 | - |
| Luxembourg[2] | - | - | - | 97.8 [-] | - | - | - | - | - | 1.6 [-] | - | - |
| Mexico | - | 100.0 [b,q] | 76.2 | 89.8 | - | - | - | 0.0 [b,k,q] | 2.8 | 9.6 | - | - |
| Netherlands | 84.3 | 89.6 | 80.0 | 80.3 | - | - | 7.5 | 7.5 | 6.6 | 5.2 | - | - |
| New Zealand | - | 87.8 | 86.4 | 78.8 [a] | - | - | - | 7.2 | 6.9 | 8.6 [a] | - | - |
| Norway | 73.0 | 76.8 | 82.5 [a] | 81.4 | - | - | 25.3 | 15.9 | 11.9 [a] | 10.3 | - | - |
| Poland | - | - | 64.7 [a] | 67.6 | 86.5 | - | - | - | 33.8 [a] | 30.4 | 11.8 | - |
| Portugal[3, 4] | 92.9 | 80.5 | 78.6 [a] | 94.4 | - | - | 1.6 | 9.1 | 5.1 [a] | 2.1 | - | - |
| Slovak Republic | - | 88.6 [c,q] | 87.7 [c] | 78.3 | 77.5 | - | - | 11.4 [c,q] | 10.8 [c] | 20.6 | 21.1 | - |
| Spain | 93.6 | 80.4 | 84.4 | 82.5 | 84.0 [a] | - | 4.1 | 11.3 | 9.2 | 9.5 | 9.6 [a] | - |
| Sweden | 84.6 [a] | 88.0 | 86.8 [a] | 91.2 | - | - | 13.6 [a] | 10.3 | 9.5 [a] | 5.8 | - | - |
| Switzerland[4, 5, 2] | 98.7 [b] | 95.5 | 92.5 | 91.4 [-] | - | - | 1.3 [b] | 1.7 [f] | 2.4 [f] | 2.3 [f] | - | - |
| Turkey[2] | - | 99.9 | 91.3 | 92.4 [-] | - | - | - | 0.0 | 1.7 | 4.3 [-] | - | - |
| United Kingdom | 61.3 | 69.4 | 70.5 | 66.6 [a] | 66.0 | - | 30.0 | 14.6 | 10.5 | 8.9 [a] | 6.8 | - |
| United States | 68.4 [h] | 77.4 [h] | 82.2 [h] | 90.6 [h] | 90.1 [h,n] | 90.0 [h,n] | 31.6 | 22.6 | 17.8 | 9.4 | 9.9 [n] | 10.0 [n] |
| **Total OECD** | **76.1** [b] | **82.6** [a,b] | **85.1** [a,b] | **89.2** [b] | **89.2** [b,n] | **-** | **22.3** [b] | **14.7** [a,b] | **11.7** [a,b] | **7.2** [b] | **7.1** [b,n] | **-** |
| **EU-25** | **-** | **-** | **80.5** [b] | **82.6** [b] | **-** | **-** | **-** | **-** | **10.8** [b] | **7.9** [b] | **-** | **-** |
| **EU-15** | **76.1** [b] | **78.9** [a,b] | **80.5** [b] | **82.8** [b] | **-** | **-** | **19.3** [b] | **13.4** [a,b] | **10.7** [b] | **7.7** [b] | **-** | **-** |
| China[2] | - | - | - | 86.4 [a,s] | - | - | - | - | - | 6.8 [a,s] | - | - |
| Israel[2] | - | 74.2 [c] | 78.6 [c] | 90.4 [c,n] | - | - | - | 25.8 [c] | 21.3 [c] | 9.6 [c] | - | - |
| Russian Federation | - | - | 43.7 | 41.5 | 40.9 | - | - | - | 51.1 | 49.0 | 50.6 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1998 instead of 2001.
2. 2000 instead of 2001.
3. 1982 instead of 1981.
4. 1992 instead of 1991.
5. 1996 instead of 1995.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/250760635132

**Table 11. Business R&D expenditures by source of funds, 1981-2003 (cont'd)**

As a percentage of total national R&D expenditures

| | Other national sources | | | | | | Abroad | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia | 0.3 [b,p] | 0.3 | 1.7 | 0.7 | - | - | 1.6 [b,p] | 4.1 | 3.1 | 5.6 | - | - |
| Austria[1] | 0.1 | - | - | 0.1 | - | - | 4.1 | - | - | 30.1 | - | - |
| Belgium | 0.0 [a] | 0.0 [b] | 0.4 | 0.1 | 0.1 [n] | - | 0.2 [a] | 0.9 [b] | 6.1 | 11.5 | 10.3 [n] | - |
| Canada | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 [n] | 0.0 [n] | 7.4 | 18.5 | 19.5 | 21.0 | 21.0 [n] | 21.0 [n] |
| Czech Republic | - | - | 0.2 | 1.6 | 1.6 | - | - | - | 3.2 | 1.9 | 2.3 | - |
| Denmark | 0.5 [a] | 1.7 | 1.5 | 0.3 | - | - | 2.8 | 4.4 | 15.5 | 9.2 | - | - |
| Finland | 0.0 | 0.1 | 0.1 | 0.3 | 0.1 | - | 0.9 | 1.2 | 5.3 | 0.7 | 1.0 | - |
| France | 0.1 | 0.1 | 0.0 | 0.0 [a] | - | - | 7.1 | 11.4 | 11.1 | 8.7 [a] | - | - |
| Germany | 0.2 | 0.3 [a] | 0.1 | 0.2 | 0.2 [b] | 0.2 [b] | 1.2 | 2.6 [a] | 2.2 | 2.4 | 2.4 [b] | 2.4 [b] |
| Greece | - | - | 0.0 | 0.0 [b] | - | - | - | 20.6 | 16.5 | 17.5 [b] | - | - |
| Hungary | - | - | - | 0.1 [s] | 0.1 [s] | - | - | 2.8 [q,s] | 4.1 [s] | 16.9 [s] | 22.6 [s] | - |
| Iceland | 0.0 | 0.0 | 0.0 | 0.2 | - | - | 8.4 | 5.9 | 1.2 | 25.3 | - | - |
| Ireland | 0.1 | 0.2 | 0.5 [p] | - | - | - | 5.7 | 6.6 | 3.8 [p] | 4.5 | - | - |
| Italy | 0.0 [r] | - | - | 0.3 | 0.3 [n] | 0.3 [n] | 4.3 [r] | 9.6 [a] | 8.2 | 6.6 | 6.8 [n] | 7.1 [n] |
| Japan | 0.0 | 0.1 | 0.1 | 0.8 | 0.6 | - | 0.1 | 0.1 | 0.1 | 0.5 | 0.5 | - |
| Korea | - | - | 0.2 | 0.2 | 0.1 | - | - | - | 0.0 | 0.6 | 0.5 | - |
| Luxembourg[2] | - | - | - | - | - | - | - | - | - | 0.6 [-] | - | - |
| Mexico | - | - | 0.4 | 0.0 | - | - | - | - | 20.7 | 0.6 | - | - |
| Netherlands | 0.0 | 0.6 | 0.1 | 0.1 | - | - | 8.2 | 2.4 | 13.2 | 14.4 | - | - |
| New Zealand | - | 0.2 | 1.0 | 0.9 [a] | - | - | - | 4.9 | 5.7 | 11.8 [a] | - | - |
| Norway | 0.0 | 0.1 | 0.1 [a] | 0.0 | - | - | 1.7 | 7.2 | 5.6 [a] | 8.4 | - | - |
| Poland | - | - | 0.2 [a] | 0.2 | 0.3 | - | - | - | 1.3 [a] | 1.8 | 1.4 | - |
| Portugal[3, 4] | 0.0 | - [-] | 0.3 [a] | - | - | - | 5.5 | 10.4 | 16.1 [a] | 3.6 | 2.9 [b] | - |
| Slovak Republic | - | - | 0.0 [c] | 0.0 | 0.3 | - | - | - | 1.6 [c] | 1.1 | 1.2 | - |
| Spain | 0.1 | 0.2 | 0.1 | 0.3 | 0.5 [a] | - | 2.2 | 8.1 | 6.4 | 7.8 | 5.9 [a] | - |
| Sweden | 0.0 [a] | 0.2 | 0.1 [a] | 0.1 | - | - | 1.8 [a] | 1.6 | 3.7 [a,j] | 2.9 | - | - |
| Switzerland[4, 5, 2] | - | 0.2 | 0.7 | 0.5 [-] | - | - | - | 2.7 | 4.4 | 5.8 [-] | - | - |
| Turkey[2] | - | - | 1.4 | 1.4 [-] | - | - | - | 0.1 | 5.6 | 1.9 [-] | - | - |
| United Kingdom | - | - | 0.0 | 0.0 [a] | 0.0 | - | 8.7 | 16.0 | 19.1 | 24.4 [a] | 27.2 | - |
| United States | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 [n] | 0.0 [n] | - | - | - | - | - | - |
| **Total OECD** | **0.1** [b] | **0.1** [a,b] | **0.1** [a,b] | **0.2** [b] | **0.2** [b,n] | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **EU-25** | **-** | **-** | **0.1** [b] | **0.2** [b] | **0.1** [b,n] | **-** | **-** | **-** | **8.6** [b] | **9.2** [b] | **-** | **-** |
| **EU-15** | **0.1** [b] | **0.2** [a,b] | **0.1** [b] | **0.1** [b] | **0.1** [b,n] | **-** | **4.6** [b] | **7.5** [a,b] | **8.8** [b] | **9.3** [b] | **-** | **-** |
| China[2] | - | - | - | - | - | - | - | - | - | 4.0 [a,s] | - | - |
| Israel[2] | - | 0.0 [c] | 0.1 [c] | 0.0 [c] | - | - | - | 0.0 [c] | 0.0 [c] | 0.0 [c] | - | - |
| Russian Federation | - | - | 0.0 | 0.3 | 0.1 | - | - | - | 5.1 | 9.2 | 8.4 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1998 instead of 2001.
2. 2000 instead of 2001.
3. 1982 instead of 1981.
4. 1992 instead of 1991.
5. 1996 instead of 1995.

*Source:* OECD, MSTI database, May 2004.

**Table 12. Business R&D expenditures, by two main sources of funds, 1981-2003**

As a percentage of GDP

| | Industry | | | | | | Government | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia | 0.18 [b,p] | 0.54 | 0.81 | 0.69 | - | - | 0.02 [b,p] | 0.02 | 0.02 | 0.04 | - | - |
| Austria[1] | 0.56 | - | - | 0.73 | - | - | 0.05 | - | - | 0.06 | - | - |
| Belgium | 0.92 [a] | 0.99 [b] | 1.09 | 1.32 | 1.38 [n] | - | 0.08 [a] | 0.08 [b] | 0.05 | 0.09 | 0.10 [n] | - |
| Canada | 0.49 | 0.57 | 0.74 | 0.92 | 0.80 [n] | 0.77 [b,n] | 0.06 | 0.08 | 0.06 | 0.04 | 0.03 [n] | 0.03 [b,n] |
| Czech Republic | - | - [c,q] | 0.61 [c,q] | 0.66 | 0.66 | - | - | 0.09 [c,q] | 0.03 [c,q] | 0.10 | 0.10 | - |
| Denmark | 0.45 [a] | 0.83 | 0.81 | 1.44 | - | - | 0.07 | 0.08 | 0.06 | 0.05 | - | - |
| Finland | 0.61 [a] | 1.08 | 1.28 | 2.31 | 2.31 | - | 0.03 [a] | 0.06 | 0.08 | 0.08 | 0.08 | - |
| France | 0.78 | 0.97 | 1.07 | 1.17 [a] | - | - | 0.28 | 0.33 | 0.18 | 0.12 [a] | - | - |
| Germany | 1.36 | 1.52 [a] | 1.30 | 1.59 | 1.60 [b] | 1.57 [b] | 0.28 | 0.18 [a] | 0.15 | 0.12 | 0.11 [b] | 0.11 [b] |
| Greece | 0.04 | 0.07 | 0.11 [a] | 0.17 [b] | - | - | 0.00 | 0.00 | 0.01 [a] | 0.00 [b] | - | - |
| Hungary | - | 0.38 [q,s] | 0.25 [a,s] | 0.29 [s] | 0.25 [s] | - | - | 0.04 [r,s] | 0.05 [a,s] | 0.02 [s] | 0.03 [s] | - |
| Iceland | 0.03 | 0.22 | 0.48 | 1.32 | - [b] | - | 0.02 | 0.02 | 0.02 | 0.03 | - | - |
| Ireland | 0.23 | 0.53 | 0.87 [p] | 0.74 | - | - | 0.04 | 0.02 | 0.04 [p] | 0.02 | - | - |
| Italy | 0.43 [r] | 0.52 [a] | 0.40 | 0.43 | 0.42 [n] | 0.43 [n] | 0.04 [r] | 0.09 [a] | 0.09 | 0.08 | 0.08 [n] | 0.08 [n] |
| Japan | 1.37 [j] | 2.05 [j] | 1.86 [j] | 2.21 | 2.27 | - | 0.03 [j] | 0.03 [j] | 0.03 [j] | 0.02 | 0.02 | - |
| Korea | - | - | 1.77 | 2.03 | 2.03 | - | - | - | 0.07 | 0.18 | 0.14 | - |
| Luxembourg[2] | - | - | - | 1.56 [-] | - | - | - | - | - | 0.02 [-] | - | - |
| Mexico | - | 0.09 [b,j,q] | 0.05 | 0.11 | - | - | - | - | 0.00 | 0.01 | - | - |
| Netherlands | 0.80 | 0.88 | 0.83 [a] | 0.88 | - | - | 0.07 | 0.07 | 0.07 [a] | 0.06 | - | - |
| New Zealand | - | 0.23 | 0.22 | 0.34 [a] | - | - | - | 0.02 | 0.02 | 0.04 [a] | - | - |
| Norway | 0.45 | 0.68 | 0.79 [a] | 0.78 | - | - | 0.16 | 0.14 | 0.11 [a] | 0.10 | - | - |
| Poland | - | - | 0.16 [a] | 0.16 | 0.11 [b] | - | - | - | 0.08 [a] | 0.07 | 0.02 [b] | - |
| Portugal[3, 4] | 0.08 | 0.10 | 0.09 [a] | 0.25 | - | - | 0.00 | 0.01 | 0.01 [a] | 0.01 | - | - |
| Slovak Republic | - | 1.41 [c,q] | 0.44 [c] | 0.34 | 0.29 | - | - | 0.18 [c,q] | 0.05 [c] | 0.09 | 0.08 | - |
| Spain | 0.18 | 0.38 | 0.33 [a] | 0.41 | 0.47 [a] | - | 0.01 | 0.05 | 0.04 [a] | 0.05 | 0.05 [a] | - |
| Sweden | 1.19 [a] | 1.65 [k] | 2.16 [a,k] | 3.03 [k] | - | - | 0.19 [a] | 0.19 [k] | 0.24 [a,k] | 0.19 [k] | - | - |
| Switzerland[4, 5, 2] | 1.55 [b] | 1.74 | 1.75 | 1.74 [-] | - | - | 0.02 [b] | 0.03 [f] | 0.05 [f] | 0.04 [f] | - | - |
| Turkey[2] | - | 0.11 | 0.08 | 0.19 [-] | - | - | - | 0.00 | 0.00 | 0.01 [-] | - | - |
| United Kingdom | 0.92 | 0.96 | 0.89 | 0.83 [a] | 0.83 | - | 0.45 | 0.20 | 0.13 | 0.11 [a] | 0.09 | - |
| United States | 1.14 [h] | 1.53 [h] | 1.48 [h] | 1.81 [h] | 1.68 [h,n] | 1.63 [b,h,n] | 0.53 [h] | 0.44 [h] | 0.32 [h] | 0.19 [h] | 0.19 [h,n] | 0.18 [b,h] |
| **Total OECD** | **0.97** [b] | **1.26** [a,b] | **1.19** [a,b] | **1.41** [b] | **1.37** [b,n] | **-** | **0.28** [b] | **0.22** [a,b] | **0.16** [a,b] | **0.11** [b] | **0.11** [b,n] | **-** |
| **EU-25** | **-** | **-** | **0.85** [b] | **0.97** [b] | **-** | **-** | **-** | **-** | **0.11** [b] | **0.09** [b] | **-** | **-** |
| **EU-15** | **0.79** [b] | **0.95** [a,b] | **0.90** [b] | **1.03** [b] | **-** | **-** | **0.20** [b] | **0.16** [a,b] | **0.12** [b] | **0.10** [b] | **-** | **-** |
| China[2] | - | - | - | 0.52 [a,s] | - | - | - | - | - | 0.04 [a,s] | - | - |
| Israel[2] | - | 1.03 [c] | 1.27 [c] | 3.22 [c,n] | - | - | - | 0.36 [c] | 0.34 [c] | 0.34 [c] | - | - |
| Russian Federation | - | - | 0.25 | 0.34 | 0.36 | - | - | - | 0.30 | 0.40 | 0.44 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1998 instead of 2001.
2. 2000 instead of 2001.
3. 1982 instead of 1981.
4. 1992 instead of 1991.
5. 1996 instead of 1995.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/348312071533

**Table 13. Intensity in business R&D expenditures by sector, 1991 and 2001 or nearest years available**

As a percentage of value added in industry

| | | Australia | | Belgium | | Canada | | Czech Republic | | Denmark | | Finland | | France | | Germany | | Ireland | | Italy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2000 | 1992 | 2001 | 1991 | 2000 | 1992 | 2001 | 1991 | 1999 | 1991 | 2001 | 1991 | 2000 | 1991 | 2001 | 1991 | 1999 | 1991 | 2001 |
| **Total manufacturing** | **(15-37)** | **2.9** | **3.3** | **5.2** | **7.7** | **3.6** | **4.1** | **2.8** | **2.1** | **4.4** | **6.0** | **5.6** | **9.4** | **7.2** | **6.9** | **6.5** | **7.7** | **2.1** | **2.2** | **2.9** | **2.4** |
| Food prod., beverages and tobacco | (15-37) | 1.0 | 1.0 [1] | 1.4 | 1.7 | 0.4 | 0.4 | 0.3 | 0.1 [1] | 1.5 | 1.5 | 3.1 | 2.3 | 1.0 | 1.2 | 0.7 | 0.7 | 1.2 | 1.0 | 0.3 | 0.4 |
| Textiles, textile prod., leather and footwear | (17-19) | 0.3 | 0.8 [1] | 1.2 | 3.6 | 1.1 | 1.1 | 2.5 | 0.4 [1] | 0.5 | 0.8 | 1.8 | 2.6 | 0.5 | 1.0 | 1.1 | 2.3 | 1.3 | 1.0 | 0.0 | 0.1 |
| Wood, pulp, paper, paper prod., printing & publishing | (20-22) | 0.6 | 0.8 [1] | 0.8 | 1.1 | 0.7 | 0.4 | 0.4 | 0.0 [1] | 0.3 | 0.3 | 2.4 | 1.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.2 | 0.2 | 0.0 | 0.1 |
| Chemical, rubber, plastics and fuel prod. | (23-25) | 3.8 | 4.4 [1] | 10.2 | 14.0 | 3.8 | 4.0 | 3.6 | 2.6 [1] | 10.3 | 17.5 | 9.3 | 12.2 | 9.8 | 9.4 | 9.0 | 10.1 | 2.6 | 1.3 | 4.9 | 3.5 |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 0.9 | 1.1 [1] | 7.3 | 2.9 | 5.8 | 1.6 | 3.7 | 0.3 [1] | 0.0 | 0.0 | 4.9 | 5.8 | 5.6 | 2.4 | 2.7 | 0.8 | - | - | 2.0 | 1.9 |
| Chemicals and chemical prod. | (24) | 5.7 | 6.9 [1] | 12.0 | 17.8 | 4.5 | 6.6 | 3.4 | 4.2 [1] | 15.7 | 23.7 | 13.8 | 17.6 | 14.1 | 13.9 | 12.6 | 15.0 | 2.8 | 1.2 | 7.3 | 4.8 |
| ....Chemicals excluding pharmaceuticals | (24ex2423) | - | - | 10.3 | - | 2.4 | 2.1 | - | 2.9 [1] | 4.4 | 8.1 | 11.6 | 7.0 | 10.7 | 7.1 | 11.4 | 12.1 | 1.1 | 0.4 | 4.4 | 3.2 |
| ....Pharmaceuticals | (2423) | - | - | 18.6 | - | 11.4 | 23.9 | - | 10.3 [1] | 28.2 | 33.6 | 20.5 | 63.7 | 22.1 | 26.3 | 18.3 | 24.1 | 10.5 | 4.5 | 12.0 | 7.0 |
| Rubber and plastics prod. | (25) | 2.2 | 1.5 [1] | 4.3 | 4.4 | 0.6 | 0.8 | 3.8 | 1.1 [1] | 1.0 | 4.4 | 4.1 | 6.0 | 3.7 | 5.1 | 2.2 | 3.4 | 1.2 | 2.6 | 1.5 | 1.3 |
| Other non-metallic mineral prod. | (26) | 1.2 | 0.8 [1] | 1.7 | 2.9 | 0.5 | 0.2 | 0.7 | 0.6 [1] | 2.1 | 1.2 | 2.0 | 1.7 | 1.7 | 2.4 | 1.9 | 2.2 | 1.1 | 1.1 | 0.2 | 0.3 |
| Basic metals and fabricated metal prod. | (27-28) | 2.5 | 2.2 [1] | 2.2 | 3.3 | 1.9 | 1.1 | 2.5 | 1.0 [1] | 1.6 | 1.0 | 3.8 | 3.6 | 1.7 | 1.4 | 1.3 | 1.5 | 1.3 | 1.4 | 0.8 | 0.3 |
| Machinery and equipment | (29-33) | 9.3 | 9.6 [1] | 12.6 | 16.5 | 13.1 | 17.7 | 5.0 | 2.2 [1] | 8.3 | 9.5 | 12.6 | 19.8 | 13.5 | 12.9 | 8.7 | 9.4 | 4.5 | 6.0 | 5.2 | 4.7 |
| Machinery and equipment, n.e.c. | (29) | 3.8 | 5.1 [1] | 5.4 | 6.5 | 1.6 | 2.1 | 3.8 | 2.8 [1] | 5.4 | 7.1 | 5.7 | 7.3 | 4.2 | 5.3 | 5.4 | 6.3 | 2.0 | 3.6 | 1.6 | 1.8 |
| Electrical and optical equipment | (30-33) | 14.9 | 13.6 [1] | 18.4 | 24.7 | 22.0 | 30.5 | 7.2 | 1.8 [1] | 12.9 | 12.4 | 22.8 | 25.9 | 19.8 | 17.5 | 11.7 | 13.0 | 5.1 | 6.3 | 9.1 | 8.5 |
| ....Office, accounting and computing machinery | (30) | - | - | - | - | 61.4 | 38.1 | -87.5 | 0.5 [1] | 14.2 | 13.9 | 11.1 | 23.4 | 16.1 | 13.4 | 13.1 | 22.0 | 2.3 | 1.7 | 43.5 | 9.8 |
| ....Electrical machinery and apparatus, nec | (31) | - | - | - | - | 2.2 | 5.6 | 2.9 | 1.2 [1] | 4.8 | 8.1 | 9.4 | 14.6 | 5.8 | 6.8 | 6.1 | 3.8 | 3.8 | 6.4 | 4.1 | 2.4 |
| ....Radio, television and communication equip. | (32) | - | - | - | - | 26.5 | 36.4 | 28.5 | 3.3 [1] | 19.5 | 13.0 | 46.5 | 30.2 | 25.3 | 33.2 | 27.5 | 45.4 | 23.5 | 14.1 | 18.3 | 21.0 |
| ....Medical, precision and optical instruments | (33) | - | - | - | - | - | - | 10.3 | 1.9 [1] | 16.5 | 15.6 | 20.6 | 11.0 | 34.9 | 16.5 | 12.5 | 10.9 | 2.0 | 4.2 | 1.7 | 5.5 |
| Transport equipment | (34-35) | 6.2 | 6.7 [1] | 2.7 | 4.8 | 5.4 | 3.8 | 6.8 | 10.3 [1] | 2.0 | 6.4 | 5.4 | 4.4 | 26.1 | 17.1 | 16.0 | 18.0 | 3.0 | 3.1 | 16.4 | 12.1 |
| Motor vehicles, trailers and semi-trailers | (34) | 5.8 | 8.1 [1] | - | - | 0.9 | 1.4 | 4.0 | 10.7 [1] | - | - | 5.7 | 3.7 | 13.2 | 13.8 | 13.1 | 18.4 | 6.9 | 5.9 | 15.5 | 12.1 |
| Other transport equipment | (35) | 7.4 | 4.0 [1] | - | - | 15.5 | 10.7 | 31.3 | 8.4 [1] | 3.1 | 9.9 | 5.1 | 4.8 | 61.3 | 24.8 | 32.3 | 15.7 | 0.4 | 1.4 | 18.0 | 12.0 |
| ....Building and repairing of ships and boats | (351) | - | - | - | - | - | - | - | 0.0 [1] | 2.6 | 13.2 | 2.7 | 2.1 | 1.1 | 1.9 | 4.2 | 1.5 | 0.0 | 3.1 | 2.3 | 0.9 |
| ....Aircraft and spacecraft | (353) | - | - | - | - | 23.7 | 14.0 | - | 18.5 [1] | - | - | 0.9 | 8.1 | 112.0 | 32.5 | 51.2 | 20.2 | - | - | 32.5 | 24.3 |
| ....Railroad equip. and transport equip. n.e.c. | (352+359) | - | - | - | - | - | - | - | 3.4 [1] | 5.4 | 0.6 | 17.4 | 16.9 | 8.4 | 6.6 | 14.7 | 9.9 | 0.4 | 0.0 | 6.3 | 4.0 |
| Manufacturing nec; recycling | (36-37) | - | - | 3.0 | 2.2 | - | - | 1.3 | 0.9 [1] | 4.9 | 1.4 | 1.0 | 2.8 | 0.5 | 2.5 | 1.3 | 1.8 | 0.3 | 0.9 | 0.1 | 0.2 |
| Electricity, gas and water supply | (40-41) | 0.4 | 0.2 | 0.1 | 0.7 | 1.1 | 0.7 | 0.0 | 0.0 | 0.1 | 0.2 | 2.6 | 2.0 | 1.2 | 1.6 | 0.3 | 0.2 | - | - | 0.7 | 0.1 |
| Construction | (45) | 0.0 | 0.1 | 0.3 | 0.4 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.6 | 0.2 | 0.2 | 0.1 | 0.1 | - | - | 0.0 | 0.0 |
| **Total services[5]** | **(50-99)** | **0.3** | **0.4** | **0.2** | **0.3** | **0.3** | **0.4** | **1.1** | **0.5** | **0.4** | **0.9** | **0.2** | **0.5** | **0.1** | **0.2** | **0.1** | **0.2** | **0.2** | **0.4** | **0.1** | **0.2** |
| Wholesale and retail trade; restaurants and hotels | (50-55) | - | - | 0.1 | 0.1 | - | - | - | 0.1 | - | - | - | - | - | 0.0 | - | - | - | 0.0 | 0.0 | 0.0 |
| Transport and storage and communication | (60-64) | - | - | 0.0 | 0.6 | 0.4 | 0.1 | 0.1 | 0.1 | - | - | 0.3 | 1.6 | - | - | - | - | 0.5 | 1.6 | 0.0 | 0.0 |
| Transport and storage | (60-63) | - | - | - | - | 0.1 | 0.1 | 0.1 | - | - | - | 0.0 | 0.2 | 0.1 | 1.8 | - | 0.6 | 0.0 | - | 0.0 | 0.0 |
| Post and telecommunications | (64) | - | - | - | - | 0.8 | 0.2 | 0.0 | - | 1.5 | 4.8 | 1.0 | 4.7 | - | - | - | - | 1.1 | - | 0.2 | 0.0 |
| Finance, insurance, real estate and business services | (65-74) | - | - | 0.6 | 0.6 | 0.6 | 0.9 | 3.1 | 1.3 | - | 1.7 | - | - | - | - | - | - | - | 0.8 | 0.3 | 0.4 |
| Financial intermediation | (65-67) | - | - | 0.5 | 0.2 | 0.4 | 0.2 | 0.0 | 0.0 | - | 0.7 | - | - | - | - | - | - | - | 0.0 | 0.0 | 0.2 |
| Real estate, renting and business activities | (70-74) | - | - | 0.6 | 0.7 | 0.7 | 1.2 | 5.0 | 1.7 | 1.2 | 2.0 | - | - | 0.3 | 0.3 | - | 0.5 | - | 1.0 | 0.4 | 0.5 |
| ....Real estate activities | (70) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ....Renting of m&eq and other business activities | (71-74) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ……Other business activities | (74) | - | - | - | - | - | - | 3.0 | - | 3.4 | 1.7 | - | 0.3 | - | 0.5 | - | - | - | - | - | 0.2 |
| Community social and personal services | (75-99) | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.2 | - | - | - | 0.1 | - | - | - | - | - | 0.0 | 0.0 | 0.0 |
| High-technology manufactures | | 16.5 | 15.5 [1] | - | - | 24.9 | 29.3 | 36.3 | 5.2 [1] | 21.7 | 23.5 | 27.2 | 29.2 | 35.8 | 25.9 | 21.0 | 22.6 | 6.2 | 5.9 | 15.0 | 12.7 |
| Medium-high technology manufactures | | 4.5 | 5.2 [1] | - | - | 1.6 | 2.0 | 4.7 | 4.8 [1] | 4.8 | 7.1 | 7.8 | 8.4 | 8.6 | 8.6 | 8.8 | 10.7 | 1.8 | 1.1 | 4.8 | 3.6 |
| Medium-low technology manufactures | | 2.3 | 1.9 [1] | - | - | 2.0 | 1.0 | 2.3 | 0.9 [1] | 1.6 | 2.4 | 3.6 | 3.7 | 2.4 | 2.4 | 1.6 | 2.0 | 1.2 | 1.6 | 0.9 | 0.5 |
| Low-technology manufactures | | - | - | 1.3 | 1.9 | 0.6 | 0.5 | 1.1 | 0.3 [1] | 1.5 | 1.0 | 2.4 | 1.6 | 0.6 | 1.0 | 0.7 | 0.8 | 0.8 | 0.6 | 0.1 | 0.2 |
| High- and medium-high technology manufactures | | 7.3 | 7.9 [1] | 10.0 | 14.6 | 8.0 | 9.6 | 5.2 | 4.8 [1] | 9.3 | 13.3 | 11.7 | 18.3 | 16.7 | 14.3 | 11.2 | 13.0 | 3.8 | 3.3 | 7.5 | 6.0 |

1. Intensity of the previous year.

2. 1998 instead of 1995.

3. EU includes the 15 EU Members before 1 May 2004 excluding Austria, Greece, Luxembourg, Portugal (for which no Anberd data are available).

4. OECD includes previous EU countries and Canada, Japan, and the United States.

5. Due to differences in data reporting methodologies, service sector R&D figures are not fully comparable across countries.

*Source:* OECD, STAN Indicators 2004.

StatLink: http://dx.doi.org/10.1787/052066133807

**Table 13. Intensity in business R&D expenditures by sector, 1991 and 2001 or nearest years available (cont'd)**

As a percentage of value added in industry

| | | Korea | | Netherlands | | Norway | | Poland | | Spain | | Sweden | | UK | | US | | EU[3] | | OECD[4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1995 | 2001 | 1991 | 2000 | 1991 | 1998 | 1994 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2000 | 1992 | 1999 | 1991 | 1999 |
| **Total manufacturing** | **(15-37)** | **5.2** | **6.0** | **5.1** | **5.7** | **5.1** | **4.1** | **1.2** | **1.0** | **1.9** | **1.8** | **9.8** | **15.7** | **5.7** | **6.6** | **8.5** | **8.5** | **5.3** | **5.7** | **83.9** | **76.8** |
| Food prod., beverages and tobacco | (17-19) | 0.9 | 0.9 | 1.8 | 2.4 | 1.2 | 1.5 | 0.1 | 0.1 [1] | 0.3 | 0.7 | 1.6 | 1.1 | 1.2 | 1.5 | 1.1 | 1.1 | 0.9 | 0.9 | 1.5 | 1.3 |
| Textiles, textile prod., leather and footwear | (20-22) | 0.6 | 1.1 | 0.7 | 1.0 | 0.9 | 1.8 | 0.5 | 0.4 [1] | 0.1 | 0.6 | 0.9 | 1.2 | 0.3 | 0.5 | 0.5 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 |
| Wood, pulp, paper, paper prod., printing & publishing | (23-25) | 0.6 | 0.5 | 0.2 | 0.3 | 0.8 | 0.9 | 0.1 | 0.1 [1] | 0.2 | 0.2 | 1.7 | 1.7 | 0.3 | 0.1 | 1.0 | 1.6 | 0.4 | 0.4 | 1.1 | 1.3 |
| Chemical, rubber, plastics and fuel prod. | (23) | 3.4 | 2.8 | 10.7 | 8.1 | 11.6 | 7.5 | 1.7 | 1.3 [1] | 2.8 | 3.0 | 14.9 | 23.3 | 11.4 | 14.9 | 10.3 | 9.1 | 8.6 | 9.2 | 18.1 | 15.9 |
| Coke, refined petroleum prod. and nuclear fuel | 23 | 1.3 | 0.7 | 6.1 | 2.0 | - | - | 1.2 | 0.6 [1] | 1.0 | 1.0 | 0.9 | 3.1 | 12.7 | 9.6 | 8.7 | 3.1 | 4.5 | 4.0 | 1.7 | 0.5 |
| Chemicals and chemical prod. | (24) | 5.2 | 5.3 | 13.9 | 10.6 | - | - | 2.3 | 2.3 [1] | 4.3 | 4.7 | 20.8 | 30.7 | 15.8 | 23.1 | 12.9 | 12.6 | 12.5 | 12.9 | 14.9 | 14.0 |
| ….Chemicals excluding pharmaceuticals | (24ex2423) | 6.1 | 5.5 | 12.1 | 7.2 | - | - | - | 1.8 [1] | 2.7 | 2.0 | 6.9 | 6.5 | 8.4 | 5.6 | 9.2 | 8.0 | 8.9 | 7.3 | 8.1 | 5.9 |
| ….Pharmaceuticals | (2423) | 2.9 | 4.8 | 27.5 | 25.4 | 42.7 | 19.6 | - | 3.9 [1] | 7.2 | 10.4 | 39.5 | 45.5 | 32.9 | 50.0 | 22.2 | 20.2 | 21.9 | 25.3 | 6.8 | 8.1 |
| Rubber and plastics prod. | (25) | 2.4 | 2.6 | 1.7 | 1.6 | 1.3 | 3.5 | 1.1 | 0.5 [1] | 1.1 | 1.2 | 2.8 | 2.3 | 0.7 | 0.6 | 3.4 | 2.9 | 1.9 | 2.6 | 1.5 | 1.5 |
| Other non-metallic mineral prod. | (26) | 1.4 | 1.1 | 0.4 | 1.0 | 1.9 | 1.6 | 0.2 | 0.2 [1] | 0.4 | 0.4 | 1.3 | 1.2 | 1.2 | 0.8 | 2.0 | 2.2 | 1.1 | 1.3 | 1.0 | 0.7 |
| Basic metals and fabricated metal prod. | (27-28) | 1.8 | 1.2 | 1.4 | 1.5 | 4.7 | 3.0 | 0.7 | 0.5 [1] | 0.7 | 0.7 | 1.9 | 2.6 | 0.9 | 0.7 | 1.6 | 1.6 | 1.3 | 1.2 | 2.9 | 2.0 |
| Machinery and equipment | (29-33) | 10.7 | 18.1 | 11.6 | 17.9 | 15.0 | 11.2 | 2.8 | 2.5 [1] | 5.3 | 3.6 | 21.0 | 38.1 | 9.1 | 10.2 | 13.6 | 16.5 | 9.1 | 9.1 | 35.9 | 35.0 |
| Machinery and equipment, n.e.c. | (29) | 5.1 | 5.3 | 2.1 | 9.1 | 6.9 | 6.1 | 2.6 | 2.5 [1] | 1.8 | 2.4 | 9.6 | 10.0 | 5.3 | 8.1 | 3.9 | 5.5 | 4.6 | 4.9 | 5.6 | 5.6 |
| Electrical and optical equipment | (30-33) | 12.7 | 22.8 | 18.2 | 25.4 | 23.6 | 16.4 | 3.1 | 2.4 [1] | 8.1 | 4.8 | 35.4 | 89.1 | 11.7 | 11.5 | 18.4 | 21.4 | 13.1 | 12.8 | 30.3 | 29.4 |
| ….Office, accounting and computing machinery | (30) | 10.1 | 21.5 | 31.3 | 257.7 | 34.5 | 20.8 | 0.3 | 1.4 [1] | 11.4 | 4.6 | 19.1 | 18.3 | 13.4 | 4.2 | 40.0 | 30.7 | - | 15.4 | 7.9 | 5.2 |
| ….Electrical machinery and apparatus, nec | (31) | 5.1 | 10.5 | 40.4 | 7.8 | 6.8 | 4.5 | 2.7 | 2.1 [1] | 3.0 | 2.4 | 12.5 | 7.6 | 11.8 | 10.4 | 8.4 | 9.6 | - | 4.3 | 5.1 | 3.9 |
| ….Radio, television and communication equip. | (32) | 15.0 | 29.0 | 14.0 | 0.5 | 71.2 | 54.1 | 5.5 | 5.3 [1] | 16.0 | 12.6 | 82.1 | -862.9 | 14.7 | 18.5 | 15.9 | 18.6 | - | 25.7 | 11.1 | 12.6 |
| ….Medical, precision and optical instruments | (33) | 4.0 | 4.9 | - | - | 10.1 | 6.5 | 1.4 | 1.0 [1] | 6.7 | 3.4 | 3.9 | 25.8 | 7.7 | 8.8 | 16.9 | 30.2 | - | 11.4 | 6.2 | 7.8 |
| Transport equipment | (34-35) | 11.3 | 6.7 | 7.4 | 3.9 | 2.0 | 2.5 | 3.6 | 3.2 [1] | 4.8 | 4.7 | 17.5 | 24.3 | 14.3 | 14.7 | 25.4 | 16.2 | 15.2 | 15.5 | 22.4 | 19.7 |
| Motor vehicles, trailers and semi-trailers | (34) | 12.3 | 7.5 | 14.7 | 5.9 | 4.5 | 9.2 | 2.5 | 2.7 [1] | 3.5 | 2.8 | 17.9 | 25.2 | 10.4 | 10.3 | 22.8 | 15.4 | - | 13.6 | 11.3 | 12.1 |
| Other transport equipment | (35) | 7.0 | 5.4 | 3.6 | 1.4 | 1.8 | 1.7 | 4.5 | 3.8 [1] | 9.8 | 13.3 | 16.4 | 20.6 | 18.4 | 19.3 | 27.3 | 17.5 | - | 21.0 | 11.0 | 7.5 |
| ….Building and repairing of ships and boats | (351) | 4.0 | - | - | 1.9 | 1.7 | 1.5 | - | 1.6 [1] | 3.1 | 7.4 | 5.5 | 3.1 | 2.0 | 6.2 | - | - | - | 3.5 | 0.1 | 0.1 |
| ….Aircraft and spacecraft | (353) | 49.9 | - | - | 0.6 | 1.8 | 13.5 | - | 9.0 [1] | 35.9 | 27.9 | 25.6 | 29.7 | 22.8 | 21.2 | 31.7 | 20.8 | - | 31.6 | 10.5 | 6.8 |
| ….Railroad equip. and transport equip. n.e.c. | (352+359) | 3.0 | - | - | 1.7 | 3.4 | 0.8 | - | 4.6 [1] | 1.8 | 6.5 | 5.5 | 11.0 | 3.9 | 28.2 | - | - | - | 8.9 | 0.4 | 0.6 |
| Manufacturing nec; recycling | (36-37) | 0.6 | 3.6 | - | 0.4 | - | - | 0.2 | 0.3 [1] | 0.3 | 0.6 | 1.5 | 1.2 | 0.7 | 0.5 | - | 1.3 | - | 0.9 | - | 0.6 |
| Electricity, gas and water supply | (40-41) | 1.8 | 0.9 | 0.1 | 0.4 | 0.0 | - | 0.1 | 0.2 | 0.4 | 0.2 | 1.5 | 0.5 | 1.3 | 0.6 | 0.2 | 0.1 | - | - | - | - |
| Construction | (45) | 1.1 | 0.8 | 0.1 | 0.2 | 0.1 | - | 0.2 | 0.1 | 0.0 | 0.1 | - | 0.2 | 0.1 | 0.1 | - | 0.1 | - | - | - | - |
| **Total services[5]** | **(50-99)** | **0.3** | **0.5** | **0.1** | **0.3** | **0.6** | **0.7** | **0.1** | **0.1** | **0.1** | **0.3** | **0.3** | **0.6** | **0.3** | **0.4** | **0.7** | **0.9** | **0.2** | **0.2** | **14.4** | **20.8** |
| Wholesale and retail trade; restaurants and hotels | (50-55) | 0.0 [2] | 0.1 | - | - | - | 0.0 [1] | 0.0 | 0.0 | 0.0 | 0.0 | - | 0.0 | - | - | - | - | - | - | - | - |
| Transport and storage and communication | (60-64) | 1.5 [2] | 1.0 | - | 0.4 | 0.2 | 0.7 [1] | 0.2 | 0.3 | 0.2 | 0.5 | - | 0.6 | - | 1.0 | - | - | - | - | - | - |
| Transport and storage | (60-63) | 0.0 [2] | 0.0 | - | 0.1 | 0.0 | 0.1 [1] | - | - | 0.0 | - | - | 0.0 | - | 0.0 | - | 0.1 | - | - | - | - |
| Post and telecommunications | (64) | 4.5 [2] | 2.9 | - | 0.9 | 1.0 | 2.7 [1] | - | - | 0.6 | - | - | 1.9 | 1.9 | 2.5 | - | - | - | - | - | - |
| Finance, insurance, real estate and business services | (65-74) | 0.5 [2] | 1.0 | - | 0.6 | 2.0 | 2.0 [1] | 0.2 | 0.1 | 0.4 | 0.7 | - | 1.5 | - | - | - | - | - | - | - | - |
| Financial intermediation | (65-67) | 0.0 [2] | 0.0 | - | 0.4 | 0.2 | 0.2 [1] | 0.0 | 0.0 | 0.0 | 0.1 | - | 1.1 | - | - | - | 0.5 | - | - | - | - |
| Real estate, renting and business activities | (70-74) | 0.7 [2] | 1.6 | - | 0.7 | 2.8 | 2.6 [1] | 0.2 | 0.1 | 0.5 | 1.0 | - | 1.5 | 1.0 | 0.7 | - | - | - | - | - | - |
| ….Real estate activities | (70) | - [2] | - | - | - | - | - [1] | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ….Renting of m&eq and other business activities | (71-74) | - [2] | - | - | - | - | - [1] | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ……Other business activities | (74) | - [2] | - | - | 0.4 | 2.1 | 1.0 [1] | - | - | - | - | - | 0.1 | - | 0.4 | - | - | - | - | - | - |
| Community social and personal services | (75-99) | 0.1 [2] | 0.0 | 0.2 | 0.0 | - | 0.0 [1] | 0.1 | 0.1 | 0.0 | 0.0 | - | 0.0 | 0.0 | 0.0 | - | - | - | - | - | - |
| High-technology manufactures | | 12.5 | - | 13.2 | 26.1 | 34.4 | 24.6 | - | 3.5 [1] | 11.6 | 10.3 | 39.9 | 81.1 | 18.9 | 23.1 | 23.6 | 22.5 | - | 22.0 | 42.4 | 40.4 |
| Medium-high technology manufactures | | 8.3 | - | 11.7 | 7.7 | - | - | - | 2.3 [1] | 2.8 | 2.5 | 11.6 | 14.5 | 8.2 | 8.7 | 9.7 | 9.8 | - | 7.7 | 30.6 | 28.1 |
| Medium-low technology manufactures | | 1.8 | - | 1.8 | 1.5 | - | - | - | 0.5 [1] | 0.8 | 0.9 | 2.0 | 2.5 | 2.3 | 1.6 | 2.9 | 2.1 | - | 1.7 | 7.3 | 4.8 |
| Low-technology manufactures | | 0.7 | 1.0 | - | 1.2 | - | - | 0.2 | 0.2 [1] | 0.3 | 0.5 | 1.6 | 1.5 | 0.7 | 0.7 | - | 1.3 | - | 0.7 | - | 3.6 |
| High- and medium-high technology manufactures | | 9.7 | 11.3 | 11.9 | 13.1 | - | - | 2.9 | 2.6 [1] | 4.9 | 4.2 | 20.0 | 32.0 | 12.1 | 14.5 | 16.0 | 15.6 | 11.3 | 11.6 | 73.2 | 68.6 |

1. Intensity of the previous year.

2. 1998 instead of 1995.

3. EU includes the 15 EU Members before 1 May 2004 excluding Austria, Greece, Luxembourg, Portugal (for which no Anberd data are available).

4. OECD includes previous EU countries and Canada, Japan, and the United States.

5. Due to differences in data reporting methodologies, service sector R&D figures are not fully comparable across countries.

*Source:* OECD, STAN Indicators 2004.

**Table 14. Business R&D expenditures by sector, 1991 and 2001 or nearest years available**

As a percentage of total R&D expenditures

| | (ISIC Rev.3) | Australia | | Belgium | | Canada | | Czech Republic | | Denmark | | Finland | | France | | Germany | | Ireland | | Italy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2000 | 1992 | 2001 | 1991 | 2001 | 1992 | 2001 | 1991 | 1999 | 1991 | 2001 | 1991 | 2000 | 1991 | 2001 | 1991 | 1999 | 1991 | 2001 |
| **Total business sector** | **(01-99)** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| **Total manufacturing** | **(15-37)** | **62.8** | **50.4** | **84.9** | **82.9** | **66.7** | **69.8** | **59.3** | **68.3** | **69.4** | **60.4** | **85.3** | **84.6** | **92.1** | **85.0** | **95.4** | **90.9** | **84.7** | **74.9** | **89.8** | **79.4** |
| Food prod., beverages and tobacco | (15-16) | 4.0 | 3.5 | 3.0 | 2.4 | 1.3 | 0.7 | 1.0 | 0.4 | 4.6 | 2.5 | 6.6 | 1.4 | 1.8 | 2.0 | 0.8 | 0.8 | 12.3 | 5.6 | 0.9 | 1.2 |
| Textiles, textile prod., leather and footwear | (17-19) | 0.4 | 0.7 | 1.3 | 2.1 | 1.0 | 0.7 | 6.6 | 0.7 | 0.4 | 0.2 | 1.0 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 2.3 | 0.5 | 0.2 | 0.6 |
| Wood, pulp, paper, paper prod., printing & publishing | (20-22) | 1.9 | 1.4 | 1.1 | 1.1 | 2.3 | 1.4 | 0.6 | 0.1 | 0.6 | 0.5 | 9.4 | 3.1 | 0.4 | 0.3 | 0.5 | 0.3 | 1.0 | 1.2 | 0.1 | 0.4 |
| Chemical, rubber, plastics and fuel prod. | (23-25) | 12.7 | 9.5 | 37.5 | 39.7 | 11.7 | 8.4 | 7.7 | 7.1 | 21.5 | 28.7 | 17.7 | 11.5 | 20.6 | 22.6 | 19.8 | 19.8 | 20.7 | 15.1 | 20.0 | 15.7 |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 0.5 | 0.3 | 2.8 | 1.0 | 3.0 | 0.4 | 1.4 | 0.1 | 0.0 | 0.0 | 2.2 | 0.8 | 2.0 | 1.3 | 0.2 | 0.2 | 0.0 | 0.0 | 1.3 | 0.7 |
| Chemicals and chemical prod. | (24) | 10.1 | 8.4 | 32.0 | 36.8 | 8.2 | 7.3 | 4.1 | 5.9 | 20.8 | 26.5 | 13.7 | 8.9 | 16.5 | 18.6 | 18.1 | 17.7 | 19.1 | 13.6 | 16.9 | 13.2 |
| ….Chemicals excluding pharmaceuticals | (24ex2423) | 5.1 | 1.6 | 21.7 | 16.0 | 3.4 | 1.8 | 3.2 | 3.2 | 3.0 | 3.5 | 8.7 | 2.9 | 8.9 | 6.1 | 13.4 | 10.9 | 6.3 | 3.1 | 6.1 | 5.1 |
| ….Pharmaceuticals | (2423) | 5.0 | 6.8 | 10.3 | 20.9 | 4.8 | 5.6 | 0.9 | 2.7 | 17.8 | 23.0 | 4.9 | 6.0 | 7.7 | 12.4 | 4.7 | 6.8 | 12.8 | 10.5 | 10.8 | 8.1 |
| Rubber and plastics prod. | (25) | 2.0 | 0.9 | 2.8 | 1.9 | 0.5 | 0.6 | 2.2 | 1.1 | 0.7 | 2.2 | 1.9 | 1.7 | 2.1 | 2.7 | 1.5 | 2.0 | 1.5 | 1.5 | 1.8 | 1.8 |
| Other non-metallic mineral prod. | (26) | 1.3 | 0.6 | 1.5 | 1.7 | 0.3 | 0.1 | 1.0 | 2.6 | 1.5 | 0.6 | 1.3 | 0.5 | 1.1 | 1.3 | 1.0 | 0.9 | 1.7 | 0.9 | 0.5 | 0.6 |
| Basic metals and fabricated metal prod. | (27-28) | 10.0 | 4.3 | 5.4 | 4.8 | 4.3 | 2.8 | 8.0 | 4.0 | 2.6 | 1.1 | 6.2 | 3.5 | 2.9 | 2.3 | 2.4 | 2.3 | 2.3 | 1.1 | 3.3 | 1.4 |
| Machinery and equipment | (29-33) | 20.4 | 19.9 | 29.3 | 25.7 | 32.3 | 44.7 | 19.8 | 14.2 | 31.7 | 23.9 | 38.5 | 62.2 | 33.6 | 30.3 | 38.8 | 31.7 | 40.9 | 48.2 | 34.6 | 33.7 |
| Machinery and equipment, n.e.c. | (29) | 4.2 | 4.0 | 5.5 | 4.5 | 1.8 | 2.3 | 10.0 | 7.4 | 12.6 | 10.0 | 10.5 | 7.6 | 4.3 | 4.8 | 11.4 | 11.2 | 3.5 | 2.9 | 5.8 | 7.0 |
| Electrical and optical equipment | (30-33) | 16.2 | 15.9 | 23.8 | 21.2 | 30.5 | 42.4 | 9.8 | 6.8 | 19.2 | 13.9 | 28.1 | 54.5 | 29.3 | 25.5 | 27.3 | 20.5 | 37.4 | 45.3 | 28.8 | 26.7 |
| ….Office, accounting and computing machinery | (30) | 2.1 | 1.9 | 0.3 | 0.3 | 6.1 | 4.1 | 0.2 | 0.0 | 1.5 | 0.8 | 0.9 | 0.2 | 3.5 | 1.5 | 3.9 | 1.9 | 8.3 | 5.1 | 6.8 | 1.1 |
| ….Electrical machinery and apparatus, nec | (31) | 2.6 | 1.4 | 4.9 | 2.2 | 1.0 | 2.3 | 3.0 | 2.4 | 2.6 | 2.9 | 4.9 | 4.4 | 3.0 | 3.5 | 7.3 | 3.0 | 4.4 | 4.7 | 5.9 | 3.4 |
| ….Radio, television and communication equip. | (32) | 9.4 | 9.9 | 16.1 | 17.5 | 22.2 | 33.7 | 5.0 | 2.9 | 7.3 | 4.0 | 16.8 | 47.5 | 8.1 | 13.7 | 10.1 | 10.7 | 21.5 | 30.6 | 14.7 | 18.3 |
| ….Medical, precision and optical instruments | (33) | 2.2 | 2.7 | 2.5 | 1.2 | 1.2 | 2.3 | 1.5 | 1.4 | 7.9 | 6.1 | 5.4 | 2.4 | 14.7 | 6.8 | 6.0 | 4.9 | 3.3 | 5.0 | 1.3 | 4.0 |
| Transport equipment | (34-35) | 10.5 | 9.1 | 4.2 | 4.7 | 13.0 | 10.6 | 13.4 | 38.9 | 1.3 | 1.9 | 3.9 | 1.4 | 31.0 | 24.5 | 30.8 | 33.9 | 3.0 | 1.6 | 30.2 | 25.4 |
| Motor vehicles, trailers and semi-trailers | (34) | 6.7 | 7.9 | 2.3 | 2.6 | 1.4 | 2.6 | 7.1 | 34.8 | 0.0 | 0.5 | 1.5 | 0.4 | 11.5 | 13.8 | 21.4 | 29.8 | 2.7 | 1.2 | 18.3 | 14.0 |
| Other transport equipment | (35) | 3.8 | 1.2 | 1.9 | 2.1 | 11.5 | 8.0 | 6.3 | 4.2 | 1.3 | 1.5 | 2.4 | 1.0 | 19.5 | 10.7 | 9.4 | 4.1 | 0.2 | 0.4 | 12.0 | 11.4 |
| ….Building and repairing of ships and boats | (351) | 1.9 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 1.5 | 0.8 | 0.3 | 0.1 | 0.1 | 0.3 | 0.1 | 0.0 | 0.1 | 0.4 | 0.2 |
| ….Aircraft and spacecraft | (353) | 1.2 | 0.1 | 1.4 | 1.8 | 11.5 | 7.8 | 4.1 | 2.8 | 0.0 | 0.0 | 0.1 | 0.3 | 18.9 | 10.2 | 8.2 | 3.6 | 0.0 | 0.4 | 10.6 | 10.2 |
| ….Railroad equip. and transport equip. n.e.c. | (352+359) | 0.6 | 0.5 | 0.5 | 0.3 | 0.0 | 0.2 | 2.2 | 1.4 | 0.4 | 0.0 | 1.6 | 0.4 | 0.5 | 0.4 | 1.0 | 0.5 | 0.2 | 0.0 | 1.0 | 1.0 |
| Manufacturing nec; recycling | (36-37) | - | - | 1.6 | 0.8 | 0.6 | 0.4 | 1.3 | 0.3 | 5.3 | 0.9 | 0.5 | 0.6 | 0.3 | 1.1 | 0.6 | 0.6 | 0.4 | 0.6 | 0.2 | 0.3 |
| Electricity, gas and water supply | (40-41) | 2.2 | 0.7 | 0.2 | 1.0 | 4.4 | 1.5 | 0.1 | 0.0 | 0.3 | 0.3 | 4.5 | 1.4 | 1.9 | 2.1 | 0.4 | 0.2 | - | - | 2.0 | 0.5 |
| Construction | (45) | 0.3 | 0.9 | 1.4 | 1.0 | 0.2 | 0.4 | 0.5 | 1.2 | 0.8 | 0.2 | 1.1 | 1.2 | 0.8 | 0.6 | 0.3 | 0.2 | - | - | 0.0 | 0.2 |
| **Total services**[3] | **(50-99)** | **27.1** | **39.9** | **13.3** | **13.7** | **25.5** | **26.4** | **38.8** | **29.8** | **28.5** | **38.9** | **7.6** | **12.4** | **4.2** | **10.6** | **3.5** | **8.4** | **13.5** | **24.6** | **8.1** | **19.9** |
| Wholesale and retail trade; restaurants and hotels | (50-55) | - | - | 1.3 | 1.0 | - | - | - | 1.2 | - | - | - | - | - | 0.0 | - | - | - | 0.0 | 0.0 | 0.6 |
| Wholesale and retail trade; repairs | (50-52) | - | - | 1.3 | 1.0 | 4.0 | 4.4 | - | 1.2 | 5.5 | 7.5 | - | 0.1 | - | 0.0 | - | - | - | 0.0 | 0.0 | 0.6 |
| Hotels and restaurants | (55) | - | - | 0.0 | 0.0 | - | - | - | 0.0 | - | - | - | - | - | 0.0 | - | - | - | 0.0 | 0.0 | 0.0 |
| Transport and storage and communication | (60-64) | - | - | 0.2 | 2.5 | 3.3 | 0.8 | 0.3 | 0.9 | - | - | 1.9 | 6.4 | - | - | - | - | 4.2 | 9.2 | 0.4 | 0.2 |
| Transport and storage | (60-63) | - | - | 0.1 | 1.0 | 0.4 | 0.3 | 0.3 | 0.8 | - | - | 0.1 | 0.5 | 0.3 | 5.2 | - | 1.1 | 0.2 | 0.0 | 0.0 | 0.1 |
| Post and telecommunications | (64) | - | - | 0.1 | 1.5 | 2.9 | 0.5 | 0.0 | 0.1 | 2.9 | 6.8 | 1.8 | 5.9 | - | - | - | - | 4.0 | 9.2 | 0.4 | 0.1 |
| Finance, insurance, real estate and business services | (65-74) | - | - | 11.6 | 9.8 | 18.3 | 21.3 | 38.5 | 23.8 | - | 24.6 | - | - | - | - | - | - | - | 15.3 | 7.5 | 19.1 |
| Financial intermediation | (65-67) | - | - | 2.4 | 0.7 | 2.9 | 1.6 | 0.0 | 0.0 | - | 2.2 | - | - | - | - | - | - | - | 0.0 | 0.0 | 2.5 |
| Real estate, renting and business activities | (70-74) | - | - | 9.2 | 9.1 | 15.3 | 19.7 | 38.5 | 23.8 | 20.0 | 22.5 | - | - | 4.0 | 5.5 | - | 6.9 | - | 15.3 | 7.5 | 16.6 |
| ……..Other business activities | (74) | - | - | 4.5 | 5.0 | 2.4 | 3.1 | 9.2 | 1.8 | 15.9 | 5.6 | - | 0.5 | - | 2.9 | - | - | - | 1.5 | 0.5 | 2.2 |
| Community social and personal services | (75-99) | - | - | 0.1 | 0.4 | - | - | 0.0 | 3.9 | - | - | - | 1.0 | - | - | - | - | - | 0.0 | 0.2 | 0.0 |
| High-technology manufactures | | 19.9 | 21.4 | 30.6 | 41.7 | 45.8 | 53.5 | 11.7 | 9.8 | 34.3 | 34.0 | 28.2 | 56.4 | 52.8 | 44.6 | 32.9 | 27.9 | 45.9 | 51.5 | 44.2 | 41.6 |
| Medium-high technology manufactures | | 19.2 | 15.4 | 34.9 | 25.5 | 7.6 | 9.1 | 25.6 | 49.2 | 18.6 | 16.9 | 27.1 | 15.8 | 28.1 | 28.6 | 54.5 | 55.3 | 17.2 | 11.8 | 37.1 | 30.5 |
| Medium-low technology manufactures | | 15.8 | 6.8 | 12.5 | 9.3 | 8.1 | 3.9 | 12.6 | 7.8 | 5.6 | 5.4 | 12.4 | 6.9 | 8.2 | 7.8 | 5.5 | 5.4 | 5.6 | 3.6 | 7.2 | 4.8 |
| Low-technology manufactures | | - | - | 7.0 | 6.4 | 5.2 | 3.3 | 9.4 | 1.5 | 10.9 | 4.1 | 17.5 | 5.5 | 2.9 | 4.0 | 2.5 | 2.3 | 16.1 | 8.0 | 1.3 | 2.5 |
| High- and medium-high technology manufactures | | 41.0 | 37.4 | 65.4 | 67.2 | 53.5 | 62.6 | 37.3 | 59.1 | 53.8 | 52.4 | 56.1 | 72.5 | 81.1 | 73.3 | 87.7 | 83.2 | 63.0 | 63.4 | 81.8 | 72.3 |

1. EU includes the 15 EU Members before 1May 2004 excluding Austria, Greece, Luxembourg, Portugal (for which no Anberd data are available).

2. OECD includes previous countries and Canada, Japan, and the United States.

3. Due to differences in data reporting methodologies, service sector R&D figures are not fully comparable across countries.

*Source:* OECD, STAN Indicators 2004.

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**Table 14. Business R&D expenditures by sector, 1991 and 2001 or nearest years available (cont'd)**

As a percentage of total R&D expenditures

| | (ISIC Rev.3) | Korea | | Netherlands | | Norway | | Poland | | Spain | | Sweden | | United Kingdom | | Unites States | | EU[1] | | OECD[2] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1995 | 2001 | 1991 | 2000 | 1991 | 1998 | 1994 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2000 | 1992 | 1999 | 1991 | 1999 |
| **Total business sector** | **(01-99)** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| **Total manufacturing** | **(15-37)** | **83.3** | **82.8** | **89.7** | **75.9** | **63.3** | **54.4** | **71.9** | **69.4** | **78.4** | **60.0** | **87.9** | **87.4** | **79.7** | **79.2** | **75.7** | **64.9** | **87.9** | **84.3** | **83.9** | **76.8** |
| Food prod., beverages and tobacco | (15-16) | 1.4 | 1.4 | 5.6 | 5.8 | 2.5 | 2.9 | 1.5 | 4.7 | 2.4 | 3.1 | 1.4 | 0.5 | 2.4 | 2.5 | 1.1 | 0.8 | 1.8 | 1.7 | 1.5 | 1.3 |
| Textiles, textile prod., leather and footwear | (17-19) | 0.7 | 0.7 | 0.4 | 0.3 | 0.3 | 0.4 | 3.7 | 1.8 | 0.5 | 1.5 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.1 | 0.5 | 0.5 | 0.5 | 0.4 |
| Wood, pulp, paper, paper prod., printing & publishing | (20-22) | 0.5 | 0.3 | 0.5 | 0.5 | 2.1 | 2.3 | 0.7 | 0.9 | 0.8 | 0.7 | 3.3 | 2.0 | 0.5 | 0.3 | 1.2 | 1.6 | 0.7 | 0.7 | 1.1 | 1.3 |
| Chemical, rubber, plastics and fuel prod. | (23-25) | 10.6 | 9.3 | 37.6 | 21.4 | 17.4 | 11.3 | 16.2 | 14.9 | 18.4 | 17.1 | 17.0 | 20.1 | 28.4 | 30.4 | 15.7 | 12.1 | 22.3 | 22.6 | 18.1 | 15.9 |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 1.3 | 1.1 | 2.7 | 0.7 | 1.6 | 1.6 | 2.3 | 0.6 | 1.3 | 1.0 | 0.1 | 0.2 | 4.5 | 2.0 | 2.1 | 0.6 | 1.3 | 0.8 | 1.7 | 0.5 |
| Chemicals and chemical prod. | (24) | 8.1 | 7.0 | 33.9 | 20.1 | 15.4 | 8.7 | 11.0 | 12.8 | 15.2 | 14.1 | 16.2 | 19.5 | 23.4 | 28.1 | 12.5 | 10.7 | 19.7 | 20.0 | 14.9 | 14.0 |
| ....Chemicals excluding pharmaceuticals | (24ex2423) | 6.7 | 4.8 | 26.2 | 11.2 | 8.4 | 4.3 | 8.8 | 7.0 | 6.3 | 4.3 | 3.1 | 1.6 | 8.7 | 4.1 | 6.5 | 4.2 | 10.1 | 7.8 | 8.1 | 5.9 |
| ....Pharmaceuticals | (2423) | 1.4 | 2.2 | 7.7 | 8.9 | 7.0 | 4.4 | 2.3 | 5.8 | 8.8 | 9.8 | 13.1 | 17.9 | 14.7 | 24.0 | 6.0 | 6.5 | 9.5 | 12.2 | 6.8 | 8.1 |
| Rubber and plastics prod. | (25) | 1.3 | 1.3 | 1.1 | 0.7 | 0.4 | 1.0 | 2.9 | 1.5 | 1.9 | 2.0 | 0.7 | 0.4 | 0.4 | 0.4 | 1.1 | 0.8 | 1.4 | 1.8 | 1.5 | 1.5 |
| Other non-metallic mineral prod. | (26) | 1.0 | 0.5 | 0.3 | 0.6 | 0.9 | 0.8 | 0.9 | 0.9 | 1.3 | 1.1 | 0.4 | 0.2 | 0.5 | 0.3 | 0.4 | 0.4 | 0.9 | 0.9 | 1.0 | 0.7 |
| Basic metals and fabricated metal prod. | (27-28) | 3.6 | 1.8 | 3.2 | 2.3 | 7.3 | 5.6 | 5.4 | 4.3 | 3.2 | 2.8 | 2.3 | 2.0 | 1.4 | 0.9 | 1.4 | 1.3 | 2.6 | 2.2 | 2.9 | 2.0 |
| Machinery and equipment | (29-33) | 41.1 | 51.3 | 36.3 | 42.0 | 29.7 | 26.3 | 26.4 | 28.9 | 31.5 | 16.9 | 43.9 | 43.4 | 25.8 | 25.2 | 31.5 | 33.0 | 34.0 | 30.5 | 35.9 | 35.0 |
| Machinery and equipment, n.e.c. | (29) | 5.1 | 4.1 | 2.8 | 9.9 | 7.0 | 7.3 | 13.9 | 14.2 | 4.8 | 5.7 | 11.2 | 7.4 | 6.0 | 7.7 | 3.0 | 3.4 | 7.9 | 7.5 | 5.6 | 5.6 |
| Electrical and optical equipment | (30-33) | 36.0 | 47.2 | 33.5 | 32.1 | 22.7 | 19.0 | 12.5 | 14.7 | 26.7 | 11.2 | 32.7 | 36.0 | 19.7 | 17.5 | 28.5 | 29.6 | 26.0 | 23.0 | 30.3 | 29.4 |
| ....Office, accounting and computing machinery | (30) | 1.8 | 7.8 | 4.1 | 25.7 | 1.8 | 1.0 | 0.0 | 0.2 | 5.9 | 1.1 | 2.2 | 0.8 | 4.0 | 0.8 | 9.6 | 5.2 | 3.7 | 2.5 | 7.9 | 5.2 |
| ....Electrical machinery and apparatus, nec | (31) | 1.9 | 1.8 | 15.6 | 1.6 | 3.4 | 2.4 | 5.4 | 6.6 | 4.3 | 2.8 | 3.1 | 1.6 | 6.4 | 4.6 | 2.6 | 1.9 | 5.7 | 3.1 | 5.1 | 3.9 |
| ....Radio, television and communication equip. | (32) | 31.6 | 36.2 | 12.8 | 0.3 | 15.6 | 13.5 | 5.8 | 6.0 | 13.1 | 5.7 | 26.6 | 28.9 | 5.9 | 8.2 | 8.8 | 12.9 | 10.8 | 12.6 | 11.1 | 12.6 |
| ....Medical, precision and optical instruments | (33) | 0.7 | 1.4 | 1.0 | 4.5 | 2.0 | 2.1 | 1.3 | 1.9 | 3.5 | 1.5 | 1.0 | 4.8 | 3.4 | 3.8 | 7.4 | 9.6 | 5.8 | 4.7 | 6.2 | 7.8 |
| Transport equipment | (34-35) | 24.1 | 16.8 | 5.8 | 2.7 | 3.1 | 4.6 | 16.6 | 12.0 | 19.7 | 16.0 | 19.1 | 19.0 | 20.2 | 19.1 | 23.5 | 15.1 | 24.6 | 24.8 | 22.4 | 19.7 |
| Motor vehicles, trailers and semi-trailers | (34) | 21.1 | 11.5 | 4.0 | 2.2 | 0.5 | 1.8 | 5.2 | 5.6 | 11.4 | 7.8 | 13.9 | 15.9 | 7.4 | 6.9 | 8.9 | 9.3 | 13.9 | 16.1 | 11.3 | 12.1 |
| Other transport equipment | (35) | 3.0 | 5.3 | 1.8 | 0.4 | 2.6 | 2.8 | 11.4 | 6.5 | 8.3 | 8.3 | 5.3 | 3.1 | 12.8 | 12.2 | 14.6 | 5.8 | 10.7 | 8.7 | 11.0 | 7.5 |
| ....Building and repairing of ships and boats | (351) | 1.4 | 1.0 | 0.1 | 0.3 | 2.1 | 2.4 | 1.1 | 1.6 | 1.2 | 1.9 | 0.3 | 0.1 | 0.2 | 0.7 | 0.0 | 0.0 | 0.3 | 0.3 | 0.1 | 0.1 |
| ....Aircraft and spacecraft | (353) | 1.5 | 3.8 | 1.7 | 0.1 | 0.3 | 0.4 | 4.4 | 3.8 | 6.6 | 5.2 | 4.4 | 2.7 | 12.4 | 9.9 | 14.2 | 5.2 | 9.8 | 7.7 | 10.5 | 6.8 |
| ....Railroad equip. and transport equip. n.e.c. | (352+359) | 0.1 | 0.4 | 0.0 | 0.1 | 0.3 | 0.0 | 5.9 | 1.1 | 0.5 | 1.2 | 0.5 | 0.3 | 0.2 | 1.6 | 0.4 | 0.6 | 0.6 | 0.7 | 0.4 | 0.6 |
| Manufacturing nec; recycling | (36-37) | 0.2 | 0.6 | - | 0.4 | - | - | 0.5 | 1.0 | 0.6 | 0.8 | 0.4 | 0.2 | 0.3 | 0.3 | - | 0.4 | - | 0.6 | - | 0.6 |
| Electricity, gas and water supply | (40-41) | 2.0 | 1.1 | 0.3 | 0.5 | 0.1 | - | 0.6 | 2.3 | 2.5 | 0.6 | 2.3 | 0.4 | 2.4 | 0.8 | 0.2 | 0.1 | - | - | - | - |
| Construction | (45) | 6.7 | 3.1 | 0.5 | 0.8 | 0.5 | - | 4.2 | 3.6 | 0.6 | 0.9 | - | 0.3 | 0.2 | 0.2 | - | 0.1 | - | - | - | - |
| **Total services[3]** | **(50-99)** | **7.6** | **12.6** | **6.7** | **19.7** | **41.8** | **48.0** | **14.4** | **18.2** | **16.4** | **37.6** | **9.0** | **11.5** | **15.1** | **18.8** | **24.3** | **34.4** | **8.2** | **12.9** | **14.4** | **20.8** |
| Wholesale and retail trade; restaurants and hotels | (50-55) | - | 0.4 | - | - | - | - | 0.3 | 0.3 | 0.0 | 0.8 | - | 0.1 | - | - | - | - | - | - | - | - |
| Wholesale and retail trade; repairs | (50-52) | - | 0.4 | - | 4.0 | 0.4 | - | 0.3 | 0.3 | 0.0 | 0.7 | - | 0.1 | - | 0.4 | - | 12.6 | - | - | - | - |
| Hotels and restaurants | (55) | - | 0.0 | - | - | - | - | 0.0 | 0.0 | 0.0 | 0.1 | - | 0.0 | - | - | - | - | - | - | - | - |
| Transport and storage and communication | (60-64) | - | 3.0 | - | 2.4 | 2.8 | - | 4.1 | 7.7 | 2.5 | 8.8 | - | 1.4 | - | 5.9 | - | - | - | - | - | - |
| Transport and storage | (60-63) | - | 0.0 | - | 0.6 | 0.4 | - | 1.3 | 2.6 | 0.0 | 0.2 | - | 0.0 | - | 0.1 | - | 0.1 | - | - | - | - |
| Post and telecommunications | (64) | - | 3.0 | - | 1.9 | 2.3 | - | 2.7 | 5.1 | 2.4 | 8.6 | - | 1.3 | 3.9 | 5.8 | - | - | - | - | - | - |
| Finance, insurance, real estate and business services | (65-74) | - | 8.9 | - | 13.2 | 38.6 | - | 5.5 | 3.5 | 13.4 | 27.4 | - | 10.0 | - | - | - | - | - | - | - | - |
| Financial intermediation | (65-67) | - | 0.0 | - | 2.2 | 1.1 | - | 0.0 | 0.1 | 0.0 | 0.6 | - | 1.1 | - | - | - | 2.0 | - | - | - | - |
| Real estate, renting and business activities | (70-74) | - | 8.9 | - | 11.0 | 37.5 | - | 5.5 | 3.4 | 13.4 | 26.8 | - | 8.9 | 10.9 | 12.3 | - | - | - | - | - | - |
| ……..Other business activities | (74) | 1.3 | 2.1 | - | 3.1 | 7.1 | - | 0.0 | 0.1 | 6.8 | 3.9 | - | 0.3 | 1.8 | 2.7 | - | - | - | 2.2 | - | - |
| Community social and personal services | (75-99) | - | 0.3 | 4.7 | 0.1 | - | - | 4.5 | 6.8 | 0.4 | 0.6 | - | 0.1 | 0.2 | 0.1 | - | - | - | - | - | - |
| High-technology manufactures | | 37.0 | 51.4 | 27.3 | 39.5 | 26.6 | 21.4 | 13.8 | 17.7 | 37.9 | 23.4 | 47.2 | 55.1 | 40.5 | 46.8 | 46.1 | 39.4 | 39.7 | 39.7 | 42.4 | 40.4 |
| Medium-high technology manufactures | | 34.9 | 22.6 | 48.6 | 24.9 | 19.5 | 15.8 | 39.1 | 34.5 | 27.3 | 21.7 | 31.7 | 26.7 | 28.7 | 24.9 | 21.4 | 19.4 | 38.2 | 35.2 | 30.6 | 28.1 |
| Medium-low technology manufactures | | 8.6 | 5.7 | 7.4 | 4.5 | 12.2 | 11.4 | 12.6 | 8.8 | 8.9 | 8.8 | 3.8 | 2.8 | 7.1 | 4.2 | 5.0 | 3.2 | 6.5 | 6.0 | 7.3 | 4.8 |
| Low-technology manufactures | | 2.9 | 3.1 | - | 7.0 | - | - | 6.5 | 8.4 | 4.3 | 6.1 | 5.2 | 2.8 | 3.5 | 3.2 | - | 3.0 | - | 3.4 | - | 3.6 |
| High- and medium-high technology manufactures | | 73.3 | 75.1 | 76.0 | 64.7 | 48.2 | 39.6 | 54.0 | 53.7 | 66.4 | 47.0 | 79.3 | 81.9 | 69.4 | 72.4 | 67.5 | 58.8 | 78.2 | 75.3 | 73.2 | 68.6 |

1. EU includes the 15 EU Members before 1 May 2004 excluding Austria, Greece, Luxembourg, Portugal (for which no Anberd data are available).

2. OECD includes previous countries and Canada, Japan, and the United States.

3. Due to differences in data reporting methodologies, service sector R&D figures are not fully comparable across countries.

*Source:* OECD, STAN Indicators 2004.

**Table 15. R&D expenditures of affiliates under foreign control, 1991-2002**

| | As a percentage of total business R&D expenditures | | | | | | | As a percentage of GDP | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 1995 | 1997 | 1999 | 2000 | 2001 | 2002 | 1991 | 1995 | 1997 | 1999 | 2000 | 2001 | 2002 |
| Australia | - | 31.1 | - | 41.8 | - | - | - | - | 0.27 | - | 0.28 | - | - | - |
| Canada | - | 29.7 | 34.3 | 32.6 | 32.1 | 31.6 n | - | - | 0.30 | 0.35 | 0.35 | 0.37 | 0.38 p | - p |
| Czech Republic | - | - | 22.1 | 27.4 | 36.9 | 45.3 | 43.4 | - d,t | - a | 0.16 d,t | 0.21 | 0.30 | 0.35 | 0.34 |
| Finland | - | - | 13.3 | 14.9 | 12.7 | 14.3 | - | - | - | 0.24 | 0.33 | 0.31 | 0.34 | - |
| France[1, 2] | - | 17.1 | 16.4 | 16.4 - | - | 21.5 | - | - | 0.24 | 0.22 | 0.22 - | - | 0.30 a | - p |
| Germany | - | 16.1 | 18.1 | 19.0 | - | - | - | - a | 0.24 | 0.28 | 0.32 | - c | - | - c |
| Greece | 7.6 | 3.8 | 3.6 | 4.5 | - | - | - | 0.01 | 0.01 a | 0.00 | 0.01 | - | - c | - |
| Hungary[2] | - | 21.8 | 65.3 | 78.5 - | - | - | - | - t | 0.07 a | 0.20 | 0.20 - | - | - | - |
| Ireland | 68.6 | 66.2 | 65.3 | 63.8 | - | 65.2 | - | 0.40 | 0.59 | 0.59 | 0.55 | - c | 0.52 | - |
| Italy[3] | 23.1 | - | - | - | - | - | - | 0.15 | - | - | - | - | - | - p |
| Japan | 0.9 | 1.4 | 1.3 | 3.9 | 3.6 | - | - | 0.02 l | 0.03 l | 0.03 | 0.08 | 0.08 | - | - |
| Netherlands | - | - | 20.6 | 21.5 | 18.7 | - | - | - | - a | 0.23 | 0.25 | 0.21 | - | - p |
| Poland[4] | - | - | - | 12.1 | 12.1 | 4.6 | - | - | - a | - | 0.03 | 0.03 | 0.01 | - b |
| Portugal | - | - | - | 18.0 | - | 30.8 | - | - | - a | - | 0.03 | - c | 0.08 | - c |
| Slovak Republic[4] | - | 0.8 | - | 20.4 | 20.4 | 19.0 | - | - d,t | 0.00 d | - a | 0.09 | 0.09 | 0.08 | - |
| Spain[5] | 38.7 - | 26.8 | 35.7 | 32.8 | - | 31.0 | - | 0.18 - | 0.10 a | 0.14 | 0.15 | - | 0.15 | - a |
| Sweden | 17.1 | 18.4 | 15.9 | 34.1 | 34.0 | - | - | 0.32 m | 0.46 a,m | 0.42 m | 0.93 m | - | - m | - |
| Turkey | - | - | 14.8 | 7.3 | 10.6 | - | - | - | - | 0.02 | 0.02 | 0.02 | - | - |
| United Kingdom | - | 29.2 | 32.8 | 31.2 | 31.3 | 40.6 | 38.0 | - | 0.37 | 0.39 | 0.39 | 0.38 | 0.50 a | 0.48 |
| United States | 10.2 | 13.3 | 12.3 | 14.7 | 14.7 | 14.9 | - | 0.20 j | 0.24 j | 0.24 j | 0.29 j | 0.30 j | 0.30 j | - j,p |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1998 instead of 1997. 2. 1998 instead of 1999. 3. 1992 instead of 1991. 4. 2000 instead of 1999. 5. 1990 instead of 1991.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/073550815144

**Table 16. Share of public R&D expenditures financed by industry, 1981-2003**

As a percentage of total national R&D expenditures of the sector

| | Government | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 1.8 [p] | 2.7 | 5.7 | 5.7 | 5.6 [-] | - | - |
| Austria[4] | 1.5 | 1.3 | - | - | 3.1 | - | - |
| Belgium[5] | 0.0 [a] | 0.0 | 1.2 [b] | 2.1 | 12.4 | - | - |
| Canada | 1.0 | 1.0 | 1.7 | 1.8 | 2.6 | 2.6 [n] | 2.6 [n] |
| Czech Republic | - | - | - | 11.3 [a] | 6.6 | 9.6 | - |
| Denmark | 1.6 | 2.2 | 3.6 | 3.5 | 7.5 | 5.4 [a] | - |
| Finland | 9.5 [a] | - | 11.2 [a] | 11.9 | 15.2 | 14.2 | - |
| France | 1.8 | 0.7 | 4.8 | 5.4 | 6.3 | - | - |
| Germany | 0.8 | 1.4 | 1.3 [a] | 3.4 [m] | 2.3 [m] | 2.3 [b,m] | 2.3 [b,m] |
| Greece | 0.0 | - | 1.0 | 2.3 | 1.9 | - | - |
| Hungary | - | - | 22.0 [c] | 15.1 [c] | 13.1 [c] | 6.4 [c] | - |
| Iceland | 0.5 | 22.3 | 10.4 | 7.2 | 5.0 | - | - |
| Ireland[3] | 3.6 | 9.0 | 13.4 [b] | 21.8 | 10.6 | 8.8 [n] | - |
| Italy | 2.3 [r] | 2.0 [r] | 1.9 [a] | 1.8 | 3.5 | 2.2 [n] | 2.9 [n] |
| Japan | 1.3 | 5.4 | 2.2 | 0.7 | 0.7 | 1.2 | - |
| Korea | - | - | - | 16.5 [e] | 8.1 [e] | 4.6 [e] | - |
| Luxembourg[3] | - | - | - | - | 5.8 [-] | - | - |
| Mexico | - | - | - | 3.3 | 5.8 | - | - |
| Netherlands | 5.7 | 23.2 | 14.8 | 16.7 | 21.6 | 18.1 | - |
| New Zealand | - | - | 5.7 | 17.7 | 20.3 | - | - |
| Norway | 3.6 | 7.6 | 7.3 | 10.0 | 10.6 | - | - |
| Poland | - | - | - | 22.6 [a] | 14.3 | 23.3 | - |
| Portugal[6, 7, 1] | 0.2 | 4.1 | 7.1 | 0.3 | 3.5 | - | - |
| Slovak Republic | - | - | 9.3 [c,q] | 32.6 [c] | 14.0 [c] | 14.0 [c] | - |
| Spain | 0.7 | 3.8 | 3.8 | 5.3 | 7.1 | 4.1 | - |
| Sweden | 5.4 [e,f] | 4.8 [e,f] | 4.8 [e,f] | 3.0 [f] | 1.6 [f] | - | - |
| Switzerland[7] | - | 3.4 [f] | 0.3 [b,f] | - | - | - | - |
| Turkey[3] | - | - | 0.3 | 3.0 | 5.4 [-] | - | - |
| United Kingdom | 11.0 | 14.6 [a] | 12.0 [a] | 6.9 | 12.5 [a] | 10.7 | - |
| United States | 0.0 [f] | 0.0 [f] | 0.0 [f] | 0.0 [f] | 0.0 [f] | 0.0 [f,n] | 0.0 [f,n] |
| **Total OECD** | **2.1** [b] | **2.9** [b] | **3.1** [a,b] | **3.7** [a,b] | **3.6** [b] | **-** | **-** |
| **EU-25** | **-** | **-** | **-** | **6.0** [b] | **6.7** [b] | **-** | **-** |
| **EU-15** | **4.1** [b] | **5.2** [a,b] | **4.8** [a,b] | **5.1** [b] | **6.3** [b] | **-** | **-** |
| China[3] | - | - | - | - | 9.6 [s] | - | - |
| Israel[3] | - | - | 1.4 [c] | 0.2 [c] | 7.5 [c,n] | - | - |
| Russian Federation | - | - | - | 8.1 | 12.4 | 12.2 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.
7. 1986 instead of 1985.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/702620165887

**Table 16. Share of public R&D expenditures financed by industry, 1981-2003 (cont'd)**

As a percentage of total national R&D expenditures of the sector

| | Higher education | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 1.4 | 2.1 | 2.5 | 4.7 | 4.9 [-] | - | - |
| Austria[4] | 1.0 | 1.7 | - | - | 1.8 | - | - |
| Belgium[5] | 9.4 [a] | 8.7 | 15.4 [b] | 13.2 | 12.7 | - | - |
| Canada | 4.1 | 4.3 | 7.0 | 8.1 | 9.3 | 9.3 [n] | 9.3 [n] |
| Czech Republic | - | - | - | 2.0 [a] | 0.7 | 0.9 | - |
| Denmark | 0.7 | 1.0 | 1.6 | 1.9 | 3.0 | 4.2 [a] | - |
| Finland | 2.1 [a] | - | 3.6 [a] | 5.7 | 6.7 | 6.2 | - |
| France | 1.3 [a] | 1.9 | 4.2 | 3.3 | 3.1 | - | - |
| Germany | 1.8 | 5.4 | 7.0 [a] | 8.2 | 12.2 | 12.2 [b] | 11.3 [b] |
| Greece | 0.0 [a] | - | 6.1 | 5.6 [a] | 6.9 | - | - |
| Hungary | - | - | 14.4 | 2.1 | 4.4 | 11.8 | - |
| Iceland | 1.2 | 0.6 | 5.0 | 5.4 | 10.9 | - | - |
| Ireland[3] | 7.1 | 6.9 | 8.6 [b] | 6.9 [b] | 5.3 [-] | - | - |
| Italy | 2.7 | 1.5 | 4.0 | 4.7 | - | - | - |
| Japan | 1.5 [b] | 2.4 [b] | 3.7 [b] | 3.6 [b] | 2.3 | 2.6 | - |
| Korea | - | - | - | 22.4 [e] | 14.3 [e] | 13.9 [e] | - |
| Luxembourg[3] | - | - | - | - | - | - | - |
| Mexico | - | - | - | 1.4 | 1.1 | - | - |
| Netherlands | 0.3 | 1.0 | 1.2 | 4.0 | 7.1 | - | - |
| New Zealand | - | - | 4.6 | 9.4 | 5.3 | - | - |
| Norway | 2.9 | 5.0 | 4.7 | 5.3 | 5.8 | - | - |
| Poland | - | - | - | 11.4 | 6.3 | 5.8 | - |
| Portugal[6, 1, 2] | 0.0 | 0.9 | 0.5 | 0.9 [a] | 0.8 | - | - |
| Slovak Republic | - | - | 6.1 [q] | 1.0 [m] | 0.3 | 0.0 | - |
| Spain | 0.0 | 1.1 | 10.0 | 8.3 | 8.7 [b] | 7.6 | - |
| Sweden | 2.3 [a] | 5.5 | 5.2 | 4.6 [a,h] | 5.5 | - | - |
| Switzerland[1, 2, 7, 3] | 9.5 [b] | 3.3 [a,b] | 1.8 | 6.2 | 5.1 [-] | - | - |
| Turkey[3] | - | - | 10.4 | 16.1 | 19.4 [-] | - | - |
| United Kingdom | 2.8 [a] | 5.2 [a] | 7.8 | 6.3 | 6.2 | 5.8 | - |
| United States | 3.3 [h] | 4.5 [h] | 5.3 [h] | 5.5 [h] | 5.5 [h] | 4.9 [h,n] | 4.5 [h,n] |
| **Total OECD** | **2.6** [b] | **3.8** [b] | **5.5** [a,b] | **5.8** [a,b] | **6.0** [b] | **5.8** [b,n] | **-** |
| **EU-25** | **-** | **-** | **-** | **6.0** [b] | **6.7** [b] | **-** | **-** |
| **EU-15** | **2.0** [a,b] | **3.7** [a,b] | **5.8** [a,b] | **5.9** [a,b] | **6.8** [b] | **-** | **-** |
| China[3] | - | - | - | - | 32.4 [s] | - | - |
| Israel[3] | - | - | 7.4 [e] | 2.3 [e] | 3.7 [e] | - | - |
| Russian Federation | - | - | - | 27.5 | 26.5 | 27.2 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1986 instead of 1985.
2. 1992 instead of 1991.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.
7. 1996 instead of 1995.

*Source:* OECD, MSTI database, May 2004.

**Table 17. Basic research expenditures, 1981-2003**

| | As a percentage of GDP | | | | | | As a percentage of GERD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 | 1981 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 0.33 [i,p] | 0.43 [i] | 0.43 [i] | 0.40 [i] | - | - | 35.1 [i,p] | 28.3 [i] | 25.9 [i] | 26.0 [i] | - | - |
| Austria[4] | - | - | - | 0.27 [a, k] | - | - | - | - | - | 15.2 [a, k] | - | - |
| Czech Republic | - | - | 0.17 | 0.53 [i] | 0.49 [i] | - | - | - [c,q] | 16.8 [c,q] | 40.8 [i] | 37.7 [i] | - |
| Denmark | - | - | - | 0.44 [a] | - | - | - | - | - | 18.3 [a] | - | - |
| France | - | 0.48 [i] | 0.51 [i] | 0.52 [i] | - | - | - [a] | 20.3 [i] | 22.1 [i] | 23.3 [i] | - [n] | - |
| Germany | 0.46 [s] | 0.47 [a] | - | - | - | - | 18.9 [s] | 18.7 [a] | - | - | - | - |
| Hungary[1] | - | 0.23 [q] | 0.18 [a] | 0.24 | 0.25 | - | - | 22.1 [c,q] | 24.7 [a,c] | 25.3 [c] | 24.5 [c] | - |
| Iceland | 0.16 | 0.29 [i] | 0.38 [i] | 0.47 [i] | 0.49 [b,i] | - | 25.0 | 24.8 [i] | 24.2 [i] | 15.4 [i] | 15.9 [i,b] | - |
| Ireland[3] | 0.07 | 0.08 | - | 0.14 [i] | - | - | 10.3 | 8.6 [b] | - | 12.2 [i,b] | - | - |
| Italy | 0.11 [r] | 0.25 [a,i] | 0.22 [i] | - | - | - | 12.5 [r] | 20.3 [a,i,a] | 22.0 [i] | - | - | - |
| Japan | 0.28 [e,i,j] | 0.36 [i,j] | 0.41 [i,j] | 0.37 [i,k] | 0.39 [i,k] | - | 12.1 [e,i,j] | 12.2 [i,j] | 14.1 [i,j] | 12.1 [i,k] | 12.5 [i,k] | - |
| Korea | - | - | 0.31 | 0.37 [e,i] | 0.40 [e,i] | - | - | - | 12.4 [e] | 12.7 [e,i] | 13.7 [e,i] | - |
| Mexico | - | - | 0.09 | 0.12 | - | - | - | - | 29.0 | 30.8 | - | - |
| Netherlands[4] | 0.48 [a] | 0.27 [i] | 0.19 [a,i] | - | - | - | 25.0 [a] | 13.7 [i] | 9.5 [a,i] | - | - | - |
| New Zealand | - | - | - | 0.53 [i] | - | - | - | - | - | 44.9 [a,i] | - | - |
| Norway | 0.19 | 0.22 | 0.25 | 0.24 | - | - | 16.1 | 13.4 | 14.7 [a] | 15.0 | - | - |
| Poland | - | - | 0.20 [a,m] | 0.19 [m] | 0.19 [b,m] | - | - | - | 30.8 [a,m] | 29.7 [m] | 32.2 [b,m] | - |
| Portugal[5, 1] | 0.05 [i] | 0.15 [i] | 0.14 [a,i,p] | 0.19 | - | - | 16.7 [i] | 24.6 [i] | 24.6 [a,i,p,a] | 22.4 | - [b] | - |
| Slovak Republic | - | - | 0.20 [c] | 0.15 | 0.15 | - | - | - [c,q] | 21.5 [c] | 23.4 [k] | 25.9 [k] | - |
| Spain | 0.06 | 0.13 | 0.17 [a] | 0.15 | 0.16 | - | 14.6 | 15.5 | 21.0 [a] | 15.8 | 15.5 | - |
| Sweden | 0.50 [a,k] | 0.50 [k,p] | - | - | - | - | 22.5 [a,k] | 18.4 [k,p] | - [a,k] | - [k] | - | - |
| Switzerland[2, 3] | - | - | 0.80 [i] | 0.72 [i] | - | - | - | - | 30.0 [i] | 28.0 [i] | - | - |
| United States | 0.32 | 0.46 | 0.40 | 0.47 | 0.49 [n] | 0.50 [b,n] | 13.7 [h] | 16.9 [h] | 15.9 [h] | 17.2 [h] | 18.4 [h,n] | 19.1 [b,h,n] |
| China | - | 0.03 [i,k] | 0.03 [i,k] | 0.06 [i] | 0.07 [i] | - | - | 4.1 [i,k] | 5.0 [i,k] | 5.6 [i] | 5.7 [i] | - |
| Israel | - | - | - | 0.89 [c,i,n] | 0.89 [c,i,n] | - | - | - | - | 17.7 [c,i,n] | 18.9 [c,i,n] | - |
| Russian Federation[1] | - | 0.07 | 0.13 | 0.15 | 0.17 | - | - | 9.5 | 15.3 | 12.9 | 13.7 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.

*Source*: OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/345101246407

**Table 18. Basic research by performer, 1991-2003**

As a percentage of GDP

| | Business enterprise | | | | | Government | | | | | Higher education | | | | | Private non-profit | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 1995 | 2001 | 2002 | 2003 | 1991 | 1995 | 2001 | 2002 | 2003 | 1991 | 1995 | 2001 | 2002 | 2003 | 1991 | 1995 | 2001 | 2002 | 2003 |
| Australia[1, 2, 3] | 0.04 | 0.04 | 0.05 - | - | - | 0.12 | 0.11 | 0.10 - | - | - | 0.25 | 0.25 i | 0.23 - | - | - | 0.02 | 0.02 | 0.03 - | - | - |
| Austria[4] | - | - | 0.04 a | - | - | - | - | 0.02 a,k | - | - | - | - | 0.21 a | - | - | - | - | 0.00 | - | - |
| Czech Republic | - | 0.01 i | 0.22 i | 0.19 i | - | - | 0.13 i | 0.20 i | 0.19 i | - | - | 0.04 i | 0.10 i | 0.11 i | - | - | 0.00 | 0.00 | 0.00 | - |
| Denmark | - | - | 0.08 | - | - | 0.05 | 0.08 | 0.07 a | 0.03 | - | 0.20 | 0.25 | 0.28 a | 0.34 | - | 0.01 | 0.01 | 0.01 | 0.01 | - |
| France | 0.06 i | 0.06 i | 0.05 a,i | - | - | 0.09 i | 0.11 i | 0.09 i | - | - | 0.32 i | 0.33 i | 0.37 i | - | - | 0.01 | 0.01 | 0.01 | - | - |
| Germany | 0.09 a | 0.07 | 0.08 | - | - | 0.12 a | - | - | - | - | 0.26 a | - | - | - | - | - | - | - | - | - |
| Hungary[1] | 0.02 c,q | 0.01 a | 0.01 | 0.02 | - | 0.13 c,q | 0.10 a | 0.11 | 0.13 | - | 0.09 c,q | 0.07 a | 0.11 | 0.10 | - | - | - | - | - | - |
| Iceland | - | - | 0.00 | 0.00 | - | 0.10 i | 0.12 i,p | 0.15 i | 0.19 b,i | - | 0.16 i | 0.24 i,p | 0.27 i | 0.23 b,i | - | 0.03 | 0.02 | 0.05 | 0.05 b | - |
| Ireland | 0.02 | - | 0.04 i | - | - | 0.00 | 0.00 b | - | - | - | 0.06 b | 0.08 b | 0.10 b | - | - | 0.00 b | 0.00 b | - | - | - |
| Italy | 0.02 a,i | 0.02 i | 0.03 i | 0.03 i,n | 0.03 i,n | 0.09 a,i | 0.08 i | 0.06 i | 0.09 i,n | 0.08 i,n | 0.14 i | 0.13 i | - | - | - | - | - | - | - | - |
| Japan | 0.14 i,j | 0.13 i,j | 0.13 i,k | 0.14 i,k | - | 0.04 j | 0.05 a | 0.09 | 0.09 i,k | - | 0.18 j | 0.14 a | 0.16 | 0.16 i,k | - | 0.02 j | 0.02 a | 0.01 | 0.01 | - |
| Korea[2] | - | 0.15 e | 0.16 i | 0.20 i | - | - | 0.07 e | 0.08 e,i | 0.09 e,i | - | - | 0.10 ei | 0.12 ei | 0.11 ei | - | - | 0.01 e | 0.00 e | 0.00 e | - |
| Mexico | - | 0.00 | 0.01 | - | - | - | 0.04 | 0.06 | - | - | - | 0.05 | 0.06 | - | - | - | 0.00 | 0.00 | - | - |
| Netherlands | 0.13 i | - | - | - | - | 0.13 i | - | - | - | - | 0.01 i | - | - | - | - | 0.01 | - | - | - | - |
| New Zealand | - | - | 0.09 i | - | - | - | - | 0.20 i | - | - | - | - | 0.24 i | - | - | - | - | - | - | - |
| Norway | 0.01 | 0.02 a | 0.03 | - | - | 0.03 | 0.04 | 0.04 | - | - | 0.17 | 0.19 | 0.18 | - | - | - | - | - | - | - |
| Poland | - | 0.01 a,m | 0.01 m | 0.01 b,m | - | - | 0.10 a,m | 0.09 m | 0.09 b,m | - | - | 0.09 m | 0.10 m | 0.10 b,m | - | - | 0.00 | 0.00 | 0.00 | - |
| Portugal[1] | 0.00 | 0.00 a,i,p | 0.01 | - | - | 0.01 | 0.01 a,i,p | 0.01 | - | - | 0.11 | 0.10 aip | 0.14 | - | - | 0.02 | 0.03 | 0.03 | - | - |
| Slovak Republic | - | 0.03 c | 0.03 | 0.03 | - | - | 0.13 c | 0.08 c | 0.09 c | - | - | 0.04 | 0.04 | 0.03 | - | - | - | 0.00 k | 0.00 k | - |
| Spain | 0.02 | 0.02 a | 0.02 | 0.02 a | - | 0.03 | 0.03 a | 0.03 | 0.03 | - | 0.08 | 0.11 a | 0.10 | 0.11 | - | 0.00 | 0.00 | 0.00 | 0.00 | - |
| Sweden | 0.03 p | - | - | - | - | 0.01 e,f | 0.08 f | 0.09 f | - | - | 0.46 | - | - | - | - | 0.00 k | - | - | - | - |
| Switzerland[1, 2, 3] | 0.16 | 0.19 | 0.20 - | - | - | 0.00 | 0.00 | 0.00 | 0.00 f,i | - | - | 0.55 | 0.47 - | - | - | 0.00 | 0.06 | 0.04 - | - | - |
| Turkey | 0.01 | 0.01 i | - | - | - | 0.01 | 0.00 i | - | - | - | - | - | - | - | - | - | - | - | - | - |
| United Kingdom | 0.04 p | 0.05 p | 0.05 a | 0.08 | - | 0.03 s | 0.04 | 0.03 a | 0.03 | - | - | - | - | - | - | - | - | - | - | - |
| United States | 0.13 | 0.08 | 0.08 | 0.08 n | 0.08 b,n | 0.04 f | 0.04 f | 0.04 f | 0.04 f,n | 0.04 b,f,n | 0.25 | 0.24 | 0.28 | 0.30 n | 0.31 b,n | 0.04 h | 0.04 h | 0.06 h | 0.07 h,n | 0.07 b,h,n |
| China | 0.00 i,k | 0.00 i,k | 0.00 i | 0.00 i | - | 0.02 i | 0.02 i | 0.04 i | 0.04 i | - | 0.01 i | 0.01 i | 0.02 i | 0.03 i | - | - | - | - | - | - |
| Israel | - | - | 0.19 c,i,n | 0.17 c,i,n | 0.17 c,i,n | - | - | 0.05 c,i,n | 0.05 c,i,n | - | - | - | 0.61 e,i,n | 0.62 e,i,n | - | - | - | 0.04 c,n | 0.05 c,n | - |
| Russian Federation[1] | 0.01 | 0.02 | 0.02 | 0.02 | - | 0.05 | 0.09 | 0.11 | 0.13 | - | 0.02 | 0.02 | 0.02 | 0.02 | - | 0.00 | 0.00 | 0.00 | 0.00 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/377412476274

**Table 19. Government budget appropriations and outlays for R&D by socio-economic objectives, 1991-2003**

As a percentage of total R&D budget

| | Defense | | | Civil | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Economic development | | | Health | | | Space | | | Non-oriented programs | | | General university funds | | |
| | 1991 | 2001 | 2003 | 1991 | 2001 | 2003 | 1991 | 2001 | 2003 | 1991 | 2001 | 2003 | 1991 | 2001 | 2003 | 1991 | 2001 | 2003 |
| Australia | 10.3 f | 5.8 f | 5.7 f,n | 25.8 f | 36.8 f | 34.3 f,n | 14.6 f | 16.4 f | 19.9 f,n | - | 0.0 f | 0.0 f,n | 15.0 f | 3.1 f | 3.7 f,n | 34.4 f | 37.9 f | 36.4 f,n |
| Austria | 0.0 f | 0.0 f | 0.0 f,n | 14.6 f | 15.8 f | 12.7 f,n | 8.6 f | 8.8 f | 8.5 f,n | 0.4 f | 0.1 f | 0.1 f,n | 12.4 f | 13.7 f | 13.1 f,n | 64.0 f | 61.5 f | 65.5 f,n |
| Belgium | 0.2 | 0.2 | 0.4 n | 25.6 | 32.9 | 36.9 n | 10.1 | 9.7 | 9.6 n | 12.4 | 11.2 | 8.9 n | 22.7 | 23.3 | 22.9 n | 23.9 | 18.6 | 18.2 n |
| Canada | 5.1 f | 4.3 f | - | 33.8 f | 32.0 f | - | 13.8 f | 23.5 f | - | 7.2 f | 6.2 f | - | 12.5 f | 7.2 f | - | 27.6 b,f | 25.7 b,f | - |
| Czech Republic[1] | - | - | 3.3 c | - | - | 19.8 c | - | - | 16.7 c | - | - | 0.9 c | - | - | 25.7 c | - | - | 27.6 c |
| Denmark | 0.6 | 0.5 a | 1.1 | 26.3 | 21.1 a | 16.5 | 14.1 | 19.8 a | 16.7 | 2.7 | 2.4 a | 2.2 | 23.3 | 18.0 a | 20.6 | 33.0 | 37.4 a | 42.1 |
| Finland | 1.4 a | 1.6 | 2.9 n | 40.4 a | 41.1 | 39.1 n | 16.3 a | 15.4 | 15.2 n | 3.1 a | 1.9 | 1.9 n | 10.5 a | 14.2 | 13.7 n | 28.3 a | 25.9 | 27.2 n |
| France[1] | 36.1 | 22.8 a | 24.3 n | 21.0 | 12.7 | 12.3 n | 6.3 | 10.1 | 10.2 n | 8.6 | 9.6 | 8.9 n | 15.3 | 19.3 | 19.7 n | 12.4 | 23.2 | 23.0 n |
| Germany | 11.0 a | 7.4 | 6.7 n | 22.7 a | 18.8 s | 19.1 n,s | 11.6 a | 13.4 s | 13.7 n,s | 5.4 a | 4.9 s | 4.9 n,s | 15.2 a | 17.2 s | 16.6 n,s | 33.2 a | 38.4 s | 39.3 n,s |
| Greece[1] | 1.5 | 0.8 | 0.9 n | 29.7 | 20.8 | 18.0 n | 17.5 | 19.8 | 19.0 n | 0.3 | 0.2 | 0.1 n | 3.4 | 12.5 | 10.9 n | 46.1 | 45.6 | 50.7 n |
| Iceland | 0.0 | 0.0 | 0.0 n | 51.4 | 36.7 | 33.0 n | 7.2 | 10.6 | 10.0 n | - | - | - | 16.6 | 17.5 | - n | 24.9 | 35.2 | 38.4 n |
| Ireland | 0.0 | 0.0 | - | 48.5 | 41.4 | - | 12.7 | 12.8 | - | 3.8 | 0.0 | - | 5.1 | 27.6 | - | 29.9 | 18.3 | - |
| Italy | 7.9 | 4.0 n | - | 21.8 | 16.1 n | - | 18.2 | 15.5 n | - | 7.0 | 7.3 n | - | 10.6 | 13.3 n | - | 31.3 | 43.7 n | - |
| Japan | 5.7 e,f,k | 4.3 f,k | 4.5 | 31.6 e,f | 32.8 f | 31.9 f,n | 5.4 e,f | 7.5 f | 7.3 f,n | 6.8 e,f | 6.7 f | 6.7 | 8.0 e,f | 13.8 f | 15.3 f,n | 42.5 e,f | 34.8 f | 34.4 f,n |
| Korea | - | 15.8 | 14.2 | - | 46.7 | 44.7 | - | 15.7 | 16.7 | - | 3.2 | 2.8 | - | 18.5 m | 21.6 | - | - l | - |
| Mexico | 0.0 f | 0.0 | - | 32.6 f | 33.5 | - | 14.2 f | 12.5 | - | 0.0 f | 0.0 | - | 20.4 f | - l | - | 32.8 f | 53.9 m | - |
| Netherlands | 3.0 | 1.9 | - | 28.1 | 25.3 | - | 8.7 | 8.7 | - | 2.6 | 2.6 | - | 10.6 | 10.7 | - | 43.0 | 46.3 | - |
| New Zealand | 1.5 | - | - | 46.7 | - | - | 25.3 | - | - | - | - | - | 1.2 | - | - | 24.1 | - | - |
| Norway | 6.2 | 7.5 | 6.9 n | 31.5 | 26.1 | 21.2 n | 18.3 | 18.8 | 18.8 n | 2.7 | 2.2 | 1.9 n | 10.5 | 8.9 | 12.2 n | 30.8 | 36.4 | 39.0 n |
| Portugal | 0.7 | 2.1 | 2.0 n | 38.5 | 31.4 | 35.4 n | 18.0 | 17.8 | 16.7 n | 0.2 | 0.5 | 0.5 n | 8.4 | 10.5 | 9.9 n | 30.3 | 35.6 | 33.5 n |
| Slovak Republic[2] | - | 9.3 m | 7.2 m | - | 29.2 | 21.3 | - | 10.9 | 10.2 | - | - l | - l | - | 32.4 m | - a,m | - | 16.6 | - l |
| Spain | 16.8 | 37.3 b | - | 27.5 | 22.7 b | - | 15.1 | 9.7 b | - | 7.0 | 2.4 b | - | 10.8 | 2.1 b | - | 20.0 | 25.8 b | - |
| Sweden | 27.3 | 14.6 | 22.2 | 17.8 | 12.2 | 13.6 | 8.3 | 10.8 | 8.9 | 1.7 | 2.7 | 0.6 | 14.6 | 16.7 | 16.7 | 30.4 | 43.1 | 38.0 |
| Switzerland[3, 4] | 4.6 f | 0.7 f | - | 3.7 f,k | 4.6 f,k | - | 3.5 f,k | 2.4 f,k | - | - | - | - | - l | - l | - | 59.3 f,m | 61.1 f,m | - |
| United Kingdom[1] | 43.9 | 30.5 | 34.1 c | 16.2 | 9.4 | 9.8 c | 12.5 | 22.4 | 20.1 c | 2.7 | 2.1 | 1.9 c | 5.1 | 13.6 | 13.3 c | 18.9 | 21.8 | 20.2 c |
| United States | 59.7 f,g,h | 50.5 f,g | 53.7 b,f,g | 8.9 f,g,h | 6.5 f,g,l | 5.6 b,f,g | 17.5 f,g,h | 26.2 f,g,l | 26.3 b,f,g | 9.9 f,g,h | 9.8 f,g | 8.4 b,f,g | 4.0 f,g,h | 6.9 f,g | 6.0 b,f,g | - | - | - |
| **Total OECD** | **36.4 a** | **28.8 n** | **-** | **17.9 a** | **15.9 n** | **-** | **13.8 a** | **18.8 n** | **-** | **7.5 a** | **7.2 n** | **-** | **8.2 a** | **10.7 n** | **-** | **15.5 a** | **17.4 n** | **-** |
| **EU-25** | **-** | **14.9 a,n** | **-** | **-** | **16.8 a,n** | **-** | **-** | **13.5 a,n** | **-** | **-** | **5.2 a,n** | **-** | **-** | **14.8 a,n** | **-** | **-** | **31.6 a,n** | **-** |
| **EU-15** | **20.6 a** | **15.4 a,n** | **-** | **23.8 a** | **17.2 a,n** | **-** | **11.3 a** | **13.8 a,n** | **-** | **5.6 a** | **5.3 a,n** | **-** | **12.4 a** | **15.0 a,n** | **-** | **24.9 a** | **32.5 a,n** | **-** |
| Russian Federation | - | 43.5 | - | - | 24.4 | - | - | 7.0 | - | - | 10.1 | - | - | 14.0 | - | - | 0.0 | - |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 2002 instead of 2003. 2. 2002 instead of 2001. 3. 1992 instead of 1991. 4. 2000 instead of 2001.

*Source*: OECD, MSTI database, May 2004.

*StatLink*: http://dx.doi.org/10.1787/147403505165

**Table 20. Tax treatment of R&D, 1990-2004**

Rate of tax subsidies for 1 USD of R&D[1], large firms and SMEs

| | SMEs | | | Large firms | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1999 | 2001 | 2004 | 1990 | 1995 | 1999 | 2001 | 2004 |
| Australia[2] | 0.11 | 0.20 | 0.12 | 0.28 | 0.21 | 0.11 | 0.20 | 0.12 |
| Austria | 0.12 | 0.12 | 0.11 | 0.02 | 0.07 | 0.12 | 0.12 | 0.11 |
| Belgium | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 | -0.01 |
| Canada | 0.32 | 0.32 | 0.32 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| Denmark[3] | - | 0.11 | 0.18 | 0.00 | 0.13 | -0.02 [4] | 0.11 | 0.18 |
| Finland | -0.01 | -0.01 | -0.01 | -0.02 | -0.01 | -0.01 | -0.01 | -0.01 |
| France | 0.09 | 0.06 | 0.13 | 0.09 | 0.08 | 0.09 | 0.06 | 0.13 |
| Germany | -0.04 | -0.02 | -0.02 | -0.05 | -0.05 | -0.04 | -0.02 | -0.02 |
| Greece | -0.01 | -0.01 | -0.01 | - | - | -0.01 | -0.01 | -0.01 |
| Hungary[5] | - | - | 0.16 | - | - | - | - | 0.16 |
| Iceland | -0.03 | -0.01 | -0.01 | -0.03 | - | -0.03 | -0.01 | -0.01 |
| Ireland | 0.06 | - | 0.05 | 0.00 | - | 0.06 | - | 0.05 |
| Italy | 0.45 | 0.44 | 0.45 | -0.04 | -0.05 | -0.03 | -0.03 | -0.03 |
| Japan[6] | 0.06 | 0.12 | 0.19 | -0.02 | -0.01 | 0.02 | 0.01 | 0.14 |
| Mexico | 0.03 | 0.03 | 0.39 | -0.02 | -0.02 | 0.03 | 0.03 | 0.39 |
| Netherlands[7] | - | 0.35 | 0.11 | -0.02 | 0.10 | 0.10 | 0.10 | 0.02 |
| New Zealand | -0.13 | -0.02 | -0.02 | - | - | -0.13 | -0.02 | -0.02 |
| Norway | -0.02 | 0.23 | 0.23 | -0.04 | -0.02 | -0.02 | -0.02 | 0.21 |
| Portugal | 0.15 | 0.34 | 0.28 | -0.02 | -0.02 | 0.15 | 0.34 | 0.28 |
| Spain | 0.31 | 0.44 | 0.44 | 0.25 | 0.28 | 0.31 | 0.44 | 0.44 |
| Sweden | -0.01 | -0.01 | -0.01 | -0.02 | -0.02 | -0.01 | -0.01 | -0.01 |
| Switzerland | -0.01 | -0.01 | -0.01 | -0.01 | -0.02 | -0.01 | -0.01 | -0.01 |
| United Kingdom | 0.11 | 0.11 | 0.11 | 0.00 | 0.00 | 0.00 | 0.10 | 0.10 |
| United States | 0.07 | 0.07 | 0.07 | 0.09 | -0.02 | 0.07 | 0.07 | 0.07 |

1. Tax subsidies are calculated as 1 minus the B-index. For example, in Australia in 2001, 1 dollar of R&D expenditure by large firms results in 20 cents of tax relief.

2. Calculation of Australia's B-index was adjusted to show the correct weights of the volume-based, 125% tax concession and the 175% incremental tax concession for R&D.

3. The 2004 calculation for Denmark applies to the 150% allowance on collaborative research at universities or public research institutions. Without this incentive, the B-index is 1.015.

4. 1998 instead of 1999.

5. The B-index for Hungary is based on the 100% R&D tax allowance for research and technology development (which also applies to subcontracted R&D if the partner is a public or non-profit research organization). A 300% allowance is available if the company's R&D laboratory is located at a university or public research site; the B-index in this situation equals 0.666.

6. The 2004 B-index for large firms in Japan applies to firms with a ratio of R&D to sales of less than 10%. The B-index for large firms with a R&D-to-sales ratio above 10% is 0.831. The B-index for research conducted in collaboration with universities is 0.782.

7. Calculations for the Netherlands were revised to reflect the taxability of the savings from the tax credit.

*Source:* OECD, 2004.

StatLink: http://dx.doi.org/10.1787/486405683434

**Table 21. Total researchers per thousand employment, 1981-2002**

| | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 |
|---|---|---|---|---|---|---|
| Australia[1, 2, 3] | 3.6 [b] | 4.3 | 6.8 | 7.2 | 7.3 [-] | - |
| Austria[4] | 1.8 | 2.0 [k] | - | - | 4.7 [k] | - |
| Belgium | 3.5 [b,r] | 4.1 [b,r] | 4.8 [b,r] | 6.1 | 7.8 | - |
| Canada[3] | 3.5 | 4.4 | 5.1 | 6.4 | 7.1 [b,n] | - |
| Czech Republic[1] | - | - | 3.8 [b,c,j,q,r] | 2.2 [b] | 2.9 [b] | 2.9 [b] |
| Denmark | 2.8 [b,r] | 3.4 [b,r] | 4.6 [r] | 6.1 [r] | 7.0 [r] | - |
| Finland[5] | 3.9 [r] | - | 6.0 [r] | 8.2 [r] | 15.8 [r] | 16.4 [r] |
| France | 3.9 [a] | 4.7 | 5.7 | 6.7 | 7.2 | - |
| Germany | 4.6 | 5.2 | 6.3 [a] | 6.2 | 6.8 | 6.8 [b] |
| Greece | - | - | 1.8 [b] | 2.6 [a] | - | - |
| Hungary | - | - | 3.2 [b,c] | 2.9 [c] | 3.8 [c] | 3.9 [c] |
| Iceland | - | - | - | - | - | - |
| Ireland[3] | 1.8 [b] | 2.5 [b] | 4.4 [b] | 4.5 [b] | 5.0 [a,b] | - |
| Italy | 2.4 | 2.9 | 3.3 | 3.4 | 2.8 | - |
| Japan | 5.3 [j] | 6.2 [j] | 7.5 [j] | 8.3 [j] | 10.2 | 9.9 [b] |
| Korea | - | - | - | 4.9 [e] | 6.3 [e] | 6.4 [e] |
| Luxembourg[3] | - | - | - | - | 6.2 [-] | - |
| Mexico | - | - | - | 0.6 | - | - |
| Netherlands | 3.4 | 4.3 | - | 4.8 | 5.5 | - |
| New Zealand | - | - | 4.0 | 4.7 | 6.9 [a] | - |
| Norway | 3.8 [r] | 4.8 [r] | 6.6 [r] | 7.5 [a,r] | 8.7 [r] | - |
| Poland | - | - | - | 3.4 | 3.8 | 3.9 [b] |
| Portugal[6, 7, 1] | 0.8 [b] | 1.1 [b] | 2.1 [a,b,r] | 2.6 [r] | 3.5 [b,r] | - |
| Slovak Republic | - | - | - | 4.6 [c] | 4.7 | 4.6 |
| Spain | 1.6 [b] | 1.8 | 2.9 | 3.5 | 5.0 | 5.1 |
| Sweden | 4.2 [a,k] | 5.0 [k,r] | 5.9 [k,r] | 8.2 | 10.6 | - |
| Switzerland[7, 1, 2, 3] | - | 4.2 [a,b,r] | 4.4 | 5.5 | 6.3 [-] | - |
| Turkey[3] | - | - | 0.6 | 0.8 [b] | 1.1 [b] | - |
| United Kingdom | 4.9 | 5.0 | 4.6 [a] | 5.4 | - | - |
| United States | 6.3 | 7.0 [a] | 7.7 | 7.6 | - | - |
| **Total OECD[3]** | **4.5 [b]** | **5.2 [a,b]** | **5.6 [a,b]** | **5.8 [a,b]** | **6.5 [b,n]** | **-** |
| **EU-25** | **-** | **-** | **-** | **4.9 [b]** | **5.6 [b]** | **-** |
| **EU-15** | **3.5 [b]** | **4.0 [b]** | **4.7 [a,b]** | **5.2 [b]** | **5.9 [b]** | **-** |
| China | - | - | 0.7 [k] | 0.8 [k] | 1.0 | 1.1 |
| Israel | - | - | - | - | - | - |
| Russian Federation | - | - | - | 9.2 | 7.9 | 7.5 |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991.
2. 1996 instead of 1995.
3. 2000 instead of 2001.
4. 1998 instead of 2001.
5. 1983 instead of 1981.
6. 1982 instead of 1981.
7. 1986 instead of 1985.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/730776281328

**Table 22. Researchers by sector of performance, 1991-2002**

Per thousand labour force

| | Business sector | | | | Government | | | | Higher education | | | | Private non-profit | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 1995 | 2001 | 2002 | 1991 | 1995 | 2001 | 2002 | 1991 | 1995 | 2001 | 2002 | 1991 | 1995 | 2001 | 2002 |
| Australia[1, 2, 3] | 1.62 | 1.67 | 1.66 | - | 1.12 | 0.99 | 0.92 [-] | - | 3.25 | 3.88 | 4.07 | - | 0.08 | 0.14 | 0.15 | - |
| Austria[4] | - | - | 3.01 | - | - | - | 0.25 | - | - | - | 1.53 | - | - | - | 0.02 | - |
| Belgium | 2.08 [b,r] | 2.82 | 4.06 [b] | 4.08 [b] | 0.19 [b] | 0.23 | 0.44 | - | 2.00 [b,r] | 2.32 [r] | 2.72 [b] | - | 0.04 [b,r] | 0.06 [r] | 0.06 [b] | - |
| Canada | 2.09 | 3.30 | 3.99 | - | 0.58 | 0.52 | 0.44 | - [n] | 1.99 | 2.08 | 2.12 [b,n] | - | 0.04 | 0.03 | 0.02 | - |
| Czech Republic | - | 0.95 | 1.11 | 1.20 | - [c,q] | 0.83 [a] | 0.94 | 0.86 | - | 0.52 | 0.82 | 0.83 | - | 0.00 | 0.03 | 0.01 |
| Denmark | 1.77 | 2.39 | 3.37 | - | 0.88 | 1.28 | 1.26 | 0.77 | 1.42 | 1.97 | 2.10 | 2.75 [a,r] | 0.06 | 0.07 | 0.06 | 0.05 |
| Finland | - | - | - | - | - [a] | - | - | - | - | - | - | - | - | - | - | - |
| France | 2.37 | 2.61 | 3.28 [a] | - | 1.03 | 1.07 | 0.85 | - [n] | 1.68 | 2.11 | 2.31 | - | 0.08 | 0.15 | 0.13 | - |
| Germany | 3.56 [a] | 3.29 | 3.98 | - | 0.94 [a] | 0.95 [b] | 0.97 | 0.99 [b] | 1.57 [a] | 1.64 | 1.71 | 1.76 [b] | 0.03 [a] | - | - | - |
| Greece | 0.26 | 0.37 | - | - | 0.49 | 0.47 [a] | 0.45 [b] | - | 0.83 | 1.43 [a] | 1.96 | - | - | 0.02 | 0.01 | - |
| Hungary[1] | 0.82 | 0.71 | 0.99 | 1.06 | 0.85 [c,q] | 0.86 [c] | 1.14 [c] | 1.12 [c] | 1.05 | 0.99 | 1.45 | 1.46 | - | - | - | - |
| Iceland | 1.19 [a] | 2.41 | 5.24 | - | 2.06 | 2.17 | 2.61 | - | 1.53 [a] | 2.55 | 3.16 | - | 0.11 [a] | 0.09 | 0.42 | - |
| Ireland | 1.57 | 2.32 | 3.35 | - | 0.26 [b] | 0.19 [b] | 0.28 | 0.31 | 1.83 [b] | 1.32 [b] | 1.23 | - | 0.15 [b] | 0.12 [b] | - | - |
| Italy | 1.20 | 1.19 | 1.11 | - | 0.51 [a] | 0.61 | 0.54 | - | 1.34 | 1.51 | 1.14 | - | - | - | - | - |
| Japan | 5.24 | 5.76 | 6.38 | 6.45 | 0.46 [b,j] | 0.46 [b,j] | 0.50 | 0.51 | 1.65 | 1.82 | 2.97 | 2.55 | 0.21 | 0.24 | 0.16 | 0.16 |
| Korea | - | 3.23 | 4.47 | 4.55 | - [e] | 0.61 [e] | 0.54 [e] | 0.50 [e] | - | 0.93 [e] | 1.03 [e] | 1.09 [e] | - | 0.05 [e] | 0.05 [e] | 0.06 |
| Luxembourg[3] | - | - | 5.24 | - | - | - | 0.76 [-] | - | - | - | 0.08 | - | - | - | - | - |
| Mexico | - | 0.06 | - | - | - | 0.17 | - | - | - | 0.32 | - | - | - | 0.01 | - | - |
| Netherlands | - | 1.79 | 2.75 | - | - | 1.06 | 0.83 | 0.82 | 1.78 | 1.68 | 1.93 | - | - | 0.06 | 0.04 | 0.03 |
| New Zealand | 0.83 | 0.88 | 1.30 [a] | - | 0.93 | 0.84 | 1.02 [a] | - | 1.14 | 1.69 | 2.89 [a] | - | - | - | - | - |
| Norway | - | - | 4.78 | - | - | - | 1.31 | - | 1.95 | 2.28 | 2.40 | - | - | - | - | - |
| Poland | - | 0.65 | 0.55 | 0.27 | - | 0.65 [a] | 0.61 | 0.85 | - | 1.63 | 2.10 | 2.16 | - | 0.00 | 0.00 | 0.00 |
| Portugal[1] | 0.21 [a] | 0.23 [a] | 0.51 | - | 0.42 | 0.58 | 0.68 | - | 1.13 [a] | 1.23 [a] | 1.68 | - | 0.24 [a] | 0.41 [a] | 0.45 | - |
| Slovak Republic | - | 0.85 [c] | 0.85 | 0.83 | - [b,c,q] | 1.48 [c] | 0.92 [k] | 0.91 [k] | - | 1.60 | 1.84 | 1.76 | - | - | 0.00 | 0.00 |
| Spain | 0.73 | 0.66 | 1.06 | 1.34 [a] | 0.51 | 0.51 | 0.75 | 0.69 | 1.31 | 1.69 | 2.63 | 2.49 | 0.01 | 0.03 | 0.05 | 0.02 |
| Sweden | 2.93 [k] | 4.34 [a] | 6.25 | - | 0.38 [k] | 0.62 [a,k] | 0.51 [k] | - | 2.52 | 2.70 | 3.55 | - | 0.01 [e] | - | - | - |
| Switzerland[1, 2, 3] | 2.37 | 3.04 | 3.86 | - | 0.15 | 0.14 | - | 0.11 | 1.76 [a] | 2.09 | 2.18 | - | - | - | - | - |
| Turkey[3] | 0.06 | 0.10 | 0.16 [a] | - | 0.09 | 0.08 | 0.11 [-] | - | 0.41 | 0.54 | 0.75 [a] | - | - | - | - | - |
| United Kingdom | 2.78 | 2.88 | 3.16 [a] | 3.50 | 0.52 | 0.48 | 0.34 | 0.31 | 1.01 | 1.65 | - | - | 0.10 | 0.11 | 0.13 | 0.14 |
| United States[3] | 6.04 | 5.89 | 7.20 [n] | - | 0.45 [h] | 0.40 [h] | - | - | 1.08 | 1.35 | - | - | 0.07 | 0.08 [k] | - | - |
| **Total OECD** | **3.51** | **3.44** | **-** | **-** | **0.54** [a,b] | **0.43** [a,b] | **-** | **-** | **1.24** | **1.14** | **-** | **-** | **0.07** | **0.06** | **-** | **-** |
| **EU-25** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **EU-15** | **2.22** | **2.32** | **-** | **-** | **0.71** [a,b] | **0.74** | **-** | **-** | **1.45** | **1.75** | **-** | **-** | **0.05** | **0.08** | **-** | **-** |
| China | 0.19 [k,s] | 0.28 [k,s] | 0.53 | 0.59 | 0.31 [k] | 0.27 [k] | 0.25 | 0.25 | 0.20 [s] | 0.19 [s] | 0.23 | 0.24 | - | - | - | - |
| Israel | - | 5.05 | 4.02 | 3.81 | - | 2.16 | 2.05 | 2.01 | - | 1.15 | 1.06 | 0.96 | - | 0.00 | 0.03 | 0.02 |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1992 instead of 1991. 2. 1996 instead of 1995. 3. 2000 instead of 2001. 4. 1998 instead of 2001.

*Source:* OECD, MSTI database, May 2004.

*StatLink*: http://dx.doi.org/10.1787/178788378577

**Table 23. Human resources in science and technology, 1995-2002**

| | HRST | |
|---|---|---|
| | Average annual growth rate, 1995-2002 | As a percentage of total employment, 2002 |
| Australia | 3.07 [1] | 35.6 [2] |
| Austria | 2.08 [3] | 24.7 [2] |
| Belgium | 2.23 [3] | 30.1 [2] |
| Canada | 3.00 | 29.0 |
| Czech Republic | 1.69 | 29.7 |
| Denmark | 3.46 | 35.3 |
| Finland | 2.32 [4] | 32.5 |
| France | 2.11 | 29.2 |
| Germany | 2.04 [3] | 33.5 [2] |
| Greece | 2.65 | 19.7 |
| Hungary | -1.03 [5] | 23.9 [2] |
| Iceland | 5.60 [5] | 29.0 [2] |
| Ireland | 7.05 | 22.4 |
| Italy | 4.26 | 28.4 |
| Japan[6] | - | 15.7 |
| Korea | 3.40 | 16.2 |
| Luxembourg | 5.43 [3] | 31.6 [2] |
| Netherlands | 3.90 | 34.3 |
| New Zealand | 3.06 [1] | 26.0 [2] |
| Norway | 7.64 [5] | 34.7 [2] |
| Poland | -1.14 [5] | 23.5 [2] |
| Portugal | -0.64 | 14.8 |
| Slovak Republic | 1.03 [7] | 28.8 |
| Spain | 8.36 | 23.1 |
| Sweden | 3.37 [4] | 37.7 |
| Switzerland | 1.04 [7] | 36.1 |
| United Kingdom | 2.49 | 25.3 |
| United States | 2.00 | 32.7 |

1. 1996-2001 instead of 1995-2002.

2. 2001 instead of 2002.

3. 1995-2001 instead of 1995-2002.

4. 1997-2001 instead of 1995-2002.

5. 1999-2001 instead of 1995-2002.

6. Data for Japan are national estimates.

7. 1999-2002 instead of 1995-2002.

*Source:* OECD, *Science, Technology and Industry Scoreboard 2003* .

StatLink: http://dx.doi.org/10.1787/053853630826

**Table 24. University graduates in science and engineering, 1988-2001**

Tertiary A level and advanced research programmes

| | Thousand of graduates | | | | | | As a percentage of total graduates | | | | | | Share of women | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Science | | | Engineering | | | Science | | | Engineering | | | Science | | | Engineering | | |
| | 1998 | 2000 | 2001 | 1998 | 2000 | 2001 | 1998 | 2000 | 2001 | 1998 | 2000 | 2001 | 1998 | 2000 | 2001 | 1998 | 2000 | 2001 |
| Australia | 17.2 | 17.5 | 19.7 | 11.8 | 11.8 | 12.4 | 11.5 | 11.8 | 11.9 | 7.9 | 7.9 | 7.5 | 8.4 | 8.6 | 8.5 | 2.9 | 3.0 | 2.9 |
| Austria | 2.2 | 1.7 | 1.7 | 2.4 | 3.0 | 3.5 | 13.7 | 9.9 | 9.1 | 14.7 | 17.3 | 18.7 | 9.3 | 7.0 | 7.4 | 5.0 | 6.7 | 6.7 |
| Belgium[1] | 1.5 | 3.2 | 3.7 | 2.6 | 4.0 | 4.3 | 8.3 | 9.9 | 10.9 | 14.6 | 12.5 | 12.5 | 6.9 | 7.5 | 8.2 | 6.3 | 5.3 | 5.1 |
| Canada | 17.5 | 18.9 | - | 12.0 | 12.6 | - | 11.7 | 12.2 | - | 8.0 | 8.2 | - | 8.9 | 9.6 | - | 3.1 | 3.2 | - |
| Czech Republic | 1.3 | 3.8 | 4.2 | 5.0 | 4.6 | 4.5 | 5.9 | 12.7 | 11.9 | 22.3 | 15.5 | 12.8 | 3.2 | 6.3 | 5.3 | 9.9 | 8.3 | 7.5 |
| Denmark[2] | 1.6 | 1.9 | 2.2 | 1.2 | 1.4 | 3.0 | 12.9 | 12.6 | 6.7 | 9.8 | 8.9 | 9.0 | 10.9 | 10.7 | 4.5 | 5.8 | 4.7 | 3.4 |
| Finland | 1.8 | 2.2 | 2.2 | 5.5 | 6.7 | 6.4 | 8.0 | 7.9 | 7.2 | 24.2 | 24.0 | 20.8 | 6.5 | 6.2 | 5.3 | 7.9 | 7.7 | 6.5 |
| France | 56.8 | 65.2 | 67.0 | 46.1 | 40.6 | 41.3 | 15.9 | 18.0 | 18.2 | 12.9 | 11.2 | 11.2 | 13.8 | 13.8 | 14.2 | 5.0 | 4.8 | 4.7 |
| Germany | 31.5 | 27.6 | 26.2 | 43.0 | 38.8 | 36.4 | 14.7 | 13.5 | 13.2 | 20.1 | 19.0 | 18.4 | 10.6 | 9.5 | 9.5 | 7.6 | 8.3 | 8.2 |
| Hungary | 2.0 | 1.4 | 1.4 | 5.9 | 5.8 | 4.2 | 4.5 | 2.3 | 2.5 | 13.5 | 9.8 | 7.4 | 3.6 | 1.3 | 1.3 | 5.5 | 3.6 | 3.3 |
| Iceland | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 13.1 | 10.7 | 11.0 | 5.9 | 7.1 | 6.5 | 8.1 | 7.8 | 8.2 | 2.3 | 2.6 | 2.1 |
| Ireland | 3.9 | 5.4 | 5.5 | 2.3 | 2.5 | 2.2 | 16.9 | 19.7 | 19.4 | 10.0 | 9.3 | 7.9 | 14.9 | 16.8 | 15.9 | 3.9 | 3.9 | 3.5 |
| Italy | 18.3 | 15.8 | 15.6 | 25.1 | 29.7 | 31.0 | 11.1 | 8.5 | 8.0 | 15.2 | 16.0 | 15.9 | 11.6 | 8.4 | 7.8 | 7.6 | 7.9 | 7.8 |
| Japan | 26.3 | 26.7 | 28.8 | 127.7 | 129.7 | 133.5 | 4.4 | 4.4 | 4.6 | 21.6 | 21.3 | 21.2 | 3.0 | 3.0 | 3.1 | 4.9 | 5.3 | 5.8 |
| Korea | 24.4 | 27.2 | 33.3 | 62.7 | 67.4 | 74.3 | 11.0 | 11.1 | 12.2 | 28.2 | 27.4 | 27.2 | 11.6 | 11.7 | 12.3 | 14.4 | 14.3 | 13.6 |
| Luxembourg | - | 0.1 | - | - | - | - | - | 31.5 | - | - | - | - | - | - | - | - | - | - |
| Mexico | 6.5 | 25.8 | 29.0 | 51.8 | 40.4 | 41.1 | 2.8 | 9.0 | 9.7 | 22.0 | 14.0 | 13.8 | 2.8 | 8.0 | 8.4 | 14.5 | 6.0 | 6.2 |
| Netherlands | 4.8 | 3.6 | 4.1 | 10.1 | 7.8 | 8.3 | 5.7 | 4.8 | 5.2 | 12.1 | 10.4 | 10.5 | 3.0 | 2.5 | 2.7 | 2.8 | 2.4 | 2.4 |
| New Zealand | 3.6 | 4.1 | 4.5 | 1.8 | 1.8 | 1.8 | 13.3 | 13.0 | 14.1 | 6.9 | 5.6 | 5.5 | 10.2 | 9.7 | 10.4 | 3.7 | 3.0 | 2.9 |
| Norway | 1.3 | 1.6 | 1.9 | 3.1 | 1.8 | 2.4 | 3.8 | 6.3 | 6.8 | 9.0 | 6.8 | 8.3 | 1.9 | 2.9 | 3.2 | 3.7 | 2.9 | 3.0 |
| Poland | 3.4 | 11.7 | 15.0 | 23.5 | 27.6 | 29.8 | 1.5 | 3.4 | 3.5 | 10.4 | 8.0 | 7.0 | 0.3 | 3.4 | 3.1 | 0.8 | 3.0 | 2.6 |
| Portugal | - | 3.0 | - | - | 6.6 | - | - | 5.7 | - | - | 12.4 | - | - | 4.1 | - | - | 6.6 | - |
| Slovak Republic[2] | 1.6 | 1.4 | 2.3 | 2.8 | 3.2 | 4.3 | 8.5 | 6.8 | 9.4 | 14.8 | 15.4 | 17.8 | 4.8 | 4.0 | 6.2 | 7.6 | 8.8 | 10.8 |
| Spain | 20.1 | 21.7 | 22.8 | 24.0 | 27.6 | 30.8 | 9.4 | 10.2 | 10.4 | 11.2 | 12.9 | 14.2 | 7.3 | 8.1 | 8.1 | 4.9 | 6.0 | 6.9 |
| Sweden | 3.0 | 3.2 | 3.6 | 5.4 | 7.8 | 8.3 | 9.0 | 8.5 | 9.4 | 16.2 | 20.5 | 21.5 | 5.4 | 6.7 | 7.5 | 6.2 | 8.6 | 10.1 |
| Switzerland | 2.6 | 3.9 | 4.0 | 3.8 | 4.2 | 3.7 | 11.4 | 14.5 | 15.0 | 17.0 | 15.7 | 14.1 | 8.2 | 9.3 | 9.0 | 5.1 | 4.6 | 4.3 |
| Turkey | 13.5 | 14.3 | 16.3 | 14.3 | 17.5 | 18.1 | 10.5 | 10.9 | 10.4 | 11.1 | 13.3 | 11.6 | 12.2 | 12.5 | 12.1 | 6.6 | 7.8 | 6.7 |
| United Kingdom | 54.2 | 64.7 | 77.0 | 46.5 | 39.0 | 44.7 | 14.5 | 16.5 | 18.1 | 12.4 | 9.9 | 10.5 | 11.4 | 13.3 | 14.6 | 4.3 | 3.6 | 3.7 |
| United States | 158.3 | 169.7 | 173.4 | 120.6 | 117.7 | 118.3 | 9.2 | 9.3 | 9.4 | 7.0 | 6.5 | 6.4 | 7.2 | 7.3 | 7.3 | 2.4 | 2.4 | 2.4 |
| **Total OECD[1, 2, 3]** | **510.9** | **544.3** | **565.5** | **657.4** | **654.9** | **668.6** | **9.6** | **9.8** | **10.0** | **12.4** | **11.8** | **11.8** | **7.7** | **8.0** | **8.0** | **4.2** | **4.4** | **4.5** |
| **EU-25[1, 2, 3]** | **211.6** | **234.4** | **254.5** | **258.2** | **250.0** | **263.0** | **11.1** | **11.6** | **11.6** | **13.6** | **12.3** | **12.0** | **9.4** | **9.0** | **8.9** | **5.4** | **5.0** | **4.9** |
| **EU-15[1, 2, 3]** | **198.6** | **216.2** | **231.7** | **220.1** | **208.8** | **220.2** | **12.9** | **13.7** | **14.1** | **14.3** | **13.3** | **13.4** | **10.4** | **10.8** | **11.1** | **5.6** | **5.5** | **5.6** |
| Israel | - | 4.0 | 4.6 | - | 3.3 | 3.8 | - | 10.3 | 11.5 | - | 8.5 | 9.6 | - | 7.3 | 8.4 | - | 3.3 | 3.7 |

1. Flemish Community only instead of Belgium in 1998.

2. 1999 instead of 1998.

3. Do not include Greece, Luxembourg, Portugal and Spain.

*Source:* OECD, Education database, July 2004.

StatLink: http://dx.doi.org/10.1787/831562532438

**Table 25. Triadic[1] patent families by priority year, 1991-2000**

| | Number of triadic patent families | | | | | Average annual growth rate 1991-2000 | As a percentage of total world triadic patent families | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 1995 | 1997 | 1999 | 2000 | | 1991 | 1995 | 1997 | 1999 | 2000 |
| Australia | 156 | 226 | 299 | 304 b,n | 321 b,n | 8.0 | 0.5 | 0.6 | 0.7 | 0.7 b,n | 0.7 b,n |
| Austria | 174 | 217 | 248 | 262 b,n | 274 b,n | 5.0 | 0.6 | 0.6 | 0.6 | 0.6 b,n | 0.6 b,n |
| Belgium | 239 | 369 | 395 | 366 b,n | 359 b,n | 4.5 | 0.8 | 1.0 | 0.9 | 0.8 b,n | 0.8 b,n |
| Canada | 275 | 382 | 525 | 539 b,n | 519 b,n | 7.1 | 0.9 | 1.1 | 1.2 | 1.2 b,n | 1.2 b,n |
| Czech Republic | 9 | 3 | 10 | 9 b,n | 9 b,n | -0.6 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Denmark | 105 | 188 | 221 | 250 b,n | 254 b,n | 9.8 | 0.4 | 0.5 | 0.5 | 0.6 b,n | 0.6 b,n |
| Finland | 161 | 312 | 416 | 419 b,n | 489 b,n | 12.4 | 0.5 | 0.9 | 1.0 | 1.0 b,n | 1.1 b,n |
| France | 1 783 | 1 905 | 2 200 | 2 081 b,n | 2 127 b,n | 2.0 | 6.0 | 5.4 | 5.2 | 4.8 b,n | 4.9 b,n |
| Germany | 3 676 | 4 815 | 5 634 | 5 867 b,n | 5 777 b,n | 5.0 | 12.3 | 13.6 | 13.4 | 13.4 b,n | 13.2 b,n |
| Greece | 5 | 1 | 9 | 4 b,n | 6 b,n | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Hungary | 22 | 25 | 31 | 30 b,n | 33 b,n | 4.6 | 0.1 | 0.1 | 0.1 | 0.1 b,n | 0.1 b,n |
| Iceland | 3 | 6 | 4 | 5 b,n | 4 b,n | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Ireland | 27 | 31 | 37 | 56 b,n | 45 b,n | 5.8 | 0.1 | 0.1 | 0.1 | 0.1 b,n | 0.1 b,n |
| Italy | 659 | 610 | 711 | 740 b,n | 767 b,n | 1.7 | 2.2 | 1.7 | 1.7 | 1.7 b,n | 1.8 b,n |
| Japan | 8 895 | 9 428 | 11 207 | 11 726 b,n | 11 757 b,n | 3.1 | 29.7 | 26.6 | 26.6 | 26.9 b,n | 26.9 b,n |
| Korea | 93 | 327 | 387 | 459 b,n | 478 b,n | 18.2 | 0.3 | 0.9 | 0.9 | 1.1 b,n | 1.1 b,n |
| Luxembourg | 9 | 13 | 16 | 19 b,n | 17 b,n | 6.4 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Mexico | 6 | 12 | 11 | 11 b,n | 15 b,n | 10.2 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Netherlands | 568 | 724 | 840 | 833 b,n | 857 b,n | 4.6 | 1.9 | 2.0 | 2.0 | 1.9 b,n | 2.0 b,n |
| New Zealand | 19 | 20 | 39 | 33 b,n | 36 b,n | 7.1 | 0.1 | 0.1 | 0.1 | 0.1 b,n | 0.1 b,n |
| Norway | 58 | 86 | 94 | 108 b,n | 109 b,n | 7.0 | 0.2 | 0.2 | 0.2 | 0.2 b,n | 0.2 b,n |
| Poland | 9 | 5 | 9 | 8 b,n | 10 b,n | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Portugal | 3 | 2 | 6 | 5 b,n | 8 b,n | 10.2 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Slovak Republic[2] | 1 | 2 | 4 | 3 b,n | 4 b,n | 23.2 | - | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| Spain | 70 | 87 | 108 | 120 b,n | 113 b,n | 5.3 | 0.2 | 0.2 | 0.3 | 0.3 b,n | 0.3 b,n |
| Sweden | 391 | 700 | 853 | 838 b,n | 811 b,n | 8.1 | 1.3 | 2.0 | 2.0 | 1.9 b,n | 1.9 b,n |
| Switzerland | 723 | 746 | 790 | 792 b,n | 753 b,n | 0.5 | 2.4 | 2.1 | 1.9 | 1.8 b,n | 1.7 b,n |
| Turkey | 0 | 2 | 3 | 5 b,n | 6 b,n | 34.5 | 0.0 | 0.0 | 0.0 | 0.0 b,n | 0.0 b,n |
| United Kingdom | 1 250 | 1 516 | 1 589 | 1 767 b,n | 1 794 b,n | 4.0 | 4.2 | 4.3 | 3.8 | 4.0 b,n | 4.1 b,n |
| United States | 10 217 | 12 312 | 14 763 | 15 079 b,n | 14 985 b,k,n | 4.3 | 34.1 | 34.7 | 35.1 | 34.6 b,n | 34.3 b,n |
| **Total OECD** | **29 607** | **35 070** | **41 459** | **42 738 b,n** | **42 739 b,k,n** | **4.1** | **98.9** | **98.8** | **98.5** | **97.9 b,n** | **97.9 b,n** |
| **EU-25** | **9 168** | **11 533** | **13 343** | **13 687 b,n** | **13 770 b,n** | **4.5** | **30.6** | **32.5** | **31.7** | **31.4 b,n** | **31.5 b,n** |
| **EU-15** | **9 122** | **11 489** | **13 283** | **13 627 b,n** | **13 699 b,n** | **4.5** | **30.5** | **32.4** | **31.6** | **31.2 b,n** | **31.4 b,n** |
| **Total world** | **29 923** | **35 501** | **42 097** | **43 635 b,n** | **43 664 b,n** | **4.2** | **100** | **100** | **100** | **100 b,n** | **100 b,n** |
| China | 12 | 19 | 41 | 66 b,n | 93 b,n | 22.9 | 0.0 | 0.1 | 0.1 | 0.2 b,n | 0.2 b,n |
| Israel | 104 | 158 | 284 | 347 b,n | 342 b,n | 13.2 | 0.3 | 0.4 | 0.7 | 0.8 b,n | 0.8 b,n |
| Russian Federation | 37 | 62 | 65 | 71 b,n | 76 b,n | 7.9 | 0.1 | 0.2 | 0.2 | 0.2 b,n | 0.2 b,n |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. Patent filed at the European Patent Office (EPO), the US Patent & Trademark Office (USPTO) and the Japanese Patent Office (JPO).

2. 1992 instead of 1991.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/482445177814

**Table 26. Number of triadic[1] patent families by priority year, 1991-2000**

Per million inhabitants

| | 1991 | 1993 | 1995 | 1997 | 1999 | 2000 |
|---|---|---|---|---|---|---|
| Australia | 9.0 | 10.8 | 12.4 | 16.0 | 16.0 b,n | 16.7 b,n |
| Austria | 22.3 | 21.7 | 27.3 | 31.1 | 32.7 b,n | 34.2 b,n |
| Belgium | 23.9 | 32.6 | 36.4 | 38.8 | 35.8 b,n | 35.1 b,n |
| Canada | 9.8 | 10.5 | 13.0 | 17.5 | 17.7 b,n | 16.9 b,n |
| Czech Republic | 0.9 | 0.7 | 0.3 | 0.9 | 0.9 b,n | 0.9 b,n |
| Denmark | 20.4 | 30.7 | 35.9 | 41.9 | 47.0 b,n | 47.7 b,n |
| Finland | 32.1 | 48.3 | 61.0 | 80.9 | 81.1 b,n | 94.5 b,n |
| France | 30.5 | 28.7 | 32.1 | 36.8 | 34.5 b,n | 35.1 b,n |
| Germany | 46.0 a | 49.1 | 59.0 | 68.7 | 71.5 b,n | 70.3 b,n |
| Greece | 0.5 | 0.3 | 0.1 | 0.8 | 0.4 b,n | 0.6 b,n |
| Hungary | 2.1 | 2.2 | 2.4 | 3.0 | 2.9 b,n | 3.3 b,n |
| Iceland | 11.6 | 3.8 | 22.4 | 12.9 | 17.2 b,n | 14.9 b,n |
| Ireland | 7.6 | 5.2 | 8.6 | 10.1 | 14.8 b,n | 11.9 b,n |
| Italy | 11.6 | 11.0 a | 10.6 | 12.4 | 12.8 b,n | 13.3 b,n |
| Japan | 71.8 | 67.8 | 75.1 | 88.8 | 92.6 b,n | 92.6 b,n |
| Korea | 2.1 | 3.8 | 7.2 | 8.4 | 9.8 b,n | 10.2 b,n |
| Luxembourg | 24.1 | 36.1 | 31.8 | 37.8 | 44.2 b,n | 37.8 b,n |
| Mexico | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 b,n | 0.1 b,n |
| Netherlands | 37.7 | 39.0 | 46.8 | 53.9 | 52.7 b,n | 53.8 b,n |
| New Zealand | 5.3 | 3.1 | 5.5 | 10.2 | 8.5 b,n | 9.2 b,n |
| Norway | 13.6 | 16.3 | 19.7 | 21.4 | 24.2 b,n | 24.2 b,n |
| Poland | 0.2 | 0.3 | 0.1 | 0.2 | 0.2 b,n | 0.3 b,n |
| Portugal | 0.3 | 0.4 | 0.2 | 0.6 | 0.5 b,n | 0.8 b,n |
| Slovak Republic[2] | 0.1 | 0.2 | 0.4 | 0.8 | 0.6 b,n | 0.8 b,n |
| Spain | 1.8 | 1.9 | 2.2 | 2.8 | 3.0 b,n | 2.8 b,n |
| Sweden | 45.4 | 57.5 | 79.3 | 96.5 | 94.6 b,n | 91.4 b,n |
| Switzerland | 105.0 | 101.0 | 105.4 | 111.1 | 110.5 b,n | 104.5 b,n |
| Turkey | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 b,n | 0.1 b,n |
| United Kingdom | 21.8 | 23.5 | 26.2 | 27.3 | 30.2 b,n | 30.6 b,n |
| United States | 40.3 | 40.5 | 46.2 | 54.1 | 54.0 b,n | 53.1 b,k,n |
| **Total OECD** | **31.3** a | **31.4** | **32.2** a | **37.5** | **38.1** b,n | **37.8** b,k,n |
| **EU-25** | **-** | **-** | **25.8** | **29.7** | **30.4** b,n | **30.4** b,n |
| **EU-15** | **24.9** a | **26.4** a | **30.8** | **35.5** | **36.2** b,n | **36.2** b,n |
| China | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 b,n | 0.1 b,n |
| Israel | 21.1 | 23.3 | 28.5 | 48.8 | 56.7 b,n | 54.5 b,n |
| Russian Federation | 0.2 | 0.2 | 0.4 | 0.4 | 0.5 b,n | 0.5 b,n |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. Patent filed at the EPO, the USPTO and the JPO.

2. 1992 instead of 1991.

*Source:* OECD, MSTI database, May 2004.

*StatLink*: http://dx.doi.org/10.1787/366528340153

**Table 27. Science and engineering articles by country, 1988-2001**

Per million inhabitants

| | 1988 | 1991 | 1995 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Australia | 593 | 618 | 736 | 797 | 763 | 758 |
| Austria | 294 | 353 | 437 | 527 | 532 | 564 |
| Belgium | 362 | 416 | 519 | 580 | 560 | 582 |
| Canada | 798 | 817 | 836 | 768 | 743 | 727 |
| Czech Republic[1] | 265 | 279 | 193 | 231 | 239 | 256 |
| Denmark | 672 | 733 | 843 | 923 | 923 | 931 |
| Finland | 564 | 640 | 809 | 943 | 942 | 983 |
| France | 372 | 402 | 493 | 532 | 511 | 514 |
| Germany[2] | 477 | 412 | 467 | 531 | 529 | 530 |
| Greece | 121 | 153 | 194 | 249 | 265 | 304 |
| Hungary | 164 | 175 | 177 | 226 | 224 | 243 |
| Iceland | 276 | 403 | 591 | 491 | 548 | 610 |
| Ireland | 224 | 260 | 336 | 406 | 420 | 432 |
| Italy | 198 | 243 | 312 | 361 | 364 | 385 |
| Japan | - | - | - | - | 437 | 451 |
| Korea | 18 | 31 | 84 | 180 | 200 | 233 |
| Mexico | 11 | 13 | 21 | 30 | 30 | 32 |
| Netherlands | 581 | 671 | 798 | 800 | 783 | 786 |
| New Zealand | 620 | 598 | 665 | 760 | 784 | 742 |
| Norway | 521 | 564 | 678 | 701 | 711 | 721 |
| Poland | 106 | 102 | 117 | 134 | 138 | 147 |
| Portugal | 43 | 65 | 99 | 174 | 177 | 208 |
| Slovak Republic | - | - | 212 | 185 | 186 | 177 |
| Spain | 140 | 187 | 289 | 375 | 370 | 387 |
| Sweden | 898 | 945 | 1 052 | 1 143 | 1 106 | 1 159 |
| Switzerland | 797 | 886 | 1 040 | 1 158 | 1 173 | 1 117 |
| Turkey | 9 | 15 | 28 | 49 | 52 | 60 |
| United Kingdom | 641 | 696 | 794 | 837 | 844 | 807 |
| United States | 725 | 766 | 762 | 711 | 696 | 705 |
| **Total OECD** | **468** | **454** | **447** | **466** | **461** | **468** |
| **EU-25** | **-** | **-** | **432** | **482** | **479** | **485** |
| **EU-15** | **389** | **416** | **499** | **555** | **550** | **556** |
| China[3] | - | 5 | 8 | 13 | 14 | 16 |
| Israel | - | 985 | 1 068 | 994 | 1 004 | 1 007 |
| Russian Federation[4] | - | - | 135 | 118 | 126 | 110 |

1. Includes articles from the former Czechoslavakia before 1996.
2. Includes articles from the former East Germany before 1992.
3. Includes articles from the Hong Kong economy before 2000.
4. Includes articles from the former USSR.

*Source:* NSF, *Science and Engineering Indicators* 2004. Population from OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/871586367658

**Table 28. Portfolio of S&E articles by field, 1988-2001**

As a percentage of total publications

| | All fields (total number) | | Clinical medicine | | Biomedical research | | Biology | | Chemistry | | Physics | | Earth & space sciences | | Engineering & technology | | Mathematics | | Psychology | | Social sciences | | Other[1] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 | 1988 | 2001 |
| Australia | 9 896 | 14 788 | 29.9 | 28.7 | 13.8 | 13.1 | 16.1 | 14.7 | 8.2 | 6.8 | 7.1 | 6.9 | 6.3 | 7.8 | 4.5 | 6.6 | 2.2 | 1.7 | 5.2 | 4.8 | 3.3 | 3.7 | 3.4 | 5.3 |
| Austria | 2 241 | 4 526 | 42.1 | 42.5 | 10.6 | 13.0 | 6.3 | 5.6 | 13.8 | 10.0 | 12.4 | 11.3 | 2.5 | 4.6 | 4.4 | 6.1 | 2.4 | 2.7 | 2.8 | 2.2 | 1.4 | 1.2 | 1.3 | 0.9 |
| Belgium | 3 586 | 5 984 | 38.4 | 32.9 | 17.1 | 14.6 | 5.4 | 8.0 | 10.4 | 11.0 | 11.9 | 12.5 | 3.0 | 4.5 | 5.5 | 7.8 | 2.3 | 2.1 | 2.8 | 2.7 | 1.7 | 2.0 | 1.6 | 2.0 |
| Canada | 21 391 | 22 626 | 25.9 | 29.3 | 14.3 | 15.2 | 14.6 | 10.3 | 8.1 | 7.8 | 8.0 | 6.6 | 5.8 | 7.3 | 8.1 | 7.9 | 2.3 | 1.9 | 4.6 | 4.7 | 4.4 | 4.4 | 3.9 | 4.6 |
| Czech Republic[2] | 2 746 | 2 622 | 16.5 | 14.5 | 13.9 | 16.0 | 4.6 | 7.7 | 29.0 | 22.9 | 14.5 | 16.2 | 3.6 | 4.5 | 5.3 | 8.2 | 1.5 | 3.9 | 7.9 | 3.1 | 2.9 | 1.5 | 0.4 | 1.3 |
| Denmark | 3 445 | 4 988 | 54.6 | 34.2 | 15.9 | 17.9 | 6.0 | 11.7 | 4.8 | 7.8 | 8.6 | 9.3 | 2.6 | 6.2 | 2.3 | 5.3 | 1.7 | 1.4 | 1.7 | 3.3 | 1.1 | 1.0 | 0.8 | 1.9 |
| Finland | 2 789 | 5 098 | 51.1 | 37.8 | 14.3 | 14.1 | 7.1 | 10.1 | 6.1 | 7.5 | 7.0 | 8.5 | 3.7 | 5.5 | 4.3 | 7.3 | 1.8 | 1.3 | 1.6 | 1.8 | 1.4 | 1.8 | 1.7 | 3.9 |
| France | 21 409 | 31 317 | 29.1 | 27.1 | 16.6 | 15.2 | 5.9 | 5.7 | 15.3 | 12.9 | 17.2 | 16.1 | 4.7 | 6.6 | 4.7 | 9.0 | 3.0 | 4.4 | 1.8 | 1.4 | 1.1 | 0.9 | 0.5 | 0.7 |
| Germany[3] | 25 666 | 43 623 | 29.0 | 30.9 | 15.4 | 14.1 | 6.2 | 5.2 | 15.7 | 12.7 | 16.5 | 16.3 | 3.3 | 5.0 | 6.7 | 8.5 | 2.2 | 2.2 | 1.8 | 1.8 | 2.3 | 2.0 | 1.0 | 1.3 |
| Greece | 1 239 | 3 329 | 20.4 | 31.3 | 8.1 | 8.1 | 9.3 | 9.2 | 14.7 | 12.5 | 16.3 | 14.1 | 7.9 | 6.3 | 14.7 | 11.4 | 4.3 | 3.0 | 2.4 | 2.1 | 0.6 | 0.5 | 1.1 | 1.5 |
| Hungary | 1 714 | 2 479 | 21.2 | 26.7 | 19.5 | 13.1 | 3.7 | 5.2 | 27.3 | 23.5 | 12.0 | 15.0 | 1.7 | 2.8 | 4.3 | 7.0 | 6.2 | 3.9 | 2.2 | 1.6 | 0.7 | 0.8 | 1.2 | 0.4 |
| Iceland | 69 | 174 | 45.0 | 31.9 | 12.3 | 10.2 | 6.2 | 16.2 | 0.0 | 3.3 | 3.4 | 4.6 | 17.6 | 16.2 | 2.2 | 2.9 | 2.2 | 2.1 | 1.5 | 5.8 | 3.6 | 3.9 | 6.1 | 3.0 |
| Ireland | 790 | 1 665 | 35.8 | 30.7 | 11.9 | 14.6 | 11.9 | 14.0 | 9.2 | 8.4 | 8.7 | 10.3 | 4.7 | 3.0 | 3.9 | 6.9 | 4.5 | 2.4 | 5.8 | 4.1 | 1.5 | 1.7 | 2.2 | 4.1 |
| Italy | 11 229 | 22 313 | 38.0 | 35.1 | 13.4 | 12.0 | 3.8 | 4.5 | 15.4 | 11.9 | 16.2 | 16.2 | 3.6 | 6.0 | 5.2 | 8.8 | 2.3 | 2.9 | 1.0 | 1.3 | 0.8 | 0.7 | 0.4 | 0.6 |
| Japan | 34 435 | 57 420 | 25.6 | 28.7 | 15.2 | 14.0 | 6.9 | 6.1 | 17.7 | 14.9 | 19.1 | 19.1 | 1.9 | 3.0 | 11.1 | 11.6 | 1.4 | 1.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.1 | 0.2 |
| Korea | 771 | 11 037 | 10.0 | 17.9 | 4.6 | 11.3 | 3.7 | 3.3 | 30.5 | 17.7 | 18.2 | 22.4 | 1.5 | 3.0 | 24.9 | 20.7 | 2.7 | 1.7 | 2.5 | 1.0 | 0.1 | 0.3 | 1.3 | 0.8 |
| Mexico | 884 | 3 209 | 24.5 | 18.7 | 14.9 | 12.0 | 15.7 | 14.8 | 11.1 | 10.5 | 15.7 | 21.2 | 6.5 | 7.6 | 4.0 | 7.7 | 3.4 | 2.1 | 2.7 | 1.7 | 1.2 | 1.5 | 0.5 | 2.3 |
| Netherlands | 8 581 | 12 602 | 36.6 | 37.5 | 15.5 | 14.2 | 8.2 | 6.0 | 10.8 | 8.6 | 11.9 | 8.8 | 4.1 | 5.5 | 4.3 | 6.4 | 1.5 | 1.4 | 2.7 | 3.9 | 2.7 | 3.6 | 1.6 | 4.0 |
| New Zealand | 2 075 | 2 903 | 28.4 | 25.9 | 10.1 | 10.5 | 28.6 | 23.6 | 6.1 | 5.7 | 4.6 | 4.2 | 6.1 | 9.3 | 3.8 | 5.2 | 1.5 | 1.8 | 3.2 | 4.4 | 4.6 | 4.4 | 2.9 | 5.0 |
| Norway | 2 192 | 3 252 | 40.3 | 33.4 | 13.8 | 12.7 | 12.8 | 12.9 | 8.0 | 6.3 | 4.9 | 5.0 | 6.4 | 10.1 | 4.4 | 6.2 | 2.1 | 2.3 | 3.9 | 4.4 | 2.2 | 3.1 | 1.2 | 3.7 |
| Poland | 4 030 | 5 686 | 12.4 | 13.2 | 9.3 | 8.6 | 5.3 | 4.8 | 27.1 | 26.7 | 28.4 | 26.5 | 1.9 | 4.1 | 9.1 | 11.0 | 4.4 | 3.9 | 1.0 | 0.5 | 0.6 | 0.3 | 0.7 | 0.5 |
| Portugal | 429 | 2 142 | 15.7 | 14.5 | 11.4 | 12.5 | 6.4 | 11.0 | 17.6 | 20.5 | 20.1 | 16.8 | 5.0 | 4.7 | 16.0 | 13.1 | 2.4 | 3.5 | 2.2 | 1.4 | 0.9 | 0.9 | 2.4 | 1.1 |
| Slovak Republic | - | 955 | - | 12.2 | - | 17.5 | - | 4.8 | - | 22.5 | - | 15.9 | - | 3.4 | - | 8.5 | - | 3.4 | - | 8.2 | - | 3.2 | 0.0 | 0.4 |
| Spain | 5 432 | 15 570 | 23.3 | 24.7 | 18.8 | 13.9 | 8.9 | 10.7 | 23.8 | 18.5 | 12.4 | 11.7 | 3.3 | 5.7 | 4.2 | 7.8 | 3.1 | 3.3 | 1.1 | 1.7 | 0.7 | 0.9 | 0.4 | 1.0 |
| Sweden | 7 573 | 10 314 | 48.2 | 36.7 | 17.2 | 15.5 | 6.9 | 7.4 | 7.5 | 8.3 | 7.5 | 10.5 | 3.2 | 4.4 | 3.9 | 8.1 | 1.2 | 1.2 | 1.8 | 1.9 | 1.2 | 1.7 | 1.4 | 4.2 |
| Switzerland | 5 316 | 8 107 | 36.3 | 32.7 | 18.5 | 16.1 | 4.1 | 5.8 | 11.9 | 12.8 | 16.5 | 13.4 | 2.7 | 6.4 | 4.2 | 6.6 | 1.6 | 1.4 | 1.7 | 2.1 | 1.7 | 1.4 | 0.9 | 1.3 |
| Turkey | 507 | 4 098 | 33.1 | 44.3 | 6.0 | 6.3 | 5.4 | 5.2 | 15.8 | 14.2 | 12.4 | 8.9 | 6.2 | 4.6 | 13.4 | 11.2 | 3.3 | 1.3 | 2.6 | 1.9 | 0.9 | 1.1 | 1.1 | 1.1 |
| United Kingdom | 36 509 | 47 660 | 36.6 | 32.8 | 14.8 | 14.2 | 7.4 | 6.2 | 9.9 | 8.5 | 9.1 | 9.0 | 4.0 | 5.9 | 6.3 | 7.4 | 1.5 | 1.6 | 4.5 | 5.7 | 2.4 | 3.0 | 3.7 | 5.7 |
| United States | 177 662 | 200 870 | 31.0 | 31.7 | 15.5 | 16.9 | 7.2 | 6.2 | 7.4 | 7.1 | 10.1 | 8.7 | 4.5 | 5.6 | 6.7 | 6.9 | 2.2 | 1.8 | 4.9 | 4.7 | 4.0 | 3.9 | 6.4 | 6.4 |
| **Total OECD** | **398 238** | **551 402** | **31.1** | **30.7** | **15.2** | **15.0** | **7.7** | **6.8** | **10.8** | **10.3** | **12.0** | **11.9** | **4.1** | **5.4** | **6.7** | **8.2** | **2.1** | **2.0** | **3.7** | **3.3** | **2.8** | **2.6** | **3.8** | **3.8** |
| **EU-25[4]** | **143 034** | **138 116** | **21.2** | **10.6** | **14.2** | **7.0** | **5.2** | **3.3** | **24.2** | **26.7** | **16.9** | **32.6** | **2.8** | **4.9** | **6.2** | **8.9** | **3.6** | **3.8** | **3.4** | **0.9** | **1.4** | **0.5** | **0.9** | **0.7** |
| **EU-15[4]** | **134 544** | **137 368** | **34.8** | **28.2** | **14.3** | **12.7** | **7.2** | **7.6** | **13.4** | **14.3** | **12.7** | **12.6** | **3.8** | **5.1** | **6.2** | **10.0** | **2.4** | **2.9** | **2.3** | **3.0** | **1.4** | **1.3** | **1.4** | **2.4** |
| China | 4 001 | 20 978 | 13.8 | 10.7 | 6.7 | 8.0 | 2.9 | 3.8 | 13.0 | 26.3 | 39.1 | 23.4 | 5.1 | 4.4 | 13.0 | 16.3 | 3.9 | 3.9 | 0.1 | 1.1 | 1.7 | 0.5 | 0.6 | 1.7 |
| Israel | 4 916 | 6 487 | 33.6 | 32.9 | 13.6 | 12.7 | 8.8 | 6.9 | 5.8 | 7.6 | 13.7 | 13.6 | 3.4 | 3.4 | 6.2 | 8.3 | 3.5 | 4.0 | 4.7 | 3.5 | 3.1 | 3.3 | 3.7 | 3.9 |
| Russian Federation[5] | 31 625 | 15 846 | 14.3 | 3.2 | 17.7 | 7.5 | 2.6 | 4.0 | 27.1 | 27.1 | 27.6 | 35.6 | 4.1 | 8.1 | 4.1 | 8.9 | 0.9 | 3.4 | 0.6 | 1.3 | 0.6 | 0.6 | 0.4 | 0.3 |

1. Other: Health sciences and professional fields.

2. Czechoslavakia instead of the Czech Republic in 1988.

3. Western Germany only in 1988.

4. Average for countries available.

5. Former USSR instead of Russian Federation in 1988.

*Source:* US National Science Foundation, *Science and Engineering Indicators* 2004.

StatLink: http://dx.doi.org/10.1787/581733703880

**Table 29. Technology balance of payments, 1981-2002**

Millions current USD

| | Receipts | | | | | | Payments | | | | | | Balance | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 |
| Australia[1,2,3] | 14 | 68 | 200 | 128 | - | - | 142 | 188 | 370 | 344 | - | - | - 129 | - 120 | - 170 | - 215 | - | - |
| Austria[4] | 24 [k] | 30 [k] | 79 [k] | 1 907 | 2 430 [-] | - | 99 [k] | 114 [k] | 301 [k] | 2 140 | 2 426 [-] | - | - 75 | - 84 | - 222 | - 233 | 4 | - |
| Belgium | 622 [a] | 694 | 1 945 | 3 758 [a] | 5 709 | - | 727 [a] | 800 | 2 380 | 3 080 [a] | 4 641 | - | - 105 | - 106 | - 435 | 677 | 1 068 | - |
| Canada | 157 | 399 | 929 | 1 283 | 2 034 | - | 416 | 550 | 928 | 1 008 | 1 051 | - | - 259 | - 151 | 1 | 275 | 983 | - |
| Czech Republic | - | - | - | - | 487 | 451 | - | - | - | - | 554 | 781 | - | - | - | - | - 67 | - 330 |
| Denmark | 107 | 184 | - | - | - | - | 71 | 161 | - | - | - | - | 36 | 23 | - | - | - | - |
| Finland | 5 | 4 | 54 | 58 | 1 303 | 1 468 | 87 [k] | 107 [k] | 311 [k] | 390 [k] | 1 060 | 1 231 | - 82 | - 102 | - 257 | - 332 | 243 | 237 |
| France | 906 | 894 | 1 742 | 2 170 | 3 196 | - | 991 | 1 064 | 2 451 | 2 988 | 2 695 | - | - 85 | - 170 | - 709 | - 818 | 501 | - |
| Germany | 934 | 1 171 | 6 282 | 10 633 | 14 306 | 15 756 [n] | 1 479 | 1 650 | 7 979 | 13 170 | 20 942 | 21 295 [n] | - 545 | - 479 | -1 697 | -2 537 | -6 636 | -5 539 |
| Hungary[3] | - | - | - | 181 | - | - | - | - | - | 215 | - | - | - | - | - | - 35 | - | - |
| Italy | 198 | 144 | 1 410 | 3 051 | 2 684 | 2 978 | 570 | 546 | 2 366 | 3 437 | 3 440 | 2 993 | - 372 | - 402 | - 956 | - 386 | - 756 | - 15 |
| Japan | 794 | 982 | 2 751 | 5 976 | 10 259 | - | 1 177 | 1 229 | 2 930 | 4 165 | 4 512 | - | - 383 | - 247 | - 179 | 1 811 | 5 747 | - |
| Mexico | 33 | 14 | 79 | 118 | 41 | 48 [n] | 273 | 163 | 420 | 487 | 419 | 664 [n] | - 241 | - 149 | - 341 | - 369 | - 378 | - 616 |
| Netherlands | 387 | 1 196 | 4 876 | - | - | - | 593 | 1 503 | 5 933 | - | - | - | - 206 | - 308 | -1 057 | - | - | - |
| New Zealand | - | - | 21 | 20 | - | - | - | - | 15 | 8 | - | - | - | - | 5 | 12 | - | - |
| Norway | 44 [k] | 28 [k] | 348 | 496 | 1 382 | 1 379 | 76 [k] | 77 [k] | 438 | 928 | 1 246 | 1 189 | - 33 | - 48 | - 90 | - 431 | 136 | 190 |
| Poland | - | - | - | 231 | 177 | - | - | - | - | 234 | 795 | - | - | - | - | - 3 | - 618 | - |
| Portugal | - | - | - | 139 | 282 | 385 | - | - | - | 537 | 597 | 693 | - | - | - | - 398 | - 316 | - 308 |
| Slovak Republic | - | - | - | 9 [q] | 30 [n,q] | - | - | - | - | 27 [q] | 65 [n,q] | - | - | - | - | - 17 | - 34 | - |
| Spain | 181 | 137 | 641 | 79 | - | - | 567 | 552 | 2 276 | 1 110 | - | - | - 387 | - 414 | -1 635 | -1 031 | - | - |
| Sweden | 68 | 87 | 217 [a] | - | - | - | 64 | 49 | 116 [a] | - | - | - | 4 | 38 | 102 | - | - | - |
| Switzerland | - | 870 | 1 941 | 2 778 | 3 233 | 4 334 | - | 233 | 745 | 1 262 | 3 251 | 4 250 | - | 637 | 1 196 | 1 516 | - 18 | 84 |
| United Kingdom | 965 | 1 038 | 2 333 | 4 218 | 17 105 [n] | - | 798 | 923 | 2 302 | 3 530 | 7 713 [n] | - | 167 | 115 | 32 | 688 | 9 392 | - |
| United States | 7 284 | 6 678 | 17 819 | 30 289 | 41 098 | 44 142 [n] | 650 | 1 170 | 4 035 | 6 919 | 16 713 | 19 258 [n] | 6 634 | 5 508 | 13 784 | 23 370 | 24 385 | 24 884 |
| Russian Federation | - | - | - | - | 242 | 211 | - | - | - | - | 398 | 577 | - | - | - | - | - 157 | - 366 |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1986 instead of 1985. 2. 1992 instead of 1991. 3. 1996 instead of 1995. 4. 2000 instead of 2001.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/525456707887

**Table 30. Technology balance of payments, 1981-2002**

Payments as a percentage of GERD

| | 1981 | 1985 | 1991 | 1995 | 2001 | 2002 |
|---|---|---|---|---|---|---|
| Australia[1, 2, 3] | 7.8 | 8.3 | 7.8 | 5.0 | - | - |
| Austria[4] | 12.8 [k] | 13.7 [k] | 12.1 [b,k] | 58.5 [b] | 68.5 [b] | - |
| Belgium[5] | 53.2 [a] | 59.5 | 72.5 [b] | 64.9 [a] | 94.0 | - |
| Canada | 11.3 | 10.9 | 9.9 | 10.1 | 7.4 | - |
| Czech Republic | - | - | - | - | 74.4 | 86.6 |
| Denmark | 11.4 | 22.2 | - | - | - | - |
| Finland | 14.4 [a,k] | 12.6 [b,k] | 12.4 [a,k] | 13.2 [k] | 25.6 | 27.1 |
| France | 8.6 [a] | 9.0 | 8.5 | 8.3 | 9.2 | - |
| Germany | 8.8 | 9.7 | 17.9 [a] | 23.9 [b] | 45.0 | 42.5 [n] |
| Hungary[3] | - | - | - | 73.3 [c] | - | - |
| Italy | 16.0 [r] | 11.4 [r] | 16.6 [a] | 31.3 | 28.3 | - |
| Japan | 4.3 [k] | 3.3 [k] | 2.9 [k] | 2.7 [k] | 3.5 | - |
| Mexico | - | - | - | 55.0 | 17.1 | - |
| Netherlands | 22.3 | 57.1 | 99.8 | - | - | - |
| New Zealand | - | - | 3.7 | 1.4 | - | - |
| Norway | 10.4 [k] | 8.1 [k] | 22.5 | 36.9 [a] | 45.8 | 37.3 |
| Poland | - | - | - | 26.7 [a] | 67.0 | - |
| Portugal | - | - | - | 88.1 | 64.3 | 61.2 |
| Slovak Republic | - | - | - | 14.8 [c,q] | 48.5 [j,n,q] | - |
| Spain | 71.9 | 60.4 | 49.3 | 23.4 | - | - |
| Sweden | 2.4 [a,j] | 1.7 [j] | 1.7 [a,j] | - | - | - |
| Switzerland[1, 2, 3, 4] | - | 8.6 [a] | 13.9 | 17.7 | 30.4 [-] | - |
| Turkey | - | - | - | - | - | - |
| United Kingdom | 6.6 [a] | 9.0 [a] | 10.8 | 15.9 | 29.0 [n] | - |
| United States | 0.9 [h] | 1.0 [h] | 2.5 [h] | 3.8 [h] | 6.1 [h] | 7.0 [h,n] |
| Russian Federation | - | - | - | - | 11.1 | 13.4 |

*Times series notes:*

(a) to (r): See standard statistical notes for science and technology indicators earlier in the Annex.

*Year availability:*

1. 1986 instead of 1985.
2. 1992 instead of 1991.
3. 1996 instead of 1995.
4. 2000 instead of 2001.
5. 1983 instead of 1981.

*Source:* OECD, MSTI database, May 2004.

StatLink: http://dx.doi.org/10.1787/507503146810

**Table 31. Share of value added in total gross value added, 1991-2001**

| | *(ISIC Rev.3)* | Australia | | Austria | | Belgium | | Canada | | Czech Republic | | Denmark | | Finland | | France | | Germany | | Greece | | Iceland | | Ireland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2000 | 1991 | 2001 | 1992 | 2001 | 1991 | 2000 | 1992 | 2001 | 1991 | 1999 | 1991 | 2001 | 1991 | 2000 | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 1999 |
| **Total manufacturing** | **(15-37)** | **13.5** | **12.0** | **21.6** | **20.6** | **20.1** | **18.7** | **15.8** | **19.9** | **29.1** | **27.5** | **17.0** | **16.3** | **19.6** | **24.5** | **19.9** | **18.1** | **27.4** | **22.4** | **14.8** | **11.9** | **15.9** | **-** | **26.6** | **33.7** |
| Food prod., beverages and tobacco | (15-16) | 2.4 | 2.6 [1] | 2.9 | 2.3 | 2.7 | 2.5 | 2.6 | 2.1 | 4.7 | 3.8 [1] | 3.2 | 2.7 | 2.7 | 1.6 | 2.9 | 2.4 | 2.3 | 2.0 | 2.8 | 2.6 | 7.9 | - | 6.9 | 5.4 |
| Textiles, textile prod., leather and footwear | (17-19) | 0.8 | 0.6 [1] | 1.4 | 0.8 | 1.4 | 1.0 | 0.8 | 0.8 | 3.6 | 1.6 [1] | 0.8 | 0.5 | 0.8 | 0.4 | 1.3 | 0.8 | 1.0 | 0.5 | 4.1 | 1.9 | 0.6 | - | 1.2 | 0.5 |
| Wood, pulp, paper, paper prod., printing & publishing | (20-22) | 2.1 | 2.1 [1] | 2.8 | 3.0 | 1.8 | 1.8 | 2.8 | 4.2 | 2.0 | 2.6 [1] | 2.3 | 2.2 | 5.1 | 6.5 | 2.1 | 1.8 | 2.5 | 2.1 | 1.4 | 1.2 | 1.9 | 0.0 | 3.4 | 6.0 |
| Chemical, rubber, plastics and fuel prod. | (23-25) | 2.1 | 1.8 [1] | 2.4 | 2.7 | 4.5 | 4.9 | 2.6 | 2.5 | 3.0 | 2.8 [1] | 2.2 | 2.7 | 2.5 | 2.6 | 3.3 | 3.6 | 4.1 | 3.7 | 1.7 | 2.0 | 1.1 | - | 5.3 | 11.3 |
| ….Coke, refined petroleum prod. and nuclear fuel | (23) | 0.4 | 0.2 [1] | 0.3 | 0.8 | 0.5 | 0.6 | 0.4 | 0.3 | 0.5 | 0.2 [1] | 0.0 | 0.0 | 0.6 | 0.4 | 0.6 | 0.8 | 0.2 | 0.4 | 0.5 | 0.9 | - | - | 0.0 | 0.0 |
| ….Chemicals and chemical prod. | (24) | 1.1 | 1.0 [1] | 1.3 | 1.1 | 3.3 | 3.6 | 1.5 | 1.4 | 1.6 | 1.4 [1] | 1.4 | 1.8 | 1.3 | 1.4 | 1.8 | 2.0 | 2.7 | 2.2 | 0.8 | 0.7 | 0.6 | - | 4.5 | 10.7 |
| ……..Chemicals excluding pharmaceuticals | (24ex2423) | - | - | 0.9 | 0.8 | 2.6 | - | 1.2 | 1.1 | - | 1.2 [1] | 0.7 | 0.7 | 1.0 | 1.1 | 1.3 | 1.3 | 2.2 | 1.7 | 0.6 | - | - | - | 3.7 | 8.4 |
| ……..Pharmaceuticals | (2423) | - | - | 0.5 | 0.4 | 0.7 | - | 0.4 | 0.3 | - | 0.2 [1] | 0.7 | 1.1 | 0.3 | 0.3 | 0.5 | 0.7 | 0.5 | 0.5 | 0.2 | - | - | - | 0.8 | 2.3 |
| ….Rubber and plastics prod. | (25) | 0.6 | 0.6 [1] | 0.8 | 0.8 | 0.8 | 0.7 | 0.6 | 0.9 | 0.8 | 1.1 [1] | 0.8 | 0.8 | 0.6 | 0.8 | 0.9 | 0.8 | 1.3 | 1.1 | 0.4 | 0.3 | 0.5 | - | 0.8 | 0.6 |
| Other non-metallic mineral prod. | (26) | 0.7 | 0.7 [1] | 1.5 | 1.2 | 1.1 | 1.0 | 0.4 | 0.5 | 1.8 | 1.9 [1] | 0.7 | 0.8 | 0.9 | 0.8 | 1.0 | 0.8 | 1.0 | 0.8 | 0.9 | 0.9 | 0.9 | - | 1.1 | 0.8 |
| Basic metals and fabricated metal prod. | (27-28) | 2.6 | 1.9 [1] | 3.2 | 3.3 | 3.1 | 2.5 | 1.8 | 2.6 | 4.4 | 4.4 [1] | 1.8 | 1.7 | 2.1 | 2.7 | 2.7 | 2.4 | 3.6 | 2.9 | 1.4 | 1.1 | 1.4 | - | 1.2 | 0.8 |
| Machinery and equipment | (29-33) | 1.4 | 1.3 [1] | 5.1 | 4.9 | 2.9 | 2.7 | 2.1 | 2.9 | 5.4 | 5.7 [1] | 4.1 | 4.1 | 4.0 | 8.5 | 3.9 | 3.5 | 8.4 | 6.3 | 0.9 | 0.9 | 0.8 | - | 5.9 | 7.8 |
| ….Machinery and equip., n.e.c. | (29) | 0.7 | 0.6 [1] | 2.5 | 2.3 | 1.3 | 1.2 | 0.9 | 1.3 | 3.6 | 2.7 [1] | 2.5 | 2.3 | 2.4 | 2.8 | 1.6 | 1.3 | 4.0 | 3.4 | 0.3 | 0.4 | - | - | 1.1 | 0.8 |
| ….Electrical and optical equipment | (30-33) | 0.7 | 0.7 [1] | 2.6 | 2.5 | 1.6 | 1.5 | 1.2 | 1.6 | 1.9 | 3.0 [1] | 1.6 | 1.8 | 1.6 | 5.7 | 2.3 | 2.2 | 4.4 | 3.0 | 0.5 | 0.5 | - | - | 4.8 | 7.0 |
| ……..Office, accounting and computing machinery | (30) | - | - | 0.0 | 0.1 | - | - | 0.1 | 0.1 | 0.0 | 0.1 [1] | 0.1 | 0.1 | 0.1 | 0.0 | 0.3 | 0.2 | 0.6 | 0.2 | 0.0 | 0.0 | - | - | 2.3 | 3.0 |
| ……..Electrical machinery and apparatus, nec | (31) | - | - | 0.9 | 1.0 | - | - | 0.4 | 0.4 | 1.4 | 1.7 [1] | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.8 | 2.2 | 1.5 | 0.1 | 0.2 | - | - | 0.8 | 0.7 |
| ……..Radio, television and communication equipment | (32) | - | - | 1.2 | 1.1 | - | - | 0.7 | 1.1 | 0.2 | 0.6 [1] | 0.4 | 0.5 | 0.5 | 4.3 | 0.5 | 0.6 | 0.7 | 0.4 | 0.3 | 0.2 | - | - | 0.6 | 2.1 |
| ……..Medical, precision and optical instruments | (33) | - | - | 0.4 | 0.4 | - | - | - | - | 0.2 | 0.6 [1] | 0.5 | 0.6 | 0.3 | 0.6 | 0.7 | 0.6 | 0.9 | 0.9 | 0.1 | 0.0 | - | - | 1.1 | 1.2 |
| Transport equipment | (34-35) | 1.1 | 1.1 [1] | 1.0 | 1.3 | 1.9 | 1.7 | 2.0 | 3.4 | 2.7 | 2.9 [1] | 0.7 | 0.5 | 0.9 | 0.9 | 1.9 | 2.1 | 3.6 | 3.6 | 0.7 | 0.6 | 0.8 | - | 0.7 | 0.5 |
| ….Motor vehicles, trailers and semi-trailers | (34) | 0.7 | 0.7 [1] | 0.8 | 1.1 | - | - | 1.4 | 2.5 | 2.4 | 2.4 [1] | 0.3 | 0.2 | 0.3 | 0.3 | 1.4 | 1.5 | 3.1 | 3.1 | 0.1 | 0.1 | - | - | 0.3 | 0.2 |
| ….Other transport equipment | (35) | 0.3 | 0.4 [1] | 0.2 | 0.2 | - | - | 0.6 | 0.9 | 0.3 | 0.5 [1] | 0.4 | 0.2 | 0.6 | 0.6 | 0.5 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 | - | - | 0.4 | 0.3 |
| ……..Building and repairing of ships and boats | (351) | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.1 | - | 0.0 [1] | 0.4 | 0.2 | 0.4 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | - | - | - | - | 0.1 | 0.0 |
| ……..Aircraft and spacecraft | (353) | - | - | - | - | - | - | 0.4 | 0.6 | - | 0.2 [1] | - | - | 0.1 | 0.1 | 0.3 | 0.5 | 0.3 | 0.3 | - | - | - | - | 0.0 | 0.0 |
| ……..Railroad equip. and transport equip. n.e.c. | (352+359) | - | - | 0.2 | 0.2 | - | - | 0.1 | 0.2 | - | 0.3 [1] | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | - | - | - | - | 0.3 | 0.3 |
| Manufacturing nec; recycling | (36-37) | 0.5 | 0.4 | 1.2 | 1.1 | 0.7 | 0.6 | 0.6 | 0.9 | 1.3 | 1.3 [1] | 1.2 | 1.0 | 0.7 | 0.6 | 0.9 | 0.7 | 0.8 | 0.6 | 1.0 | 0.8 | 0.7 | - | 1.0 | 0.7 |
| Electricity, gas and water supply | (40-41) | 3.6 | 2.5 | 2.8 | 2.2 | 2.9 | 2.6 | 3.3 | 2.8 | 6.3 | 4.0 | 2.3 | 2.2 | 2.3 | 1.8 | 2.4 | 2.0 | 2.3 | 1.9 | 2.6 | 1.8 | 3.5 | - | 2.4 | 1.3 |
| Construction | (45) | 6.1 | 5.7 | 7.3 | 7.4 | 5.5 | 4.9 | 6.3 | 5.0 | 6.9 | 7.1 | 4.8 | 5.3 | 7.5 | 5.7 | 6.0 | 4.6 | 5.9 | 4.8 | 7.5 | 8.3 | 8.8 | - | 5.4 | 6.6 |
| **Total services** | **(50-99)** | **68.2** | **70.6** | **64.6** | **67.1** | **69.3** | **72.3** | **68.3** | **64.1** | **49.1** | **55.8** | **71.0** | **72.1** | **64.8** | **64.2** | **68.4** | **72.5** | **62.2** | **69.4** | **62.8** | **70.4** | **60.0** | **-** | **56.3** | **53.9** |
| Wholesale and retail trade; restaurants and hotels | **(50-55)** | 13.6 | 13.3 | 17.7 | 16.6 | 14.9 | 13.4 | 14.0 | 13.3 | 14.2 | 17.0 | 14.6 | 14.5 | 12.3 | 11.4 | 13.7 | 12.8 | 11.9 | 12.0 | 18.5 | 20.7 | 14.8 | - | 14.7 | 12.2 |
| Transport and storage and communication | **(60-64)** | 9.0 | 8.4 | 7.8 | 7.1 | 6.9 | 6.9 | 7.3 | 6.8 | 6.1 | 8.2 | 7.5 | 7.6 | 9.4 | 10.5 | 6.4 | 6.3 | 5.8 | 6.2 | 6.6 | 8.4 | 7.2 | - | 5.9 | 5.5 |
| Transport and storage | (60-63) | 5.9 | 5.3 | 5.4 | 4.8 | - | - | 4.2 | 4.1 | 4.7 | - | 5.5 | 5.3 | 7.1 | 7.1 | 4.1 | 4.2 | 3.5 | 3.8 | - | 5.2 | 5.7 | - | 3.4 | - |
| Post and telecommunications | (64) | 3.0 | 3.2 | 2.5 | 2.2 | - | - | 3.1 | 2.7 | 1.5 | - | 2.1 | 2.3 | 2.3 | 3.4 | 2.3 | 2.1 | 2.4 | 2.4 | - | 3.2 | 1.5 | - | 2.5 | - |
| Finance, insurance, real estate and business services | **(65-74)** | 25.9 | 29.3 | 18.4 | 23.5 | 24.6 | 28.0 | 23.9 | 24.7 | 17.2 | 15.7 | 22.8 | 23.2 | 18.0 | 21.0 | 27.1 | 30.4 | 24.2 | 29.8 | 19.5 | 21.2 | 17.2 | - | 15.8 | 20.0 |
| Financial intermediation | (65-67) | 6.5 | 7.4 | 6.8 | 6.6 | 6.2 | 5.3 | 6.3 | 7.1 | 6.6 | 3.6 | 4.8 | 5.0 | 4.3 | 3.8 | 5.0 | 5.1 | 5.0 | 3.8 | - | 5.7 | 5.3 | - | 3.3 | 4.5 |
| Real estate, renting and business activities | (70-74) | 19.4 | 21.9 | 11.6 | 16.8 | 18.4 | 22.7 | 17.6 | 17.6 | 10.5 | 12.1 | 18.0 | 18.2 | 13.7 | 17.2 | 22.1 | 25.3 | 19.2 | 26.0 | - | 15.5 | 11.9 | - | 12.5 | 15.5 |
| ….Real estate activities | (70) | 9.9 | 9.8 | 6.6 | 8.3 | - | - | 12.2 | 10.8 | 4.6 | - | 11.1 | 10.7 | 9.1 | 10.4 | 11.0 | 11.9 | 9.3 | 12.4 | - | 12.2 | 7.9 | - | - | - |
| ….Renting of m&eq and other business activities | (71-74) | 9.6 | 12.1 | 5.0 | 8.5 | - | - | 5.4 | 6.8 | 5.9 | - | 6.9 | 7.5 | 4.6 | 6.8 | 11.1 | 13.4 | 9.9 | 13.6 | - | 3.3 | 4.0 | - | - | - |
| ……..Other business activities | (74) | - | - | 3.6 | 5.6 | - | - | - | - | 4.3 | - | 5.0 | 5.4 | 2.9 | 4.2 | 7.3 | 9.2 | 7.3 | 9.5 | - | 2.7 | - | - | - | - |
| Community social and personal services | **(75-99)** | 19.7 | 19.6 | 20.7 | 20.0 | 23.0 | 24.1 | 23.1 | 19.3 | 11.6 | 15.0 | 26.0 | 26.7 | 25.1 | 21.2 | 21.2 | 23.1 | 20.3 | 21.4 | 18.2 | 20.2 | 20.8 | - | 19.9 | 16.1 |
| High technology manufactures | | 0.8 | 0.9 [1] | 2.1 | 1.9 | - | - | 1.6 | 2.1 | 0.4 | 1.7 [1] | 1.7 | 2.3 | 1.3 | 5.2 | 2.3 | 2.5 | 2.9 | 2.3 | - | - | - | - | 4.8 | 8.6 |
| Medium-high technology manufactures | | 2.7 | 2.3 [1] | 5.3 | 5.4 | - | - | 4.0 | 5.5 | 7.4 | 8.3 [1] | 4.1 | 3.9 | 4.5 | 5.1 | 5.1 | 5.0 | 11.6 | 9.7 | - | - | - | - | 6.1 | 10.4 |
| Medium-low technology manufactures | | 4.3 | 3.6 [1] | 5.8 | 6.1 | - | - | 3.5 | 4.3 | 7.6 | 7.7 [1] | 3.7 | 3.6 | 4.5 | 5.0 | 5.3 | 4.9 | 6.2 | 5.2 | 3.5 | - | - | - | 3.1 | 2.2 |
| Low technology manufactures | | 5.7 | 5.6 | 8.3 | 7.2 | 6.6 | 5.9 | 6.8 | 8.0 | 11.7 | 9.2 [1] | 7.6 | 6.5 | 9.3 | 9.2 | 7.1 | 5.7 | 6.6 | 5.2 | 9.3 | 6.4 | 11.0 | - | 12.5 | 12.5 |
| High and medium-high technology manufactures | | 3.6 | 3.3 [1] | 7.4 | 7.3 | 8.0 | 8.0 | 5.6 | 7.7 | 9.8 | 10.0 [1] | 6.2 | 6.4 | 6.2 | 10.8 | 7.6 | 7.6 | 14.6 | 12.1 | 2.4 | 2.2 | 2.1 | - | 11.0 | 19.0 |

1. Intensity of the previous year.

2. 1998 instead of 1995.

3. EU includes the 15 EU Members before 1 May 2004 excluding Austria, Greece, Luxembourg, Portugal (for which no Anberd data are available).

4. OECD includes previous EU countries and Canada, Japan, and the United States.

*Source:* OECD, STAN Indicators 2004.

StatLink: http://dx.doi.org/10.1787/005860125823

**Table 31. Share of value added in total gross value added, 1991-2001 (cont'd)**

| | (ISIC Rev.3) | Italy | | Japan | | Korea | | Netherlands | | Norway | | Poland | | Spain | | Sweden | | United Kingdom | | Unites States | | EU[3] | | OECD[4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2001 | 1991 | 2001 | 1995 | 2001 | 1991 | 2000 | 1991 | 1998 | 1994 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2000 | 1992 | 1999 | 1991 | 1999 |
| **Total manufacturing** | **(15-37)** | **22.5** | **20.1** | **25.8** | **20.1** | **29.2** | **30.3** | **18.2** | **16.0** | **12.1** | **13.0** | **21.7** | **17.9** | **19.9** | **17.4** | **18.9** | **20.6** | **21.0** | **16.5** | **17.4** | **15.5** | **21.8** | **20.1** | **21.0** | **18.7** |
| Food prod., beverages and tobacco | (15-16) | 2.4 | 2.0 | 2.5 | 2.4 | 3.0 | 3.4 | 3.2 | 3.0 | 2.1 | 1.9 | 3.5 | 3.8 [1] | 3.4 | 2.5 | 1.8 | 1.7 | 3.1 | 2.3 | 1.9 | 1.5 | 2.7 | 2.4 | 2.4 | 2.1 |
| Textiles, textile prod., leather and footwear | (17-19) | 3.4 | 2.9 | 1.3 | 0.6 | 2.1 | 1.4 | 0.6 | 0.4 | 0.3 | 0.2 | 2.6 | 1.5 [1] | 1.9 | 1.3 | 0.3 | 0.3 | 1.3 | 0.7 | 0.9 | 0.5 | 1.6 | 1.2 | 1.3 | 0.8 |
| Wood, pulp, paper, paper prod., printing & publishing | (20-22) | 2.1 | 2.0 | 2.3 | 1.9 | 1.7 | 1.4 | 2.5 | 2.3 | 2.5 | 2.5 | 2.3 | 2.5 [1] | 2.1 | 1.9 | 4.0 | 4.4 | 2.8 | 2.5 | 2.5 | 2.1 | 2.4 | 2.3 | 2.4 | 2.3 |
| Chemical, rubber, plastics and fuel prod. | (23-25) | 2.9 | 2.7 | 3.4 | 3.3 | 5.7 | 7.5 | 3.6 | 3.2 | 1.5 | 1.5 | 3.4 | 3.1 [1] | 3.1 | 3.0 | 2.4 | 3.2 | 3.8 | 2.8 | 3.0 | 2.7 | 3.3 | 3.2 | 3.2 | 3.1 |
| ….Coke, refined petroleum prod. and nuclear fuel | (23) | 0.5 | 0.2 | 1.0 | 1.3 | 1.8 | 3.4 | 0.5 | 0.4 | - | - | 0.7 | 0.6 [1] | 0.6 | 0.5 | 0.3 | 0.2 | 0.5 | 0.3 | 0.5 | 0.4 | - | 0.3 | - | 0.5 |
| ….Chemicals and chemical prod. | (24) | 1.7 | 1.6 | 2.0 | 1.7 | 2.9 | 2.9 | 2.5 | 2.3 | - | - | 1.7 | 1.4 [1] | 1.7 | 1.6 | 1.6 | 2.4 | 2.2 | 1.7 | 1.9 | 1.7 | 2.0 | 2.0 | 2.0 | 1.9 |
| ……..Chemicals excluding pharmaceuticals | (24ex2423) | 1.0 | 0.9 | 1.4 | 1.0 | 2.0 | 1.9 | 2.2 | 1.9 | - | - | - | 1.1 [1] | 1.1 | 1.1 | 0.9 | 0.9 | 1.6 | 1.0 | 1.4 | 1.1 | 1.4 | 1.3 | 1.4 | 1.2 |
| ……..Pharmaceuticals | (2423) | 0.6 | 0.7 | 0.6 | 0.7 | 0.9 | 1.0 | 0.3 | 0.4 | 0.2 | 0.2 | - | 0.3 [1] | 0.6 | 0.5 | 0.7 | 1.5 | 0.7 | 0.7 | 0.5 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 |
| ….Rubber and plastics prod. | (25) | 0.8 | 0.8 | 0.3 | 0.2 | 1.0 | 1.1 | 0.6 | 0.5 | 0.3 | 0.3 | 1.0 | 1.0 [1] | 0.8 | 0.8 | 0.5 | 0.6 | 1.0 | 0.9 | 0.6 | 0.6 | - | 0.9 | - | 0.7 |
| Other non-metallic mineral prod. | (26) | 1.4 | 1.4 | 0.9 | 0.7 | 1.3 | 1.0 | 0.7 | 0.7 | 0.5 | 0.5 | 1.4 | 1.4 [1] | 1.5 | 1.4 | 0.6 | 0.5 | 0.7 | 0.5 | 0.4 | 0.4 | 1.1 | 1.0 | 0.8 | 0.7 |
| Basic metals and fabricated metal prod. | (27-28) | 3.1 | 2.7 | 3.6 | 2.3 | 3.8 | 3.4 | 2.3 | 1.8 | 1.5 | 1.9 | 2.6 | 2.2 [1] | 2.2 | 2.3 | 2.5 | 2.8 | 2.4 | 1.7 | 1.8 | 1.6 | 2.7 | 2.5 | 2.6 | 2.2 |
| Machinery and equipment | (29-33) | 4.8 | 4.3 | 7.7 | 5.5 | 7.0 | 6.3 | 3.2 | 2.8 | 1.9 | 2.3 | 3.3 | 3.1 [1] | 2.8 | 2.5 | 4.4 | 4.2 | 4.3 | 3.4 | 4.5 | 4.1 | 5.0 | 4.6 | 5.3 | 4.6 |
| ….Machinery and equip., n.e.c. | (29) | 2.5 | 2.4 | 3.0 | 1.9 | 1.8 | 1.7 | 1.3 | 1.3 | 1.0 | 1.2 | 1.9 | 1.5 [1] | 1.3 | 1.2 | 2.4 | 2.7 | 1.7 | 1.3 | 1.5 | 1.2 | 2.3 | 2.1 | 2.1 | 1.6 |
| ….Electrical and optical equipment | (30-33) | 2.3 | 1.9 | 4.8 | 3.6 | 5.2 | 4.6 | 1.9 | 1.5 | 0.9 | 1.1 | 1.4 | 1.6 [1] | 1.6 | 1.2 | 1.9 | 1.5 | 2.5 | 2.1 | 3.0 | 2.8 | 2.6 | 2.5 | 3.2 | 2.9 |
| ……..Office, accounting and computing machinery | (30) | 0.1 | 0.1 | 0.7 | 0.5 | 0.3 | 0.8 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 [1] | 0.2 | 0.1 | 0.2 | 0.2 | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 | 0.2 | 0.5 | 0.4 |
| ……..Electrical machinery and apparatus, nec | (31) | 1.0 | 0.9 | 1.3 | 1.0 | 0.7 | 0.4 | 0.4 | 0.2 | 0.5 | 0.5 | 0.7 | 0.7 [1] | 0.7 | 0.6 | 0.5 | 0.8 | 0.8 | 0.6 | 0.6 | 0.4 | 1.2 | 1.0 | 0.9 | 0.7 |
| ……..Radio, television and communication equipment | (32) | 0.6 | 0.5 | 2.3 | 1.8 | 3.9 | 2.8 | 0.9 | 0.8 | 0.2 | 0.2 | 0.4 | 0.3 [1] | 0.4 | 0.2 | 0.7 | -0.1 | 0.6 | 0.6 | 1.1 | 1.4 | 0.6 | 0.7 | 1.1 | 1.3 |
| ……..Medical, precision and optical instruments | (33) | 0.5 | 0.4 | 0.5 | 0.3 | 0.3 | 0.6 | - | - | 0.2 | 0.3 | 0.3 | 0.4 [1] | 0.3 | 0.2 | 0.5 | 0.7 | 0.7 | 0.6 | 0.9 | 0.6 | 0.6 | 0.6 | 0.7 | 0.5 |
| Transport equipment | (34-35) | 1.3 | 1.3 | 2.4 | 2.3 | 3.9 | 5.5 | 0.8 | 0.8 | 1.5 | 1.8 | 1.6 | 1.3 [1] | 2.0 | 1.8 | 2.3 | 2.9 | 2.1 | 1.8 | 1.8 | 1.9 | 2.1 | 2.2 | 2.1 | 2.2 |
| ….Motor vehicles, trailers and semi-trailers | (34) | 0.8 | 0.7 | 2.2 | 2.0 | 3.1 | 3.4 | 0.3 | 0.4 | 0.1 | 0.2 | 0.7 | 0.7 [1] | 1.6 | 1.5 | 1.6 | 2.3 | 1.1 | 0.9 | 0.8 | 1.2 | 1.6 | 1.6 | 1.4 | 1.6 |
| ….Other transport equipment | (35) | 0.5 | 0.6 | 0.2 | 0.3 | 0.8 | 2.2 | 0.5 | 0.4 | 1.4 | 1.6 | 0.9 | 0.6 [1] | 0.4 | 0.3 | 0.7 | 0.6 | 1.0 | 0.9 | 1.0 | 0.7 | 0.5 | 0.6 | 0.7 | 0.6 |
| ……..Building and repairing of ships and boats | (351) | 0.1 | 0.2 | 0.1 | 0.1 | 0.7 | - | - | 0.2 | 1.2 | 1.6 | - | 0.3 [1] | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| ……..Aircraft and spacecraft | (353) | 0.2 | 0.3 | 0.1 | 0.1 | 0.1 | - | - | 0.1 | 0.1 | 0.0 | - | 0.1 [1] | 0.1 | 0.1 | 0.4 | 0.3 | 0.8 | 0.6 | 0.9 | 0.5 | 0.3 | 0.3 | 0.5 | 0.4 |
| ……..Railroad equip. and transport equip. n.e.c. | (352+359) | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | - | - | 0.1 | 0.1 | 0.0 | - | 0.1 [1] | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Manufacturing nec; recycling | (36-37) | 1.1 | 1.0 | 1.6 | 1.1 | 0.6 | 0.4 | 1.2 | 1.1 | 0.4 | 0.5 | 1.0 | 1.0 [1] | 0.9 | 0.8 | 0.5 | 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.8 | 0.8 | 0.9 | 0.8 |
| Electricity, gas and water supply | (40-41) | 2.2 | 2.3 | 3.1 | 3.7 | 2.1 | 2.8 | 2.0 | 1.5 | 3.4 | 2.6 | 3.8 | 3.7 | 3.3 | 2.1 | 3.3 | 2.7 | 2.7 | 1.8 | 2.9 | 2.2 | 2.5 | 2.2 | 2.8 | 2.5 |
| Construction | (45) | 6.2 | 4.9 | 9.3 | 6.9 | 11.2 | 8.3 | 5.8 | 5.8 | 4.1 | 5.1 | 7.3 | 7.2 | 8.7 | 8.7 | 6.6 | 4.4 | 5.9 | 5.5 | 3.9 | 4.7 | 6.3 | 5.4 | 6.0 | 5.4 |
| **Total services** | **(50-99)** | **65.2** | **69.5** | **59.3** | **67.9** | **51.0** | **53.9** | **66.1** | **71.4** | **63.7** | **64.6** | **56.1** | **65.0** | **62.4** | **67.9** | **68.0** | **70.2** | **66.0** | **72.8** | **72.1** | **76.2** | **66.0** | **69.4** | **66.6** | **70.8** |
| Wholesale and retail trade; restaurants and hotels | **(50-55)** | 17.0 | 16.6 | 13.6 | 13.2 | 10.2 # | 12.2 | 15.4 | 15.2 | 12.3 | 11.8 [1] | 20.5 | 21.8 | 18.0 | 19.0 | 12.0 | 12.1 | 14.0 | 15.1 | 17.3 | 18.3 | 14.3 | 14.5 | 15.4 | 15.8 |
| Transport and storage and communication | **(60-64)** | 7.1 | 7.4 | 6.5 | 6.2 | 7.0 # | 6.6 | 7.0 | 7.3 | 11.4 | 9.6 [1] | 7.5 | 7.3 | 7.2 | 8.7 | 8.7 | 8.2 | 8.1 | 7.9 | 6.5 | 6.7 | 6.9 | 7.0 | 6.7 | 6.8 |
| Transport and storage | (60-63) | 5.3 | 5.0 | 5.0 | 4.5 | 4.6 # | 4.3 | 5.0 | 4.8 | 9.1 | 7.4 [1] | - | - | 5.2 | - | 6.4 | 5.6 | 5.0 | 4.7 | 3.1 | 3.2 | 4.5 | - | 4.0 | - |
| Post and telecommunications | (64) | 1.8 | 2.3 | 1.5 | 1.7 | 2.4 # | 2.3 | 2.0 | 2.6 | 2.3 | 2.2 [1] | - | - | 2.0 | - | 2.3 | 2.6 | 3.1 | 3.1 | 3.4 | 3.5 | 2.4 | - | 2.6 | - |
| Finance, insurance, real estate and business services | **(65-74)** | 21.2 | 26.0 | 21.2 | 26.9 | 19.3 # | 19.0 | 20.3 | 26.4 | 18.3 | 17.5 [1] | 9.1 | 15.3 | 18.1 | 20.0 | 21.8 | 25.0 | 22.2 | 27.9 | 25.3 | 30.0 | 23.5 | 26.4 | 23.4 | 27.2 |
| Financial intermediation | (65-67) | 6.1 | 5.9 | 5.1 | 6.3 | 6.8 # | 6.9 | 4.8 | 6.3 | 5.1 | 4.0 [1] | 1.1 | 2.2 | 6.3 | 5.8 | 4.9 | 3.6 | 5.4 | 5.3 | 6.4 | 8.7 | 5.5 | 5.1 | 5.8 | 6.6 |
| Real estate, renting and business activities | (70-74) | 15.1 | 20.1 | 16.1 | 20.6 | 12.5 # | 12.2 | 15.5 | 20.0 | 13.2 | 13.5 [1] | 8.0 | 13.1 | 11.8 | 14.2 | 17.0 | 21.4 | 16.8 | 22.7 | 18.9 | 21.3 | 18.0 | 21.3 | 17.6 | 20.5 |
| ….Real estate activities | (70) | - | 10.8 | 10.3 | 12.8 | 8.5 # | 8.5 | 7.3 | 8.0 | 8.7 | 7.7 [1] | - | - | 7.4 | - | 11.0 | 10.7 | - | 9.5 | 11.5 | 11.4 | - | - | - | - |
| ….Renting of m&eq and other business activities | (71-74) | - | 9.4 | 5.8 | 7.7 | 4.0 # | 3.7 | 8.2 | 12.0 | 4.5 | 5.8 [1] | - | - | 4.4 | - | 6.0 | 10.6 | - | 13.1 | 7.4 | 9.9 | - | - | - | - |
| ……..Other business activities | (74) | - | 7.5 | - | - | - # | - | 6.2 | 8.7 | 3.3 | 4.1 [1] | - | - | - | - | - | 7.4 | - | 9.1 | - | - | - | - | - | - |
| Community social and personal services | **(75-99)** | 19.8 | 19.5 | 18.0 | 21.6 | 15.3 # | 16.1 | 23.4 | 22.5 | 21.7 | 21.5 [1] | 19.0 | 20.6 | 19.1 | 20.2 | 25.5 | 24.9 | 21.7 | 21.8 | 23.0 | 21.3 | 21.3 | 21.6 | 21.1 | 21.1 |
| High technology manufactures | | 2.1 | 2.0 | 4.2 | 3.4 | 5.4 | - | 2.1 | 1.8 | 0.8 | 0.9 | - | 1.4 [1] | 1.6 | 1.2 | 2.5 | 2.5 | 3.2 | 2.8 | 3.8 | 3.6 | 2.3 | 2.4 | 3.3 | 3.2 |
| Medium-high technology manufactures | | 5.6 | 5.1 | 7.9 | 6.0 | 7.7 | - | 4.3 | 3.9 | - | - | - | 4.1 [1] | 4.8 | 4.5 | 5.7 | 6.9 | 5.3 | 3.9 | 4.3 | 4.0 | 6.6 | 6.2 | 5.9 | 5.3 |
| Medium-low technology manufactures | | 5.9 | 5.3 | 6.0 | 4.7 | 8.6 | - | 4.2 | 3.6 | - | - | - | 5.6 [1] | 5.3 | 5.2 | 4.0 | 4.2 | 4.7 | 3.5 | 3.4 | 3.1 | 5.2 | 4.8 | 4.7 | 4.2 |
| Low technology manufactures | | 8.9 | 7.8 | 7.7 | 6.0 | 7.5 | 6.6 | 7.6 | 6.7 | 5.2 | 5.1 | 9.4 | 8.8 [1] | 8.3 | 6.5 | 6.6 | 7.0 | 7.8 | 6.2 | 5.9 | 4.8 | 7.6 | 6.7 | 7.0 | 6.0 |
| High and medium-high technology manufactures | | 7.8 | 7.2 | 12.2 | 9.5 | 13.8 | 14.8 | 6.6 | 5.9 | - | - | 6.6 | 5.8 [1] | 6.5 | 5.9 | 8.3 | 9.5 | 8.6 | 6.9 | 8.2 | 7.7 | 9.1 | 8.7 | 9.4 | 8.7 |

1. Intensity of the previous year.

2. 1998 instead of 1995.

3. EU includes the 15 EU Members before 1 May 2004 excluding Austria, Greece, Luxembourg, Portugal (for which no Anberd data are available).

4. OECD includes previous EU countries and Canada, Japan, and the United States.

*Source:* OECD, STAN Indicators 2004.

**Table 32. Trade-to-GDP ratio for goods and services, 1991-2003[1]**

Average imports and exports, as a percentage of nominal GDP, and average annual growth rates (%)

| | Goods | | | | | | | Services | | | | | | | Goods and services | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trade-to-GDP ratio | | | | Average growth | | | Trade-to-GDP ratio | | | | Average growth | | | Trade-to-GDP ratio | | | | Average growth | | |
| | 1991 | 1995 | 2001 | 2003 | 1991-2003 | 1991-2001 | 2001-03 | 1991 | 1995 | 2001 | 2003 | 1991-2003 | 1991-2001 | 2001-03 | 1991 | 1995 | 2001 | 2003 | 1991-2003 | 1991-2001 | 2001-03 |
| Australia[2] | 13.1 | 15.3 | 17.0 | 16.6 | 2.1 | 2.6 | -2.4 | 4.0 | 4.6 | 4.5 | 4.3 | 0.8 | 1.3 | -4.5 | 17.1 | 19.9 | 21.6 | 20.9 | 1.8 | 2.3 | -2.9 |
| Austria | 26.7 | 25.8 | 35.4 | 34.7 | 2.2 | 2.8 | -1.0 | 12.1 | 11.4 | 17.0 | 16.3 | 2.5 | 3.4 | -1.9 | 38.8 | 37.2 | 52.4 | 51.0 | 2.3 | 3.0 | -1.3 |
| Belgium | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 68.2 | 66.9 | 84.2 | 80.9 | 1.4 | 2.1 | -2.0 |
| Canada | 21.4 | 31.0 | 35.3 | 30.9 | 3.1 | 5.0 | -6.7 | 4.3 | 5.1 | 5.9 | 5.5 | 2.0 | 3.1 | -3.9 | 25.7 | 36.1 | 41.2 | 36.4 | 2.9 | 4.7 | -6.3 |
| Czech Republic | 41.3 | 44.0 | 61.0 | 58.4 | 2.9 | 3.9 | -2.3 | 8.0 | 12.0 | 11.1 | 8.8 | 0.8 | 3.3 | -11.3 | 49.3 | 56.0 | 72.1 | 67.2 | 2.6 | 3.8 | -3.5 |
| Denmark | 26.6 | 26.4 | 29.4 | 28.3 | 0.5 | 1.0 | -1.8 | 7.7 | 7.0 | 12.1 | 11.7 | 3.5 | 4.5 | -1.5 | 34.3 | 33.4 | 41.4 | 40.0 | 1.3 | 1.9 | -1.7 |
| Finland | 17.7 | 26.4 | 30.2 | 28.7 | 4.0 | 5.4 | -2.6 | 4.7 | 6.4 | 5.5 | 5.3 | 0.9 | 1.6 | -2.4 | 22.4 | 32.8 | 35.7 | 34.0 | 3.5 | 4.7 | -2.6 |
| France | 18.0 | 18.1 | 22.5 | 20.8 | 1.2 | 2.2 | -4.0 | 3.7 | 3.7 | 4.6 | 4.4 | 1.5 | 2.3 | -2.5 | 21.7 | 21.8 | 27.1 | 25.2 | 1.2 | 2.2 | -3.7 |
| Germany | 22.3 | 20.0 | 28.3 | 28.0 | 1.9 | 2.4 | -0.5 | 4.1 | 4.1 | 5.9 | 5.9 | 3.0 | 3.6 | 0.1 | 26.4 | 24.2 | 34.2 | 34.0 | 2.1 | 2.6 | -0.4 |
| Greece | 17.8 | 16.5 | 17.9 | 16.7 | -0.5 | 0.1 | -3.5 | 4.3 | 4.7 | 10.1 | 7.7 | 4.8 | 8.5 | -13.9 | 22.1 | 21.3 | 28.0 | 24.4 | 0.8 | 2.4 | -7.0 |
| Hungary | - | 34.5 | 62.1 | 54.3 | 5.7 | 9.8 | -6.7 | - | 10.1 | 11.4 | 9.7 | -0.5 | 2.0 | -7.9 | 41.8 | 44.6 | 73.5 | 64.1 | 3.6 | 5.6 | -6.9 |
| Iceland | 23.6 | 24.8 | 26.8 | 23.5 | 0.0 | 1.3 | -6.6 | 8.9 | 9.7 | 14.2 | 13.5 | 3.5 | 4.7 | -2.7 | 32.5 | 34.5 | 41.0 | 37.0 | 1.1 | 2.3 | -5.2 |
| Ireland | 45.0 | 57.9 | 63.4 | 47.2 | 0.4 | 3.4 | -14.7 | 10.4 | 12.9 | 27.6 | 28.7 | 8.4 | 9.7 | 2.1 | 55.4 | 70.8 | 90.9 | 75.9 | 2.6 | 5.0 | -9.0 |
| Italy | 14.7 | 19.4 | 21.6 | 19.5 | 2.3 | 3.9 | -5.2 | 3.9 | 5.6 | 6.1 | 5.7 | 3.2 | 4.5 | -3.4 | 18.6 | 25.0 | 27.7 | 25.1 | 2.5 | 4.0 | -4.8 |
| Japan[3] | 7.5 | 6.9 | 8.4 | 8.8 | 1.4 | 1.1 | 4.6 | 1.7 | 1.5 | 1.7 | 1.8 | 0.6 | 0.2 | 5.5 | 9.2 | 8.4 | 10.1 | 11.0 | 1.5 | 1.0 | 4.4 |
| Korea | 23.7 | 24.5 | 29.9 | 30.7 | 2.2 | 2.3 | 1.3 | 3.7 | 4.9 | 6.7 | 6.2 | 4.3 | 6.0 | -4.4 | 27.4 | 29.4 | 36.7 | 36.9 | 2.5 | 2.9 | 0.3 |
| Luxembourg | 62.4 | 53.3 | 53.5 | 46.8 | -2.4 | -1.5 | -6.7 | 40.3 | 49.6 | 90.9 | 81.3 | 5.8 | 8.1 | -5.6 | 102.7 | 103.0 | 144.4 | 128.1 | 1.8 | 3.4 | -6.0 |
| Mexico[2] | 14.7 | 25.7 | 26.3 | 25.5 | 5.0 | 5.8 | -3.1 | 3.1 | 3.4 | 2.4 | 2.3 | -2.7 | -2.7 | -3.4 | 17.8 | 29.1 | 28.6 | 27.8 | 4.0 | 4.7 | -3.2 |
| Netherlands | 43.5 | 44.9 | 51.1 | 48.4 | 0.7 | 1.6 | -3.7 | 9.2 | 9.5 | 11.5 | 11.8 | 1.9 | 2.2 | 0.4 | 52.7 | 54.5 | 62.6 | 59.0 | 0.9 | 1.7 | -2.9 |
| New Zealand[2] | 20.8 | 21.3 | 25.4 | 23.4 | 1.1 | 2.0 | -8.3 | 7.2 | 7.6 | 8.4 | 8.2 | 1.2 | 1.5 | -2.2 | 27.9 | 28.9 | 33.7 | 31.5 | 1.1 | 1.9 | -6.7 |
| Norway | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 36.0 | 34.9 | 37.2 | 34.5 | -0.3 | 0.3 | -3.7 |
| Poland[3] | 19.8 | 19.5 | 24.5 | 26.3 | 2.6 | 2.1 | 7.1 | 3.1 | 3.1 | 5.0 | 5.0 | 4.3 | 4.8 | -0.5 | 22.9 | 22.6 | 29.5 | 35.7 | 3.7 | 2.5 | 9.5 |
| Portugal[3] | - | 27.4 | 29.6 | 28.0 | 0.3 | 1.3 | -5.7 | - | 5.9 | 6.1 | 5.9 | 0.1 | 0.6 | -2.5 | 33.6 | 33.3 | 35.7 | 33.4 | 0.0 | 0.6 | -3.2 |
| Slovak Republic | - | 45.4 | 66.2 | 68.6 | 4.3 | 4.9 | 1.8 | - | 11.6 | 11.3 | 10.2 | -3.3 | -2.8 | -5.2 | 46.1 | 57.0 | 77.5 | 78.8 | 4.5 | 5.2 | 0.9 |
| Spain | 13.8 | 17.5 | 23.1 | 21.7 | 3.8 | 5.2 | -3.0 | 4.2 | 5.2 | 7.7 | 7.1 | 4.4 | 6.0 | -3.8 | 18.0 | 22.7 | 30.7 | 28.8 | 4.0 | 5.4 | -3.2 |
| Sweden | 20.8 | 29.1 | 32.1 | 30.5 | 3.2 | 4.3 | -2.6 | 5.8 | 6.8 | 10.6 | 9.9 | 4.5 | 6.0 | -3.3 | 26.6 | 35.9 | 42.7 | 40.4 | 3.5 | 4.7 | -2.8 |
| Switzerland[2] | 27.1 | 26.0 | 33.7 | 31.4 | 1.2 | 2.2 | -4.0 | 6.5 | 6.8 | 9.3 | 9.3 | 3.1 | 3.5 | 1.1 | 33.6 | 32.9 | 43.0 | 40.6 | 1.6 | 2.5 | -2.9 |
| Turkey | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 15.2 | 22.1 | 32.5 | 29.0 | 5.4 | 7.6 | -5.7 |
| United Kingdom | 18.6 | 22.2 | 21.2 | 19.2 | 0.3 | 1.3 | -4.9 | 5.1 | 6.4 | 7.6 | 7.4 | 3.1 | 3.9 | -1.1 | 23.7 | 28.5 | 28.7 | 26.6 | 1.0 | 1.9 | -3.9 |
| United States[2] | 7.8 | 9.1 | 9.5 | 9.1 | 1.4 | 2.0 | -4.3 | 2.5 | 2.6 | 2.7 | 2.6 | 0.5 | 0.7 | -1.0 | 10.3 | 11.7 | 12.1 | 11.7 | 1.2 | 1.7 | -3.6 |
| **Total OECD[2, 4]** | **13.4** | **14.7** | **16.8** | **16.5** | **1.9** | **2.3** | **-1.7** | **3.3** | **3.6** | **4.3** | **4.4** | **2.5** | **2.6** | **1.4** | **18.0** | **19.4** | **22.3** | **22.1** | **1.9** | **2.1** | **-0.9** |
| **EU-15[2, 4]** | **19.4** | **21.3** | **25.7** | **24.7** | **1.6** | **2.7** | **-3.9** | **4.6** | **5.3** | **7.3** | **7.3** | **4.1** | **4.6** | **-0.4** | **26.3** | **28.8** | **35.5** | **34.3** | **1.9** | **2.8** | **-2.7** |
| **EU-25[2, 4]** | **19.4** | **21.6** | **26.3** | **25.3** | **1.8** | **3.1** | **-4.7** | **4.6** | **5.3** | **7.3** | **7.3** | **4.2** | **4.6** | **-0.6** | **26.4** | **29.0** | **35.9** | **34.9** | **2.2** | **3.1** | **-2.4** |

1. Or nearest years available. 2. 2002 instead of 2003. 3. 2002 instead of 2003 for Goods and for Services. 4. Aggregates of countries for which data are available.

*Source:* OECD, National Accounts database, November 2004.

*StatLink*: http://dx.doi.org/10.1787/534761537201

**Table 33. Export ratio by industry and technology level, 1992-2002**

Exports as a percentage of production

| | *(ISIC Rev.3)* | Australia | | Austria | | Belgium | | Canada | | Czech Rep. | | Denmark | | Finland | | France | | Germany | | Greece | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1992 | 1999 | 1992 | 2002 | 1992 | 2002 | 1992 | 2000 | 1993 | 2001 | 1992 | 2002 | 1992 | 2002 | 1992 | 2002 | 1992 | 2001 | 1995 | 2002 |
| **Total manufacturing** | **(15-37)** | **17** | **21** | **45** | **67** | **46** | **115** | **42** | **53** | **33** | **53** | **57** | **70** | **38** | **48** | **29** | **38** | **32** | **47** | **20** | **22** |
| **High technology manufactures** | | **31** | **41** | **56** | **107** [1] | **-** | **155** [2] | **57** | **84** | **76** | **68** [1] | **101** | **130** | **59** | **-** | **42** | **62** [1] | **54** | **101** | **26** | **-** |
| Pharmaceuticals | (2423) | 16 | 26 | 58 | 111 [1] | 59 | 135 [2] | 10 | 25 | - | 67 [1] | 85 | 101 | 36 | - | 24 | 53 [1] | 46 | 90 | 11 | - |
| Office, accounting and computing machinery | (30) | 99 | 116 | 1,044 | 208 | - | 2,804 [2] | 117 | 120 | 180 | 114 [1] | 206 | 406 | 69 | 310 | 62 | 102 [1] | 46 | 117 | 156 | 895 |
| Radio, television and communication equip. | (32) | 16 | 25 | 32 | 90 | - | 110 [2] | 40 | 69 | 72 | 73 [1] | 95 | 185 | 62 | 58 | 39 | 66 [1] | 51 | 108 | 20 | 38 |
| Medical, precision and optical instruments | (33) | 42 | 67 | 71 | 102 | - | 232 [2] | - | - | 29 | 42 [1] | 102 | 96 | 71 | 62 | 29 | 45 [1] | 47 | 74 | 50 | 68 |
| Aircraft and spacecraft | (353) | 42 | 40 | - | - [1] | - | 78 [2] | 74 | 87 | - | 38 [1] | - | - | 9 | - | 68 | 66 [1] | 100 | 142 | - | - |
| **Medium-high technology manufactures** | | **14** | **20** | **73** | **92** [1] | **-** | **129** [2] | **62** | **72** | **63** | **69** [1] | **75** | **86** | **50** | **-** | **41** | **51** [1] | **42** | **54** | **24** | **-** |
| Chemicals excluding pharmaceuticals | (24ex2423) | 13 | 18 | 54 | 79 [1] | 56 | 118 [2] | 38 | 53 | - | 59 [1] | 63 | 90 | 38 | - | 47 | 61 [1] | 46 | 60 | 21 | - |
| Machinery and equipment, nec | (29) | 19 | 26 | 71 | 81 | - | 160 [2] | 47 | 67 | 43 | 80 [1] | 76 | 77 | 46 | 48 | 39 | 55 [1] | 43 | 57 | 23 | 38 |
| Electrical machinery and apparatus, nec | (31) | 14 | 25 | 81 | 90 | - | 97 [2] | 41 | 66 | 31 | 71 [1] | 58 | 77 | 49 | 77 | 37 | 53 [1] | 24 | 38 | 29 | 42 |
| Motor vehicles, trailers and semi-trailers | (34) | 11 | 17 | 96 | 123 | - | 141 [2] | 81 | 81 | 56 | 66 [1] | 113 | 156 | 137 | 165 | 40 | 44 | 48 | 55 | 36 | 33 |
| Railroad equip. and transport equip. nec | (352+359) | 5 | 5 | 32 | 68 [1] | - | 89 [2] | 32 | 34 | - | 60 [1] | 118 | 165 | 9 | - | 39 | 36 [1] | 42 | 38 | - | - |
| **Medium-low technology manufactures** | | **21** | **23** | **40** | **44** [1] | **-** | **66** [2] | **33** | **35** | **31** | **46** [1] | **43** | **41** | **34** | **41** | **21** | **24** [1] | **22** | **31** | **23** | **-** |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 17 | 26 | 6 | 13 | 34 | 55 | 21 | 25 | 12 | 23 [1] | 42 | 28 | 30 | 38 | 14 | 15 | 15 | 21 | 22 | 18 |
| Rubber and plastics prod. | (25) | 5 | 7 | 68 | 66 | 46 | 102 | 27 | 40 | 31 | 58 [1] | 54 | 58 | 34 | 38 | 26 | 31 [1] | 26 | 39 | 18 | 31 |
| Other non-metallic mineral prod. | (26) | 3 | 4 | 26 | 28 | 30 | 52 | 18 | 28 | 48 | 50 [1] | 32 | 28 | 18 | 26 | 16 | 19 | 15 | 23 | 22 | 11 |
| Basic metals | (27) | 47 | 46 | 56 | 65 | 47 | 90 [2] | 60 | 53 | 32 | 44 [1] | 54 | 67 | 47 | 58 | 42 | 45 [1] | 36 | 47 | 37 | 35 |
| Fabricated metal prod., except mach. & equip. | (28) | 5 | 4 | 37 | 40 | 21 | 42 [2] | 15 | 24 | 34 | 48 [1] | 35 | 34 | 22 | 19 | 12 | 14 [1] | 15 | 22 | 12 | 16 |
| Building and repairing of ships and boats | (351) | 19 | 49 | 58 | 394 [1] | - | 38 [2] | 15 | 51 | - | 90 [1] | 54 | 60 | 44 | 75 | 24 | 49 [1] | 46 | 66 | - | - |
| **Low technology manufactures** | | **14** | **16** | **29** | **48** | **39** | **83** | **29** | **38** | **24** | **34** [1] | **48** | **59** | **32** | **41** | **20** | **26** [1] | **20** | **27** | **18** | **18** |
| Food prod., beverages and tobacco | (15-16) | 19 | 22 | 8 | 27 | 30 | 56 | 14 | 21 | 14 | 13 [1] | 51 | 59 | 5 | 10 | 20 | 23 | 13 | 18 | 15 | 13 |
| Textiles, textile prod., leather and footwear | (17-19) | 20 | 26 | 64 | 95 | 58 | 153 | 13 | 35 | 42 | 71 [1] | 82 | 193 | 38 | 54 | 31 | 52 | 49 | 77 | 32 | 38 |
| Wood and prod. of wood and cork | (20) | 8 | 10 | 35 | 47 | 30 | 65 | 60 | 58 | 27 | 38 [1] | 42 | 43 | 48 | 45 | 12 | 18 [1] | 9 | 18 | 6 | 5 |
| Pulp, paper, paper prod., printing & publishing | (21-22) | 3 | 4 | 41 | 50 | 24 | 49 | 45 | 44 | 21 | 37 [1] | 18 | 22 | 51 | 54 | 13 | 17 [1] | 16 | 23 | 7 | 6 |
| Manufacturing nec; recycling | (36-37) | 9 | 12 | 32 | 60 | 70 | 186 | 25 | 51 | 37 | 53 [1] | 61 | 59 | 23 | 26 | 19 | 26 [1] | 25 | 37 | 6 | 8 |

1. Intensity of the previous year.

2. 2000 instead of 2002.

3. EU includes the 15 EU Members before 1 May 2004 excluding Belgium, Greece, Luxembourg, Netherlands.

4. OECD includes previous EU countries and Australia, Canada, Japan, Norway and the United States.

*Source:* OECD, STAN Indicators 2004.

*StatLink*: http://dx.doi.org/10.1787/442804674716

**Table 33. Export ratio by industry and technology level, 1992-2002 (cont'd)**

Exports as a percentage of production

| | *(ISIC Rev.3)* | Hungary | | Iceland | | Ireland | | Italy | | Japan | | Korea | | Mexico | | Netherlands | | New Zealand | | Norway | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1992 | 2002 | 1992 | 2000 | 1992 | 1999 | 1992 | 2002 | 1992 | 2002 | 1994 | 2001 | 1992 | 2001 | 1992 | 2002 | 1992 | 1998 | 1992 | 2002 |
| **Total manufacturing** | **(15-37)** | **39** | **63** | **50** | **54** | **70** | **84** | **23** | **34** | **13** | **18** | **23** | **31** | **19** | **42** | **64** | **82** | **36** | **40** | **37** | **40** |
| **High technology manufactures** | | **-** | **94** [1] | **-** | **36** [1] | **123** | **120** | **31** | **56** [1] | **27** | **30** [1] | **39** | **-** | **-** | **84** | **93** | **223** [1] | **-** | **-** | **67** | **78** [1] |
| Pharmaceuticals | (2423) | - | 48 [1] | - | 15 [1] | 248 | 168 | 15 | 50 [1] | 4 | 6 [1] | 4 | 6 | 8 | 15 | 61 | 101 [1] | - | - | 64 | 62 [1] |
| Office, accounting and computing machinery | (30) | 35 | 108 [1] | - | 187 [1] | 106 | 106 | 76 | 83 [1] | 34 | 33 [1] | 59 | 53 | 89 | 141 | 392 | 1,625 [1] | - | - | 179 | 259 [1] |
| Radio, television and communication equip. | (32) | 67 | 98 [1] | - | 8 [1] | 103 | 124 | 26 | 51 [1] | 27 | 28 [1] | 44 | 58 | 76 | 68 | 46 | 84 [1] | - | - | 57 | 64 [1] |
| Medical, precision and optical instruments | (33) | 24 | 91 [1] | - | 49 [1] | 95 | 92 | 32 | 55 [1] | 43 | 86 | 33 | 20 | - | - | - | - [1] | - | - | 55 | 54 [1] |
| Aircraft and spacecraft | (353) | 229 | 5 [1] | - | 47 [1] | - | - | 48 | 70 [1] | 13 | 31 [1] | 96 | - | - | 140 | - | 76 [1] | - | - | 55 | 237 [1] |
| **Medium-high technology manufactures** | | **-** | **77** [1] | **-** | **22** [1] | **77** | **99** | **33** | **50** [1] | **20** | **25** [1] | **24** | **-** | **34** | **69** | **82** | **95** [1] | **-** | **-** | **-** | **-** |
| Chemicals excluding pharmaceuticals | (24ex2423) | - | 69 [1] | - | 4 [1] | 79 | 101 | 22 | 37 [1] | 14 | 21 [1] | 27 | 36 | 21 | 31 | 76 | 90 [1] | - | - | - | - |
| Machinery and equipment, nec | (29) | 40 | 85 [1] | - | 47 | 96 | 96 | 42 | 59 | 19 | 29 | 28 | 45 | 42 | 94 | 82 | 74 | - | - | 40 | 47 [1] |
| Electrical machinery and apparatus, nec | (31) | 76 | 56 [1] | - | 4 [1] | 70 | 115 | 19 | 31 [1] | 16 | 24 [1] | 39 | 45 | 89 | 159 | 102 | 160 [1] | - | - | 26 | 52 [1] |
| Motor vehicles, trailers and semi-trailers | (34) | 78 | 94 [1] | - | 42 [1] | 60 | 87 | 39 | 53 [1] | 23 | 26 [1] | 16 | 31 | 26 | 55 | 99 | 122 [1] | - | - | 96 | 82 [1] |
| Railroad equip. and transport equip. nec | (352+359) | 36 | 77 [1] | - | 0 [1] | 2 | 8 | 35 | 50 [1] | 74 | 95 [1] | 8 | - | - | 61 | - | 130 [1] | - | - | 11 | 23 [1] |
| **Medium-low technology manufactures** | | **28** | **36** [1] | **-** | **54** [1] | **61** | **46** | **17** | **24** [1] | **6** | **8** [1] | **16** | **-** | **12** | **20** | **56** | **60** [1] | **-** | **-** | **-** | **-** |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 15 | 22 [1] | - | - | - | - | 14 | 17 | 2 | 1 | 8 | 17 | 8 | 1 | 76 | 78 | - | - | - | - |
| Rubber and plastics prod. | (25) | 32 | 45 [1] | 4 | 9 | 72 | 53 | 23 | 32 | 15 | 21 [1] | 18 | 26 | 17 | 30 | 76 | 79 | - | - | 30 | 34 [1] |
| Other non-metallic mineral prod. | (26) | 27 | 30 [1] | 1 | 1 | 31 | 26 | 17 | 21 | 5 | 8 | 4 | 7 | 8 | 15 | 31 | 20 | 6 | 4 | 13 | 13 [1] |
| Basic metals | (27) | 53 | 53 [1] | 94 | 98 [1] | 94 | 94 | 22 | 30 [1] | 6 | 11 | 16 | 19 | 16 | 20 | 94 | 105 | 76 | 85 | 75 | 75 |
| Fabricated metal prod., except mach. & equip. | (28) | 26 | 34 [1] | 9 | 5 [1] | 54 | 33 | 12 | 17 [1] | 4 | 6 | 17 | 19 | 14 | 39 | 32 | 25 | 10 | 12 | 26 | 21 [1] |
| Building and repairing of ships and boats | (351) | 29 | 50 [1] | - | 99 [1] | 63 | 9 | 11 | 56 [1] | 54 | 53 [1] | 49 | - | - | 9 | - | 34 [1] | - | - | 51 | 20 |
| **Low technology manufactures** | | **37** | **42** [1] | **59** | **59** | **51** | **43** | **19** | **28** | **3** | **3** [1] | **21** | **23** | **6** | **16** | **50** | **53** | **-** | **-** | **18** | **21** |
| Food prod., beverages and tobacco | (15-16) | 25 | 24 [1] | 72 | 73 | 50 | 41 | 9 | 16 | 1 | 1 | 4 | 4 | 2 | 5 | 52 | 58 | 51 | 52 | 16 | 20 |
| Textiles, textile prod., leather and footwear | (17-19) | 111 | 76 [1] | 30 | 35 | 85 | 85 | 30 | 44 | 6 | 10 [1] | 48 | 58 | 13 | 44 | 121 | 158 | 56 | 58 | 32 | 44 |
| Wood and prod. of wood and cork | (20) | 26 | 42 [1] | 0 | 3 | 33 | 23 | 5 | 8 | 0 | 0 [1] | 4 | 3 | 6 | 5 | 33 | 21 | 37 | 36 | 19 | 13 |
| Pulp, paper, paper prod., printing & publishing | (21-22) | 10 | 21 [1] | 1 | 2 | 52 | 44 | 9 | 14 | 2 | 2 [1] | 6 | 12 | 7 | 11 | 31 | 31 | 16 | 18 | 21 | 22 |
| Manufacturing nec; recycling | (36-37) | 33 | 151 [1] | 0 | 1 | 31 | 34 | 33 | 44 | 5 | 7 [1] | 26 | 43 | 24 | 53 | 33 | 28 | 14 | 12 | 23 | 28 |

1. Intensity of the previous year.
2. 2000 instead of 2002.
3. EU includes the 15 EU Members before 1 May 2004 excluding Belgium, Greece, Luxembourg, Netherlands.
4. OECD includes previous EU countries and Australia, Canada, Japan, Norway and the United States.

*Source:* OECD, STAN Indicators 2004.

**Table 33. Export ratio by industry and technology level, 1992-2002 (cont'd)**

Exports as a percentage of production

| | *(ISIC Rev.3)* | Poland | | Portugal | | Slovak Rep. | | Spain | | Sweden | | Switzerland | | UK | | Unites States | | EU[3] | | OECD[4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1994 | 2001 | 1992 | 1999 | 1997 | 1999 | 1992 | 2001 | 1992 | 2001 | 1997 | 2000 | 1992 | 2001 | 1992 | 2001 | 1992 | 1999 | 1992 | 1999 |
| **Total manufacturing** | **(15-37)** | **1** | **1** | **29** | **38** | **54** | **63** | **19** | **31** | **41** | **51** | **54** | **66** | **31** | **43** | **13** | **17** | **30** | **39** | **21** | **26** |
| **High technology manufactures** | | **-** | **4** [1] | **42** | **62** | **-** | **-** | **28** | **49** | **66** | **67** | **-** | **-** | **57** | **100** | **26** | **35** | **49** | **71** | **34** | **43** |
| Pharmaceuticals | (2423) | - | 4 [1] | 11 | 23 | - | - | 10 | 32 | 67 | 79 | - | - | 40 | 76 | 10 | 15 | 33 | 56 | 19 | 28 |
| Office, accounting and computing machinery | (30) | 0 | 1 [1] | 175 | 128 | 78 | 461 | 52 | 50 | 97 | 136 | - | - | 69 | 101 | 47 | 58 | 65 | 104 | 48 | 57 |
| Radio, television and communication equip. | (32) | 5 | 5 [1] | 52 | 75 | 77 | 140 | 33 | 66 | 65 | 55 | 40 | 52 | 52 | 123 | 24 | 37 | 45 | 74 | 31 | 40 |
| Medical, precision and optical instruments | (33) | 1 | 1 [1] | 61 | 60 | 34 | 30 | 24 | 47 | 65 | 72 | 76 | 88 | 51 | 63 | 16 | 26 | 44 | 56 | 30 | 41 |
| Aircraft and spacecraft | (353) | - | 9 [1] | - | - | - | - | 121 | 86 | 46 | 103 | - | - | 70 | 123 | 35 | 44 | 73 | 77 | 47 | 57 |
| **Medium-high technology manufactures** | | **-** | **2** [1] | **39** | **66** | **-** | **-** | **36** | **51** | **50** | **58** | **-** | **-** | **45** | **53** | **20** | **24** | **42** | **51** | **-** | **-** |
| Chemicals excluding pharmaceuticals | (24ex2423) | - | 2 [1] | 20 | 34 | - | - | 22 | 38 | 43 | 66 | - | - | 46 | 60 | 17 | 22 | 41 | 54 | - | - |
| Machinery and equipment, nec | (29) | 3 | 3 [1] | 36 | 51 | 58 | 81 | 34 | 42 | 52 | 64 | 70 | 82 | 51 | 55 | 24 | 27 | 45 | 54 | 32 | 38 |
| Electrical machinery and apparatus, nec | (31) | 3 | 2 [1] | 57 | 94 | 64 | 82 | 25 | 36 | 49 | 66 | 44 | 51 | 36 | 52 | 24 | 38 | 29 | 41 | 24 | 34 |
| Motor vehicles, trailers and semi-trailers | (34) | 3 | 3 [1] | 57 | 85 | 112 | 103 | 49 | 67 | 54 | 50 | 104 | 126 | 45 | 48 | 18 | 19 | 47 | 52 | 33 | 35 |
| Railroad equip. and transport equip. nec | (352+359) | - | 5 [1] | 28 | 27 | - | - | 15 | 45 | 18 | 23 | - | - | 17 | 20 | 11 | 11 | 33 | 38 | 33 | 32 |
| **Medium-low technology manufactures** | | **-** | **1** [1] | **19** | **24** | **-** | **-** | **17** | **21** | **39** | **44** | **-** | **-** | **21** | **24** | **7** | **8** | **22** | **25** | **-** | **-** |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 1 | 1 [1] | 24 | 18 | 34 | 45 | 24 | 20 | 48 | 49 | - | - | 24 | 29 | 5 | 5 | 18 | 20 | - | - |
| Rubber and plastics prod. | (25) | 1 | 1 [1] | 14 | 33 | 67 | 75 | 18 | 29 | 45 | 56 | 48 | 53 | 21 | 22 | 8 | 11 | 26 | 32 | 18 | 21 |
| Other non-metallic mineral prod. | (26) | 0 | 0 [1] | 18 | 19 | 47 | 45 | 11 | 18 | 17 | 26 | 21 | 27 | 16 | 17 | 6 | 7 | 16 | 20 | 11 | 13 |
| Basic metals | (27) | 1 | 1 [1] | 17 | 47 | 62 | 54 | 27 | 29 | 52 | 61 | 94 | 174 | 33 | 44 | 10 | 13 | 35 | 39 | 19 | 22 |
| Fabricated metal prod., except mach. & equip. | (28) | 0 | 0 [1] | 18 | 26 | 34 | 47 | 10 | 13 | 25 | 27 | 27 | 31 | 13 | 15 | 5 | 6 | 15 | 18 | 9 | 11 |
| Building and repairing of ships and boats | (351) | - | 2 [1] | 29 | 10 | - | - | 47 | 26 | 71 | 57 | - | - | 15 | 15 | 10 | 9 | 31 | 39 | 33 | 34 |
| **Low technology manufactures** | | **0** | **0** [1] | **29** | **31** | **39** | **45** | **9** | **19** | **28** | **39** | **-** | **-** | **16** | **17** | **6** | **7** | **20** | **25** | **12** | **15** |
| Food prod., beverages and tobacco | (15-16) | 0 | 0 [1] | 9 | 12 | 14 | 13 | 7 | 16 | 6 | 15 | 12 | 13 | 14 | 15 | 6 | 6 | 15 | 19 | 9 | 11 |
| Textiles, textile prod., leather and footwear | (17-19) | 1 | 0 [1] | 49 | 53 | 96 | 125 | 15 | 36 | 58 | 107 | 72 | 78 | 30 | 43 | 7 | 13 | 35 | 46 | 21 | 29 |
| Wood and prod. of wood and cork | (20) | 0 | 0 [1] | 38 | 39 | 45 | 53 | 7 | 11 | 36 | 42 | 8 | 10 | 3 | 5 | 6 | 4 | 14 | 19 | 11 | 14 |
| Pulp, paper, paper prod., printing & publishing | (21-22) | 0 | 0 [1] | 20 | 24 | 43 | 52 | 9 | 16 | 40 | 50 | 21 | 26 | 11 | 12 | 5 | 6 | 17 | 21 | 11 | 12 |
| Manufacturing nec; recycling | (36-37) | 0 | 0 [1] | 19 | 21 | 45 | 53 | 10 | 21 | 34 | 41 | 88 | 95 | 26 | 24 | 12 | 15 | 26 | 32 | 14 | 19 |

1. Intensity of the previous year.

2. 2000 instead of 2002.

3. EU includes the 15 EU Members before 1 May 2004 excluding Belgium, Greece, Luxembourg, Netherlands.

4. OECD includes previous EU countries and Australia, Canada, Japan, Norway and the United States.

*Source:* OECD, STAN Indicators 2004.

**Table 34. Import penetration by industry and technology level, 1992-2002**

Imports as a percentage of domestic demand

| | (ISIC Rev.3) | Australia | | Austria | | Belgium | | Canada | | Czech Republic | | Denmark | | Finland | | France | | Germany | | Greece | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1992 | 1999 | 1992 | 2002 | 1995 | 2002 | 1992 | 2000 | 1993 | 2001 | 1992 | 2002 | 1992 | 2002 | 1992 | 2002 | 1992 | 2001 | 1995 | 2002 |
| **Total manufacturing** | **(15-37)** | **26** | **34** | **49** | **66** | **76** | **117** | **43** | **53** | **32** | **53** | **53** | **68** | **31** | **37** | **29** | **37** | **29** | **40** | **40** | **46** |
| **High technology manufactures** | | **65** | **75** | **68** | **106** [1] | **129** | **152** | **72** | **88** | **92** | **81** [1] | **101** | **137** | **67** | **52** [1] | **42** | **59** [1] | **56** | **101** | **72** | **-** |
| Pharmaceuticals | (2423) | 36 | 49 | 65 | 109 [1] | 91 | 145 [2] | 32 | 53 | - | 86 [1] | 73 | 103 | 58 | 74 [1] | 19 | 47 [1] | 36 | 84 | 58 | - |
| Office, accounting and computing machinery | (30) | 100 | 103 | 152 | 146 | 253 | 474 [2] | 107 | 108 | 106 | 106 [1] | 126 | 155 | 78 | 119 | 72 | 101 [1] | 62 | 109 | 102 | 109 |
| Radio, television and communication equipment | (32) | 50 | 70 | 42 | 90 | 119 | 110 [2] | 56 | 74 | 83 | 82 [1] | 95 | 172 | 63 | 37 | 45 | 64 [1] | 57 | 107 | 71 | 73 |
| Medical, precision and optical instruments | (33) | 75 | 85 | 79 | 102 | 151 | 169 [2] | - | - | 66 | 62 [1] | 103 | 94 | 75 | 54 | 33 | 48 [1] | 38 | 65 | 91 | 95 |
| Aircraft and spacecraft | (353) | 71 | 76 | - | - | 86 | 78 [2] | 73 | 83 | - | 71 [1] | - | - | 50 | 84 [1] | 55 | 49 [1] | 100 | 156 | - | - |
| **Medium-high technology manufactures** | | **39** | **49** | **76** | **92** [1] | **102** | **135** [2] | **66** | **73** | **66** | **67** [1] | **77** | **88** | **54** | **56** [1] | **38** | **48** [1] | **29** | **39** | **71** | **-** |
| Chemicals excluding pharmaceuticals | (24ex2423) | 32 | 40 | 66 | 84 [1] | 109 | 125 [2] | 42 | 59 | - | 69 [1] | 76 | 93 | 50 | 54 [1] | 44 | 57 [1] | 36 | 53 | 65 | - |
| Machinery and equipment, nec | (29) | 51 | 63 | 71 | 77 | 100 | 161 [2] | 69 | 79 | 55 | 81 [1] | 68 | 72 | 45 | 39 | 41 | 56 [1] | 26 | 37 | 70 | 75 |
| Electrical machinery and apparatus, nec | (31) | 39 | 54 | 76 | 88 | 64 | 97 [2] | 65 | 82 | 33 | 68 [1] | 62 | 71 | 49 | 74 | 30 | 48 [1] | 17 | 32 | 48 | 65 |
| Motor vehicles, trailers and semi-trailers | (34) | 37 | 46 | 97 | 123 | 111 | 150 [2] | 79 | 76 | 42 | 53 [1] | 106 | 120 | 128 | 130 | 35 | 38 | 34 | 35 | 92 | 93 |
| Railroad equip. and transport equip. nec | (352+359) | 32 | 44 | 37 | 60 [1] | 80 | 94 [2] | 31 | 38 | - | 45 [1] | 111 | 111 | 25 | 50 [1] | 40 | 43 [1] | 39 | 42 | - | - |
| **Medium-low technology manufactures** | | **15** | **20** | **38** | **45** [1] | **53** | **60** [2] | **28** | **33** | **22** | **47** [1] | **45** | **46** | **28** | **27** | **22** | **25** [1] | **22** | **27** | **34** | **-** |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 16 | 15 | 23 | 39 | 39 | 48 | 11 | 11 | 18 | 45 [1] | 47 | 35 | 31 | 26 | 22 | 20 | 28 | 27 | 16 | 16 |
| Rubber and plastics prod. | (25) | 24 | 29 | 64 | 67 | 81 | 102 | 36 | 43 | 38 | 64 [1] | 52 | 57 | 40 | 38 | 27 | 32 [1] | 22 | 29 | 41 | 51 |
| Other non-metallic mineral prod. | (26) | 10 | 12 | 21 | 27 | 36 | 42 | 30 | 37 | 20 | 30 [1] | 26 | 30 | 19 | 20 | 15 | 19 | 16 | 20 | 25 | 17 |
| Basic metals | (27) | 18 | 23 | 53 | 58 | 76 | 87 [2] | 39 | 45 | 19 | 53 [1] | 78 | 82 | 31 | 42 | 42 | 47 [1] | 37 | 45 | 46 | 42 |
| Fabricated metal prod., except mach.&equip. | (28) | 11 | 13 | 35 | 39 | 34 | 43 [2] | 27 | 33 | 21 | 37 [1] | 31 | 35 | 21 | 16 | 12 | 15 [1] | 12 | 15 | 33 | 35 |
| Building and repairing of ships and boats | (351) | 3 | 50 | 71 | 239 [1] | 36 | 29 [2] | 16 | 59 | - | 82 [1] | 25 | 48 | 25 | 17 | 14 | 29 [1] | 16 | 50 | - | - |
| **Low technology manufactures** | | **15** | **19** | **31** | **44** | **59** | **81** | **22** | **27** | **17** | **32** [1] | **38** | **52** | **14** | **20** | **22** | **28** [1] | **27** | **31** | **26** | **29** |
| Food prod., beverages and tobacco | (15-16) | 7 | 9 | 11 | 27 | 42 | 50 | 13 | 17 | 10 | 15 [1] | 29 | 40 | 7 | 17 | 16 | 19 | 17 | 20 | 22 | 24 |
| Textiles, textile prod., leather and footwear | (17-19) | 35 | 48 | 71 | 96 | 91 | 180 | 41 | 54 | 25 | 69 [1] | 85 | 169 | 59 | 73 | 39 | 61 | 64 | 85 | 31 | 41 |
| Wood and prod. of wood and cork | (20) | 13 | 12 | 20 | 24 | 55 | 62 | 17 | 16 | 10 | 22 [1] | 50 | 54 | 8 | 9 | 16 | 23 [1] | 20 | 19 | 27 | 36 |
| Pulp, paper, paper prod., printing & publishing | (21-22) | 15 | 16 | 33 | 36 | 45 | 51 | 23 | 23 | 27 | 41 [1] | 28 | 31 | 9 | 10 | 17 | 21 [1] | 16 | 21 | 32 | 25 |
| Manufacturing nec; recycling | (36-37) | 28 | 36 | 38 | 60 | 119 | 189 | 39 | 48 | 27 | 38 [1] | 38 | 46 | 30 | 36 | 27 | 35 [1] | 30 | 40 | 29 | 36 |

1. For comparison: intensity of the previous year.

2. 2000 instead of 2002.

3. EU includes the 15 EU Members before 1 May 2004 excluding Belgium, Greece, Luxembourg, Netherlands.

4. OECD includes previous EU countries and Australia, Canada, Japan, Norway and the United States.

*Source:* OECD, STAN Indicators 2004.

StatLink: http://dx.doi.org/10.1787/707487145841

**Table 34. Import penetration by industry and technology level, 1992-2002 (cont'd)**

Imports as a percentage of domestic demand

| | (ISIC Rev.3) | Hungary | | Iceland | | Ireland | | Italy | | Korea | | Mexico | | Netherlands | | New Zealand | | Norway | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1992 | 2001 | 1992 | 2000 | 1992 | 1999 | 1992 | 2001 | 1994 | 2001 | 1992 | 2001 | 1992 | 2002 | 1992 | 1998 | 1992 | 2002 |
| **Total manufacturing** | **(15-37)** | **38** | **63** | **55** | **63** | **64** | **76** | **21** | **31** | **21** | **24** | **25** | **45** | **63** | **80** | **38** | **43** | **44** | **47** |
| **High technology manufactures** | | **-** | **94** | **-** | **81** [1] | **147** | **140** | **40** | **63** | **33** | **-** | **-** | **84** | **93** | **211** [1] | **-** | **-** | **84** | **177** [1] |
| Pharmaceuticals | (2423) | - | 55 | - | 62 [1] | -125 | -139 | 20 | 49 | 7 | 11 | 17 | 23 | 62 | 101 [1] | - | - | 70 | 84 [1] |
| Office, accounting and computing machinery | (30) | 88 | 110 | - | 100 [1] | 112 | 111 | 83 | 93 | 51 | 32 | 91 | 192 | 296 | - | - | - | 114 | 693 [1] |
| Radio, television and communication equipment | (32) | 78 | 98 | - | 97 [1] | 102 | 135 | 41 | 61 | 27 | 48 | 77 | 72 | 52 | 90 [1] | - | - | 77 | 90 [1] |
| Medical, precision and optical instruments | (33) | 47 | 94 | - | 80 [1] | 91 | 87 | 43 | 61 | 63 | 43 | - | - | - | - [1] | - | - | 75 | - [1] |
| Aircraft and spacecraft | (353) | 200 | 32 | - | 66 [1] | 184 | 152 | 46 | 74 | 99 | - | - | 205 | - | 82 [1] | - | - | 80 | 79 [1] |
| **Medium-high technology manufactures** | | **-** | **77** | **-** | **82** [1] | **78** | **98** | **32** | **45** | **28** | **-** | **37** | **69** | **83** | **94** [1] | **-** | **-** | **-** | **96** [1] |
| Chemicals excluding pharmaceuticals | (24ex2423) | - | 80 | - | 64 [1] | 69 | 104 | 36 | 48 | 33 | 35 | 32 | 52 | 70 | 85 [1] | - | - | - | 95 [1] |
| Machinery and equipment, nec | (29) | 54 | 91 | - | 82 | 98 | 98 | 23 | 38 | 48 | 45 | 72 | 96 | 85 | 72 | - | - | 64 | 76 [1] |
| Electrical machinery and apparatus, nec | (31) | 69 | 51 | - | 82 [1] | 77 | 116 | 16 | 27 | 32 | 54 | 87 | 192 | 102 | 148 [1] | - | - | 50 | 128 [1] |
| Motor vehicles, trailers and semi-trailers | (34) | 80 | 92 | - | 98 [1] | 90 | 98 | 52 | 62 | 6 | 6 | 10 | 45 | 99 | 114 [1] | - | - | 99 | 110 [1] |
| Railroad equip. and transport equip. nec | (352+359) | 51 | 74 | - | 84 [1] | 11 | 13 | 25 | 41 | 10 | - | - | 56 | - | 123 [1] | - | - | 37 | 123 [1] |
| **Medium-low technology manufactures** | | **25** | **46** | **-** | **60** [1] | **71** | **63** | **16** | **20** | **15** | **-** | **24** | **37** | **52** | **53** [1] | **-** | **-** | **-** | **53** [1] |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 11 | 19 | - | - [1] | 121 | 121 | 18 | 16 | 17 | 14 | 18 | 11 | 47 | 63 | - | - | - | 61 [1] |
| Rubber and plastics prod. | (25) | 36 | 59 | 49 | 53 | 76 | 66 | 16 | 22 | 8 | 12 | 42 | 60 | 80 | 80 | - | - | 60 | 81 [1] |
| Other non-metallic mineral prod. | (26) | 21 | 36 | 21 | 20 | 36 | 34 | 7 | 9 | 6 | 11 | 7 | 13 | 39 | 27 | 20 | 21 | 25 | 33 [1] |
| Basic metals | (27) | 48 | 65 | 89 | 94 [1] | 96 | 97 | 36 | 44 | 20 | 21 | 27 | 40 | 94 | 104 | 69 | 80 | 70 | 68 |
| Fabricated metal prod., except mach.&equip. | (28) | 24 | 45 | 47 | 41 [1] | 60 | 50 | 5 | 7 | 10 | 10 | 32 | 54 | 34 | 26 | 19 | 18 | 42 | 29 [1] |
| Building and repairing of ships and boats | (351) | 21 | 55 | - | 99 [1] | 65 | 62 | 11 | 34 | 22 | - | - | 42 | - | 14 [1] | - | - | 37 | 19 |
| **Low technology manufactures** | | **27** | **37** | **37** | **42** | **37** | **32** | **14** | **21** | **13** | **18** | **12** | **18** | **46** | **47** | **-** | **-** | **24** | **27** |
| Food prod., beverages and tobacco | (15-16) | 9 | 13 | 24 | 33 | 23 | 24 | 15 | 20 | 9 | 12 | 7 | 8 | 34 | 40 | 11 | 15 | 10 | 14 |
| Textiles, textile prod., leather and footwear | (17-19) | 118 | 75 | 71 | 75 | 90 | 94 | 14 | 27 | 18 | 32 | 18 | 42 | 112 | 138 | 52 | 60 | 79 | 85 |
| Wood and prod. of wood and cork | (20) | 20 | 41 | 61 | 54 | 47 | 42 | 15 | 17 | 27 | 28 | 9 | 11 | 58 | 47 | 6 | 7 | 20 | 24 |
| Pulp, paper, paper prod., printing & publishing | (21-22) | 25 | 36 | 30 | 30 | 45 | 24 | 11 | 16 | 11 | 14 | 21 | 31 | 33 | 31 | 20 | 23 | 21 | 22 |
| Manufacturing nec; recycling | (36-37) | 40 | 346 | 45 | 56 | 32 | 41 | 11 | 18 | 15 | 29 | 25 | 39 | 45 | 39 | 30 | 34 | 48 | 52 |

1. For comparison: intensity of the previous year.

2. 2000 instead of 2002.

3. EU includes the 15 EU Members before 1 May 2004 excluding Belgium, Greece, Luxembourg, Netherlands.

4. OECD includes previous EU countries and Australia, Canada, Japan, Norway and the United States.

*Source:* OECD, STAN Indicators 2004.

**Table 34. Import penetration by industry and technology level, 1992-2002 (cont'd)**

Imports as a percentage of domestic demand

| | (ISIC Rev.3) | Poland | | Portugal | | Spain | | Slovak Rep. | | Sweden | | Switzerland | | United Kingdom | | United States | | EU[3] | | OECD[4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1992 | 2001 | 1992 | 1999 | 1992 | 2001 | 1997 | 1999 | 1992 | 2001 | 1997 | 2000 | 1992 | 2001 | 1992 | 2001 | 1992 | 1999 | 1992 | 1999 |
| **Total manufacturing** | **(15-37)** | **21** | **38** | **38** | **47** | **25** | **35** | **55** | **63** | **37** | **45** | **53** | **65** | **34** | **48** | **15** | **23** | **30** | **37** | **20** | **26** |
| **High technology manufactures** | | **-** | **70** [1] | **69** | **74** [1] | **51** | **68** | **-** | **-** | **65** | **62** | **-** | **-** | **57** | **100** | **23** | **36** | **52** | **71** | **31** | **43** |
| Pharmaceuticals | (2423) | - | 65 [1] | 36 | 53 [1] | 19 | 46 | - | - | 48 | 57 | - | - | 29 | 72 | 8 | 19 | 28 | 48 | 17 | 27 |
| Office, accounting and computing machinery | (30) | 88 | 83 [1] | 104 | 108 [1] | 76 | 74 | 97 | 157 | 98 | 109 | 139 | 142 | 75 | 101 | 51 | 68 | 74 | 103 | 50 | 65 |
| Radio, television and communication equipment | (32) | 50 | 74 [1] | 66 | 64 [1] | 58 | 80 | 89 | 117 | 58 | 45 | 57 | 69 | 59 | 126 | 32 | 42 | 53 | 73 | 29 | 38 |
| Medical, precision and optical instruments | (33) | 50 | 49 [1] | 89 | 87 [1] | 58 | 71 | 59 | 64 | 64 | 70 | 49 | 71 | 50 | 64 | 12 | 23 | 44 | 55 | 27 | 38 |
| Aircraft and spacecraft | (353) | - | 93 [1] | - | - [1] | 114 | 90 | - | - | 50 | 103 | - | - | 60 | 124 | 14 | 30 | 69 | 74 | 36 | 49 |
| **Medium-high technology manufactures** | | **-** | **59** [1] | **66** | **73** [1] | **43** | **55** | **-** | **-** | **46** | **52** | **-** | **-** | **47** | **58** | **21** | **31** | **38** | **46** | **-** | **-** |
| Chemicals excluding pharmaceuticals | (24ex2423) | - | 55 [1] | 47 | 59 [1] | 37 | 47 | - | - | 55 | 73 | - | - | 43 | 58 | 11 | 20 | 41 | 51 | - | - |
| Machinery and equipment, nec | (29) | 44 | 63 [1] | 70 | 69 [1] | 52 | 56 | 71 | 87 | 45 | 54 | 50 | 68 | 49 | 56 | 19 | 26 | 36 | 44 | 24 | 31 |
| Electrical machinery and apparatus, nec | (31) | 28 | 56 [1] | 60 | 80 [1] | 33 | 41 | 70 | 83 | 54 | 66 | 35 | 43 | 39 | 53 | 27 | 47 | 25 | 38 | 21 | 34 |
| Motor vehicles, trailers and semi-trailers | (34) | 35 | 61 [1] | 83 | 87 [1] | 45 | 66 | 110 | 105 | 41 | 40 | 101 | 103 | 52 | 62 | 29 | 36 | 43 | 48 | 29 | 34 |
| Railroad equip. and transport equip. nec | (352+359) | - | 39 [1] | 65 | 40 [1] | 36 | 42 | - | - | 23 | 27 | - | - | 31 | 41 | 17 | 21 | 36 | 43 | 28 | 32 |
| **Medium-low technology manufactures** | | **-** | **28** [1] | **29** | **34** [1] | **17** | **22** | **-** | **-** | **37** | **39** | **-** | **-** | **24** | **26** | **9** | **13** | **22** | **24** | **-** | **-** |
| Coke, refined petroleum prod. and nuclear fuel | (23) | 11 | 14 [1] | 30 | 26 [1] | 23 | 23 | 18 | 26 | 50 | 42 | 109 | 113 | 18 | 26 | 9 | 13 | 24 | 22 | - | - |
| Rubber and plastics prod. | (25) | 24 | 37 [1] | 35 | 47 [1] | 22 | 30 | 64 | 78 | 50 | 57 | 52 | 56 | 25 | 26 | 9 | 12 | 25 | 29 | 18 | 20 |
| Other non-metallic mineral prod. | (26) | 11 | 19 [1] | 10 | 13 [1] | 8 | 10 | 31 | 33 | 27 | 30 | 34 | 40 | 18 | 19 | 9 | 14 | 14 | 15 | 10 | 13 |
| Basic metals | (27) | 16 | 43 [1] | 63 | 76 [1] | 27 | 36 | 39 | 35 | 42 | 53 | 95 | 155 | 43 | 50 | 14 | 22 | 39 | 43 | 20 | 24 |
| Fabricated metal prod., except mach.&equip. | (28) | 16 | 33 [1] | 24 | 31 [1] | 13 | 14 | 36 | 48 | 22 | 22 | 22 | 26 | 14 | 18 | 6 | 9 | 12 | 14 | 9 | 11 |
| Building and repairing of ships and boats | (351) | - | 19 [1] | 17 | 10 [1] | 18 | 26 | - | - | 69 | 24 | - | - | 13 | 8 | 2 | 6 | 17 | 20 | 12 | 15 |
| **Low technology manufactures** | | **11** | **21** [1] | **22** | **27** [1] | **14** | **21** | **36** | **44** | **23** | **30** | **-** | **-** | **25** | **30** | **11** | **16** | **22** | **26** | **15** | **19** |
| Food prod., beverages and tobacco | (15-16) | 8 | 9 [1] | 16 | 22 [1] | 10 | 17 | 22 | 23 | 14 | 25 | 18 | 19 | 19 | 22 | 5 | 6 | 16 | 19 | 11 | 13 |
| Textiles, textile prod., leather and footwear | (17-19) | 12 | 59 [1] | 31 | 36 [1] | 22 | 39 | 96 | 128 | 84 | 103 | 86 | 90 | 45 | 67 | 27 | 44 | 39 | 50 | 31 | 42 |
| Wood and prod. of wood and cork | (20) | 4 | 12 [1] | 11 | 16 [1] | 14 | 19 | 20 | 31 | 9 | 15 | 17 | 19 | 29 | 31 | 8 | 13 | 19 | 21 | 14 | 17 |
| Pulp, paper, paper prod., printing & publishing | (21-22) | 22 | 26 [2] | 19 | 23 [2] | 14 | 17 | 35 | 43 | 13 | 16 | 31 | 37 | 18 | 18 | 4 | 6 | 16 | 18 | 9 | 10 |
| Manufacturing nec; recycling | (36-37) | 17 | 29 [1] | 30 | 29 [1] | 18 | 22 | 39 | 51 | 39 | 41 | 91 | 96 | 37 | 39 | 27 | 39 | 26 | 31 | 19 | 26 |

1. For comparison: intensity of the previous year.

2. 2000 instead of 2002.

3. EU includes the 15 EU Members before 1 May 2004 excluding Belgium, Greece, Luxembourg, Netherlands.

4. OECD includes previous EU countries and Australia, Canada, Japan, Norway and the United States.

*Source:* OECD, STAN Indicators 2004.

**Table 35. Outward and inward foreign direct investment flows, 1990-2001**

Billion USD

| | Outward flows | | | | | | Inward flows | | | | | | Cumulative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | net outflow |
| Australia | 2 | 2 | 5 | 2 | 1 | 6 | 6 | 5 | 6 | 7 | 7 | 6 | - 39 |
| Austria | 2 | 1 | 3 | 3 | 6 | 3 | - | - | - | 3 | 9 | 6 | 10 |
| Belgium-Luxembourg | 6 | 12 | 28 | 133 | 218 | 86 | 8 | 11 | 23 | 149 | 226 | 77 | - 38 |
| Canada | 5 | 11 | 34 | 16 | 48 | 35 | 8 | 9 | 23 | 24 | 67 | 27 | 10 |
| Czech Republic | - | 0 | 0 | 0 | 0 | 0 | - | 3 | 4 | 6 | 5 | 5 | - 26 |
| Denmark | 2 | 3 | 4 | 13 | 24 | 9 | 1 | 4 | 6 | 11 | 32 | 7 | - 4 |
| Finland | 3 | 1 | 19 | 7 | 24 | 8 | 1 | 1 | 12 | 5 | 9 | 3 | 40 |
| France | 36 | 16 | 43 | 127 | 176 | 83 | 16 | 24 | 29 | 47 | 43 | 53 | 326 |
| Germany[1] | 24 | 39 | 89 | 110 | 50 | 43 | 2 | 14 | 25 | 55 | 195 | 32 | 171 |
| Greece | - | - | - | - | - | 1 | 2 | - | - | - | - | 2 | - 7 |
| Hungary | - | - | - | 0 | 1 | 0 | - | - | - | 2 | 2 | 2 | - 5 |
| Iceland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ireland | - | - | 4 | 5 | 5 | 6 | 0 | 0 | 9 | 19 | 26 | 16 | - 53 |
| Italy | 7 | 6 | 12 | 7 | 12 | 21 | 6 | 5 | 3 | 7 | 13 | 15 | 40 |
| Japan | 57 | 53 | 40 | 65 | 50 | 33 | 3 | 4 | 10 | 21 | 29 | 18 | 441 |
| Korea | 1 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 5 | 11 | 10 | 3 | - 13 |
| Mexico | - | - | - | - | - | - | 3 | 10 | 12 | 12 | 15 | 24 | - 132 |
| Netherlands | 13 | 19 | 39 | 41 | 72 | 40 | 9 | 11 | 38 | 32 | 54 | 51 | 92 |
| New Zealand | 2 | 2 | 0 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 3 | - 19 |
| Norway | 1 | 3 | 3 | 6 | 8 | 2 | 1 | 2 | 4 | 8 | 6 | 3 | 3 |
| Poland | - | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 7 | 9 | 6 | - 46 |
| Portugal | 0 | 1 | 4 | 3 | 8 | 8 | 2 | 1 | 3 | 1 | 6 | 6 | - 3 |
| Slovak Republic | - | - | - | - | 0 | 0 | - | - | - | - | 2 | 1 | - 4 |
| Spain | 3 | 4 | 19 | 42 | 55 | 28 | 14 | 6 | 12 | 16 | 38 | 22 | 18 |
| Sweden | 15 | 11 | 24 | 22 | 41 | - | 2 | 14 | 20 | 61 | 23 | 13 | - 20 |
| Switzerland | 7 | 12 | 19 | 33 | 43 | 11 | 5 | 2 | 9 | 12 | 19 | 8 | 119 |
| Turkey | - | - | - | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 3 | - 11 |
| United Kingdom | 18 | 44 | 122 | 201 | 254 | 39 | 30 | 20 | 71 | 88 | 117 | 53 | 372 |
| United States | 31 | 92 | 131 | 175 | 165 | 114 | 48 | 59 | 174 | 283 | 301 | 124 | - 201 |
| **Total OECD[2]** | **236** | **335** | **645** | **1 015** | **1 263** | **580** | **171** | **214** | **506** | **888** | **1 267** | **590** | **1 020** |
| **EU-25[2]** | **129** | **157** | **410** | **715** | **944** | **375** | **93** | **118** | **259** | **508** | **811** | **370** | **862** |
| **EU-15[2]** | **129** | **157** | **410** | **715** | **943** | **375** | **93** | **111** | **249** | **493** | **793** | **355** | **943** |

1. The statistics cover unified Germany as from 1990.

2. Excluding missing countries for respective years.

*Source:* OECD, FDI database, May 2004.

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