

Snapshots 'Key Figures 2003/2004'

4. From 'European Paradox' to declining competitiveness?

'The ultimate limits to growth may lie not as much in our capacity to generate new ideas, so much as in our ability to process an abundance of potentially new seed ideas into usable forms' (Weitzman, 1998).

The 'European Paradox', as popularised by the first 'European Report on Science and Technology Indicators' (European Commission, 1994), refers to the fact that Europe plays a leading world role in terms of scientific excellence and the provision of highly-skilled human capital. But it largely fails to convert science-based findings and inventions into wealth-generating innovations. As Commissioner Busquin said, "Investing in research is important but is only one side of the coin. Excellent research needs to find its way into commercially valuable innovations". This year's Key Figures highlights a deterioration of Europe's scientific and technological performance compared to the US. The EU-15 is still lagging behind the US in terms of technological performance and does not seem to be catching up. Its world leadership in scientific performance appears to be deteriorating. The following figures confirm this:

- In terms of scientific publications, Europe's strong growth seems to have halted. Actual numbers are still rising, **but the EU-15 share of world publications is declining**, whereas the US is recovering. In the mid-1990s, the EU-15 took over from the US and became the largest producer of scientific literature in absolute terms as well as in world share (Figure II-1a). From 2001 to 2002, however, the situation deteriorated for the EU-15 in terms of share (-2.1%), and its total number of publications also fell. While the US suffered from diminishing publication numbers and shares during the late 1990s, it has managed to grow in both categories since 2000.
- Per capita, the **EU-15 generates fewer patents with a high economic value than the US and Japan¹** (see fig II.2c). **Moreover, the EU-15 is lagging behind the US in its share of patents in biotechnology and information and communications technology** (see table II-2b in publication).
- **Most of the Acceding countries are in a position of catching up** from relatively low levels of scientific and technological output. Although there are some noticeable encouraging tendencies in several Acceding countries, one can expect that with the enlargement of the Union, Europe's strength in scientific output will be reinforced but its technological performance will not follow the same rhythm, at least in the short term. In other words, in relation to its enlarged population, the EU-25's strong performance in science will contrast increasingly with its relative weaker development and commercialisation of technology.

The gap with the US in terms of scientific and technological performance appears to be reflected in Europe's competitiveness. Competitiveness can be measured in a number of different ways. What is generally agreed is that a shift is taking place in Europe's economy as a response to the transition to a knowledge-based economy. The importance of research, ability to transform new knowledge into the production of new

¹ These so-called 'Triadic patents' are patents that relate to inventions for which protection has been sought at the three major patent offices: the European Patent Office, the US Patents and Trademarks Office and the Japanese Patent Office. It is thought that such patents are likely to be associated with a higher expected commercial return, since it is costly to patent in three different patent systems.

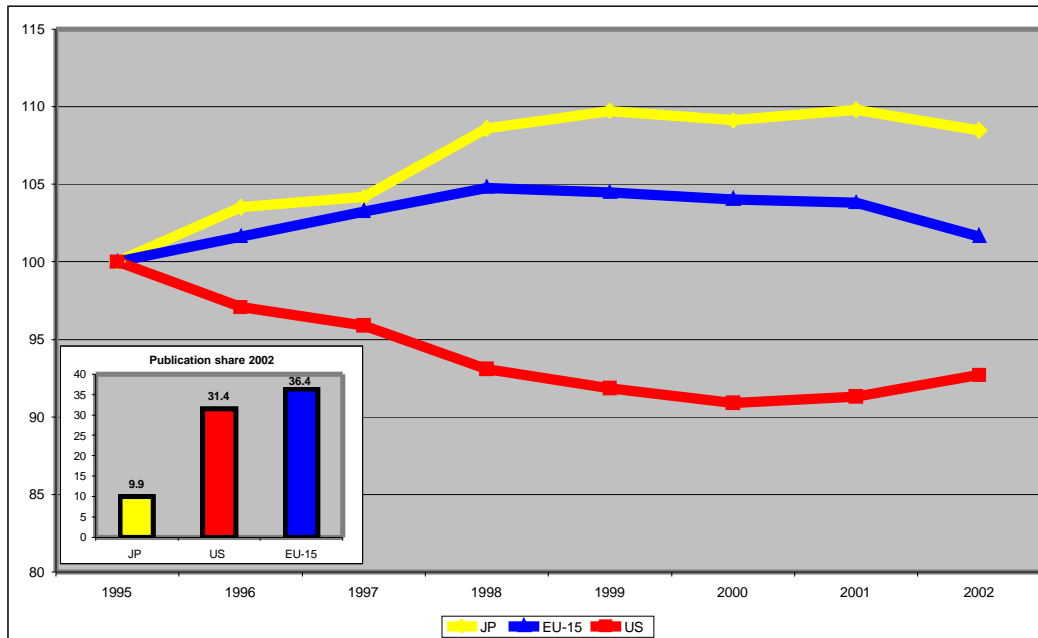
goods and services, and especially the ability to sell new products abroad is crucial for Europe's long term competitiveness.

The goods and services with above-average content of knowledge (i.e. the high-tech products and knowledge-intensive services) play an important role in the competitive position of any country. According to the recent report, *Employment in Europe 2003*, the **countries recording positive trends in indicators on high-technology and knowledge-intensive activities are also by and large the countries that have recently experienced the fastest growth in overall employment levels** (e.g. Ireland, Sweden, Finland) (European Commission, 2003c). This confirms **that even high labour cost countries are able to compete in the increasingly globalised economy as long as they maintain and increase the high content of knowledge, high qualification levels and expertise in the labour force in all segments of industry.**

The share of so-called 'knowledge workers' in a country's total employment and its ability to produce high-tech products and sell them on international markets thus constitute important indications of international economic success. The relationship between high-tech, knowledge-intensive activities and competitiveness is in no way straightforward and should not be interpreted in a mechanistic way. However, the ability to capture new market opportunities seems dependent on an interaction between a number of important factors, many of which being linked to the capacity to produce as well as to absorb new knowledge. This holds true equally for the individual level (development of new skills and ideas) and for the company level (development of new and better products, competencies and increased competitiveness).

- Share of high-tech exports in the overall export of a country is clear evidence for of its capacity to compete internationally, although one should bear in mind the limits of this indicator related to the diverse economic structures of individual countries, the size of economies and different degrees of their openness. An important finding, nonetheless, is that Europe's share in high-tech international trade (not taking into account intra-European trade) is substantially inferior to that of the US and Japan. On the other hand, the recent growth rates of high-tech exports have been higher in the EU-15 than in either the US or Japan which both recorded negative growth.
- The high-tech manufacturing and knowledge intensive services are not an exclusive domain of the most advanced European economies. **The relative weight of the high-tech manufacturing sector is quite high in several Accession countries**, with GDP levels well below the EU-15 average and strong high-tech export growth. Here also the data should be interpreted with caution given the fact that even high-tech manufacturing sectors do not necessarily involve only knowledge-intensive jobs (and vice versa). On the other hand, the indicator clearly suggests that important structural changes have been under way in a number of Accession countries, especially those of Central Europe.

Figure II-1a The growth of share of world publications by the EU-15, US and Japan, 1995-2002 and publication share (%), 2002 (1995=100)

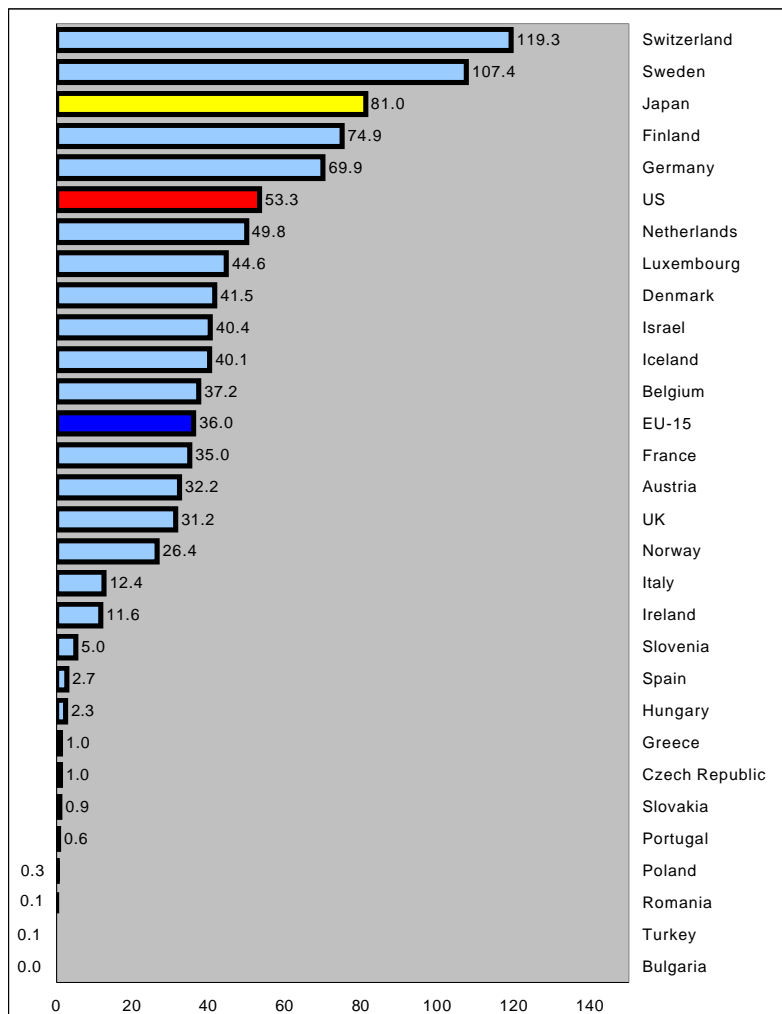


Source: DG Research

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Data: ISI, CWTS (treatments)

Figure II-2c Triadic patents (1) per million population, 1998

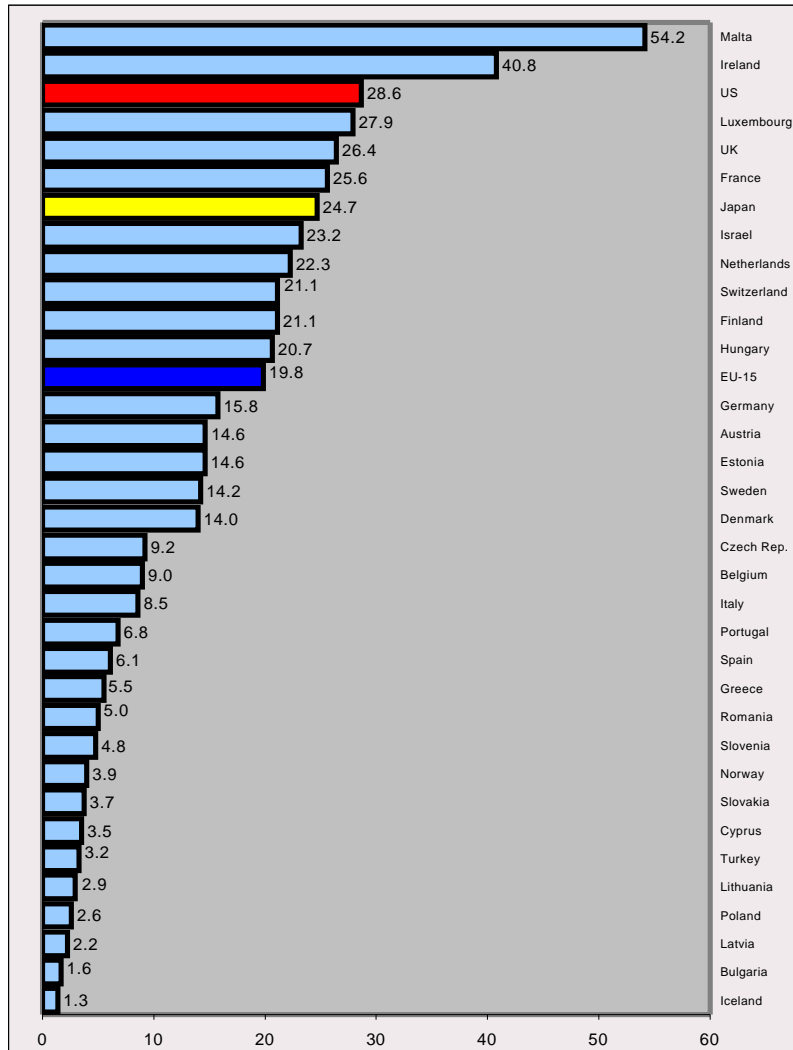


Source: DG Research

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Data: OECD, Eurostat

Figure II-3a High-tech exports as a % of total exports, 2001



Source: DG Research

Data: Eurostat (Comext), UN (Comtrade)

Note : EU-15 value excludes intra-EU-15 exports.

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