

## JAPAN

On many indicators, Japan is at the forefront of world science, and is among the leading OECD countries on measures such as R&D intensity and business R&D. However, R&D outputs have not always appeared commensurate with the substantial investment in R&D. In particular, labour productivity growth has remained close to the OECD average for the past decade, and is the main factor behind the gap in GDP per capita with the leading OECD countries. Strengthening the efficiency of the innovation system will be essential to increasing growth.

In 2006, Japan's R&D intensity was the third highest in the OECD area, at 3.39% of GDP, and accounted for 17% of total (provisional) OECD area R&D expenditure. The high ranking is mainly due to the business sector, which funded and performed 77% of R&D. Japan had the fourth largest number of researchers relative to total employment in 2006, with 11 researchers per 1 000 total employment, compared to an OECD average of 7.3.

Outputs from the investment in R&D exhibit a range of strengths and weaknesses. High- and medium-high-technology exports are very strong, accounting for over 80% of Japan's exports of manufactured goods and primary products. Japan has the largest number of triadic patent families per million population in the OECD area and is the world's second largest producer of scientific articles, in absolute terms. However, production of scientific articles on a per capita basis is below the OECD average and well behind that of the leaders, and the level of citations is relatively low. Few firms have introduced new-to-market innovations, with just 26% of large firms and 11% of small

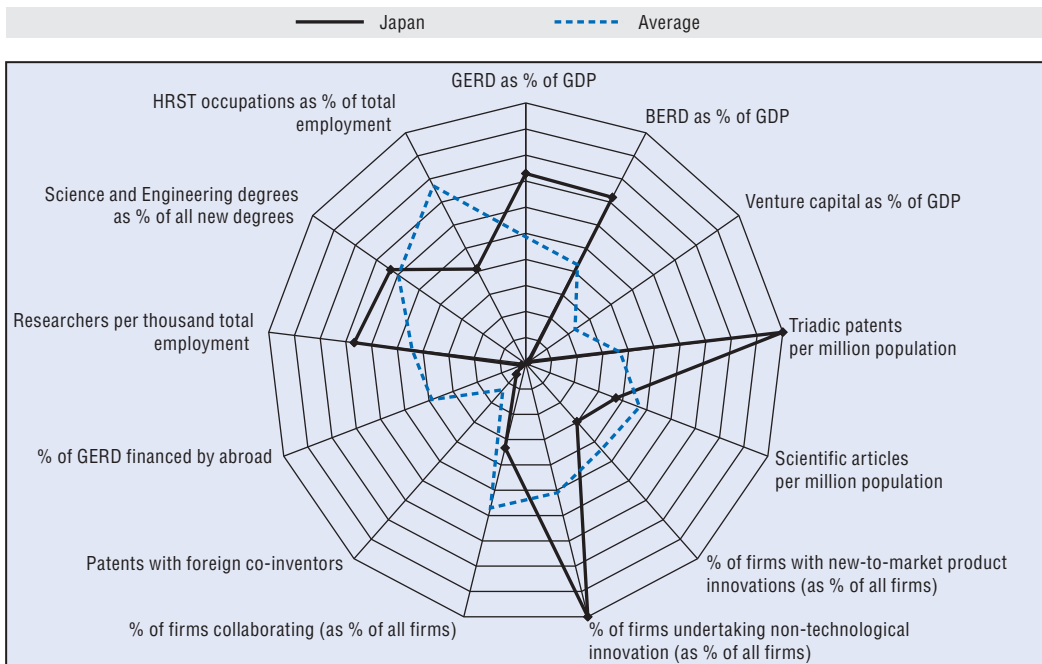
and medium-sized firms (SMEs) doing so between 2002 and 2004. However, more than 80% of Japan's large firms (and almost 60% of SMEs) introduced non-technological innovations in that period.

A number of structural features may explain the lower than expected returns on R&D investment. Knowledge flows are hindered by relatively weak ties between the business sector and research organisations in the public sector, and by low levels of openness to international trade and investment and of international R&D linkages. Venture capital investment is also low and regulations in the services sector inhibit innovative activity.

Japan's science and technology policies are set out in the Third Basic Plan (2006-10) and are informed by the Innovation 25 long-term strategic guidelines which aim to address challenges such as population ageing and climate change. Investment in human resources is a strategic priority for 2008. Policy initiatives include the Global COE Program, which provides funding support for establishing world-class education and research centres in university graduate schools and related research institutes, and the World Premier International Research Centre Initiative, which aims to create "globally visible research centres" that attract top-level researchers from around the world.

The main policy challenge is to support innovative activities through continuing framework reforms. Improvements in public-private and international linkages and reduction of regulatory barriers to innovation will be particularly important.

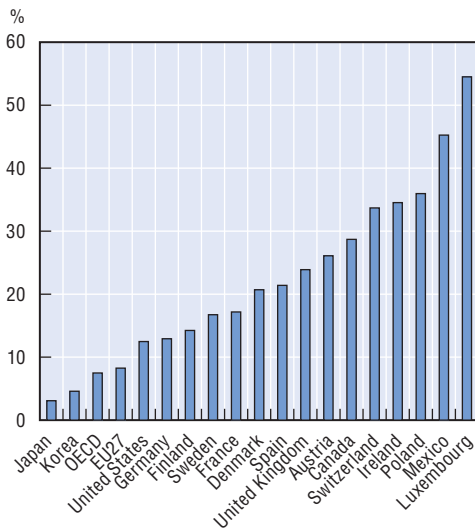
### Science and innovation profile of Japan



StatLink <http://dx.doi.org/10.1787/453145503770>

### Patents with foreign co-inventors

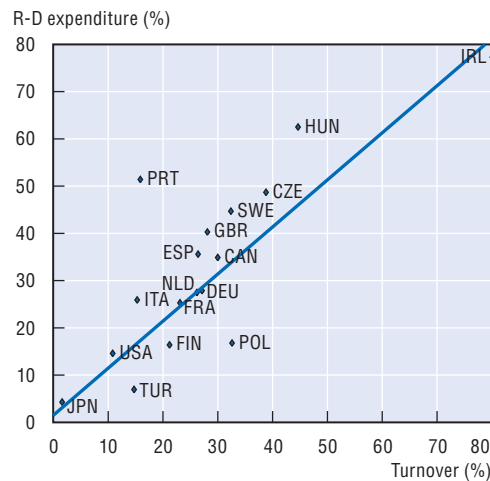
Share of patent applications to the European Patent Office, 2002-04



StatLink <http://dx.doi.org/10.1787/453166377586>

### Share of R&D expenditure and turnover of affiliates under foreign control in total R&D and turnover

2004



StatLink <http://dx.doi.org/10.1787/453226530511>