OECD SCIENCE, TECHNOLOGY AND INDUSTRY SCOREBOARD 2005

BRIEFING NOTE FOR THE UNITED STATES

Science, technology and innovation hold the key to stronger growth

Science, technology and innovation are key factors contributing to economic growth in both advanced and developing economies. A growing number of OECD countries are emphasising innovation and knowledge in their quest for stronger economic growth. This process is reinforced by rapid globalisation and the emergence of new international players outside the OECD area, notably China.

The 2005 ***OECD Science, Technology and Industry Scoreboard*** points to large cross-country differences in the extent to which OECD countries are able to apply science, technology and innovation to foster stronger growth performance. It also points to large differences in the extent to which countries are able to attract and benefit from global knowledge flows. OECD data show that the United States continues to be a strong performer in the knowledge-based economy, although it faces some challenges.

The United States remains central to knowledge creation in the OECD area …

OECD data show that the **United States** was the largest global spender on research and development (R&D) in 2003, spending 285 billion USD, or 42% of the OECD total. This is ahead of the European Union (211 billion USD, or 31% of the OECD total), Japan (114 billion USD, or 17% of the OECD total) and China (85 billion USD). The **United States** also has a high R&D intensity, of 2.6% of GDP in 2003, which is below Japan's (3.2%), but well ahead of the EU (2.0%) or China (1.3%). The **United States** has experienced a decline in R&D intensity from a peak of 2.73 of GDP in 2001 to 2.6 in 2003, which is mainly due to a decline in business spending on R&D since 2000.

The **United States** remains the largest private spender on R&D, however, spending 196 billion USD in 2003, or about 43% of the OECD total. Relative to business sector value added the intensity of business R&D in the United States has fallen from its peak of 2.9% in 2000, to 2.6% in 2003. This is below Japan, at 3.2%, but ahead of the European Union, at 1.7%.

The **United States** has the second highest government R&D budget as a percentage of GDP (around 1.2%), 57% of which is devoted to defence. The United Kingdom is second with almost one-third of its government R&D budget devoted to defence. Spain, France and Sweden were the only other OECD countries for which the share of defence R&D exceeded one-fifth. Three-quarters of the growth in the government R&D budget in the **United States** between 2001 and 2005 can be attributed to defence R&D.

In recent years, there has been higher growth in the public R&D budget in the **United States** (7% annually from 2000 to 2005) than in the EU (1.5% per annum since 1995) or Japan (6% from 1995-2003). The **United States**' civil budget for R&D amounts to less than 0.5% of GDP, which is below Japan, Germany (both 0.7% of GDP) and France (0.8% of GDP).

The **United States** maintains its leadership in terms of scientific output as measured by articles in scientific journals and accounts for around 30% of the world total. But when this is compared to population, the **United States** is closer to the OECD average, trailing countries such as Sweden and

Switzerland. Moreover, while scientific output has kept growing rapidly in Europe and Japan, the number of articles in scientific journals has stabilised in the **United States**.

The **US** contribution to global patenting is lower than its contribution to global R&D efforts. France, Germany, Japan, the United Kingdom and the **United States** accounted for 83.6% of all triadic patent families in 2001. The **United States** and the European Union (EU-25) each account for about 34% of worldwide triadic patents, while Japan accounts for less than 25% of all triadic patents.

The **United States** is an important partner in international co-operation in patenting. For most countries, **US** companies account for a large share of foreign ownership of patents; 21.9% of Canadian patents are owned by residents of the **United States** out of a total of 34.4% of foreign-owned patents in Canada.

… but only 16% of degrees in the United States are in science and engineering

Science and engineering (S&E) degrees represent 23% of total new degrees awarded in OECD countries, 27% in the European Union, 26% in Japan, but only 16% in the **United States.** These percentages have declined in many countries since 1998, raising concerns about the future availability of scientists and researchers.

In 2003, China had the second highest number of researchers in the world (862 000), behind the **United States** (1.3 million in 1999), but ahead of Japan (675 000) and Russia (487 000). Among the major OECD regions, Japan had the highest number of researchers relative to total employment (10.4 per thousand), followed by the **United States** (9.3) and the European Union (5.8).

The vast majority of OECD countries are net beneficiaries of highly skilled migration. Migration streams converge massively towards four main settlement destinations: the **United States** with over 7.8 millions highly skilled expatriates, the European Union (4.7 millions), Canada (2 millions) and Australia (1.4 million). Over half of these skilled migrants come from outside the OECD area.

Foreign students represent more than a third of doctoral enrolments in Switzerland and Belgium and more than a quarter in the United Kingdom and the **United States**. In absolute numbers, the **United States** attracts far more foreign doctoral students than other OECD countries, with around 79 000, followed by the United Kingdom with some 22 000.

The United States has among the highest uptake of ICT

The **United States** is among the OECD countries that has invested most in ICT. In 2003, the share of ICT investment in GDP was over 4% in Australia, Korea and the **United States**, but under 2% in France, Germany and Ireland. The **United States** was also among the countries that received the largest boost to GDP growth from ICT capital over 1995-2003, of 0.8 percentage points. Australia and Sweden were the only countries that experienced similar increases in economic growth from ICT capital.

E-mail is the most popular of the Internet's communication services, and is used by more than half the adult population in many OECD countries. More than 60% of adults in each of the Nordic countries use e-mail, as do between 56 and 60% of adults in Switzerland, Luxembourg, Japan and the **United States**.

Japan and the **United States** have good data on business-to-consumer e-commerce (B2C) sales. Japan shows increasing rates of growth, and **US** retail trade data reveal steady growth in retail e-commerce sales, with a nearly fourfold increase between the final quarter of 1999 and the first quarter of 2005.

There were close to 27 secure servers per 100 000 inhabitants across OECD countries in July 2004, up from 1.8 per 100 000 in July 1998. Countries with high levels were Iceland (86 per 100 000 inhabitants), the **United States** (68), Canada (48), New Zealand (41), Luxembourg and Australia (40).

In almost all OECD countries, households with children are more likely to have Internet access at home and men are more likely than women to use the Internet. However, significantly more women than men use the Internet in the **United States**. Adults in the Nordic countries are the highest users of online banking services, whereas adults in Japan and the **United States** are most likely to use the Internet for online shopping.

Foreign-controlled affiliates make an important contribution to the US economy

In 2002, the share of the turnover of foreign-controlled affiliates in total manufacturing turnover ranged from 75 % in Ireland to less than 3 % in Japan. In the **United States**, over 20% of manufacturing turnover was due to foreign-controlled affiliates, as was almost 13% of manufacturing employment.

In 2002, the share of the turnover of foreign affiliates in services ranged from almost 40% of total services turnover in Ireland to less than 1 % in Japan. In the **United States**, almost 8% of services turnover was due to foreign-controlled affiliates, as was almost 4 % of employment.

Foreign affiliates also account for almost 18% of manufacturing R&D in the **United States**, which is substantially above Japan (only 3.8%), but below Germany (25.6%), France (22.3%), the United Kingdom (31.5%) and Canada (37.9%).

Foreign affiliates made an important contribution to labour productivity growth in the **United States**, accounting for almost a quarter of manufacturing productivity growth over 1995-2001. In the Czech Republic and Sweden the bulk of productivity growth in manufacturing was due to foreign affiliates.

The United States is facing growing competition in manufacturing

The **United States** was among a limited number of OECD countries where services accounted for the bulk of labour productivity growth over 1995-2003. Knowledge-intensive services, such as telecommunications, finance, insurance and business services, now account for almost 25% of **US** value added, which is the third highest share in the OECD, with only Switzerland and Luxembourg having a larger share.

High-technology industries, such as pharmaceuticals, aircraft, ICT equipment and precision instruments, account for over 35% of **US** manufacturing exports. Only Ireland, Korea and Switzerland have a larger share of these industries in total exports. The **United States**, as well as Japan, have lost market share in the OECD area in these industries over the past decade, mainly to the benefit of Mexico, Ireland, Belgium and Korea.

The **United States** accounted for just over 25% of worldwide value added in manufacturing in 2002. China accounted for about 8%, making it the third-largest manufacturing economy in the world, ahead of Germany, but behind Japan and the **United States**.