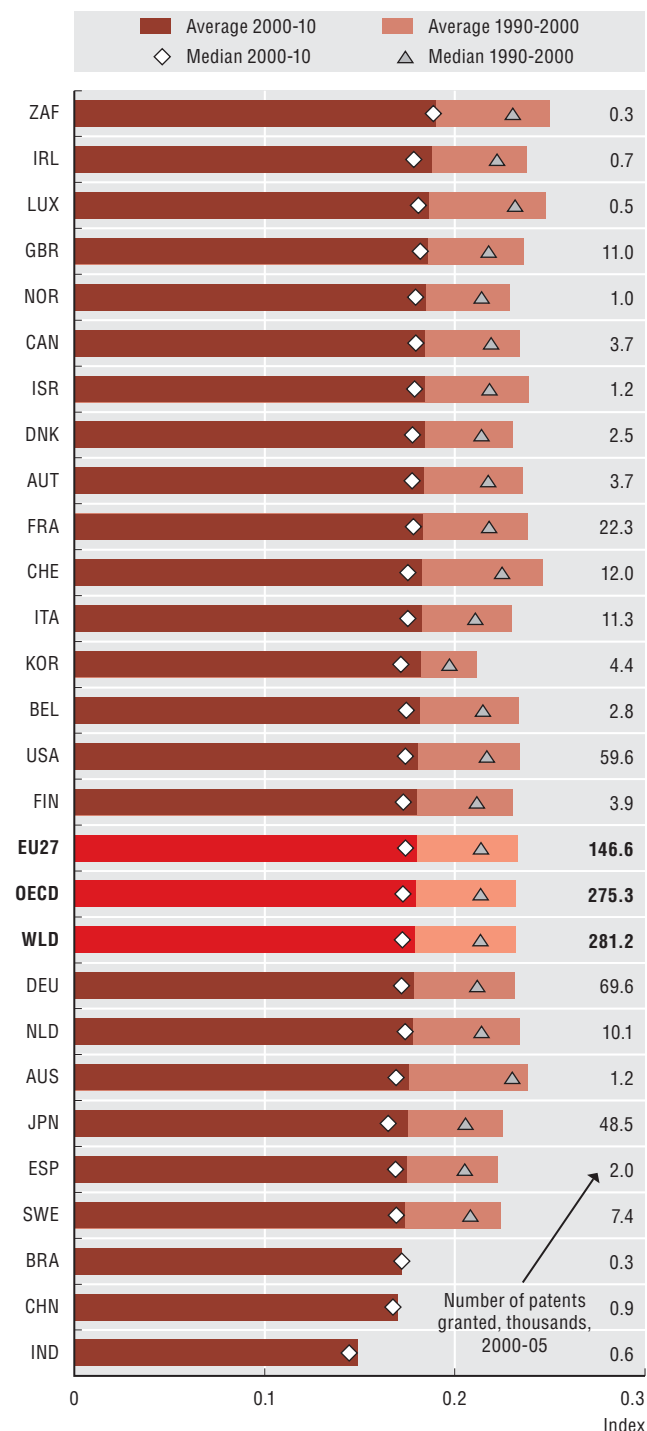


13. Technology performance: quality

Patent quality index by country, 1990-2000 and 2000-10

Composite index based on patents granted by the EPO



Source: OECD, calculations based on the Worldwide Patent Statistical Database, EPO, April 2011. See chapter notes.

StatLink <http://dx.doi.org/10.1787/888932488198>

Patent quality indicators try to capture both the technological and the economic value of innovations, and are typically based on patent citations, claims, patent renewals and patent family size. They are considered meaningful measures of research productivity and are found to be correlated with the social and private value of the patented inventions. The difference in average patent quality across firms is generally associated with the market evaluation of firms.

A new composite index suggests that patent quality has declined steadily in the last decade. It shows an average 20% decline between the two periods considered. Comparisons of the differences between median and mean values indicate reduced quality dispersion in recent years, i.e. there are in general smaller differences between patents of different quality levels. The difference in average patent quality between top and bottom ranking countries has also decreased over time, passing from 15% in the 1990s to about 9% in the 2000s. A selection effect – the tendency to file relatively high-quality patents abroad – may explain the higher average scores of some non-European countries for patents filed at the European Patent Office (EPO).

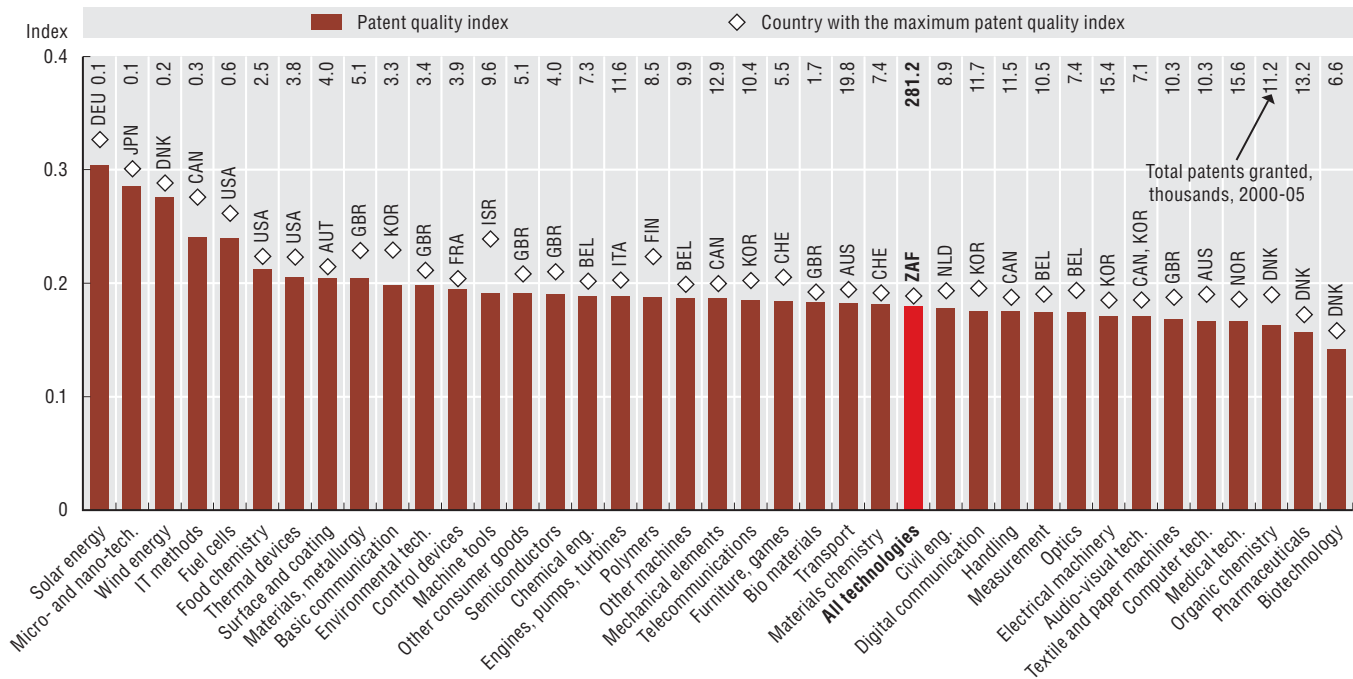
Renewable energy technologies, nanotechnologies and information technology methods exhibit the highest patent quality index during 2000-10, although statistics rely on small samples for these sectors. Differences between top performers and average sector quality levels may be indicative of competitive advantages. Sectors generally believed to be highly innovative and known to rely more on basic science, e.g. biotechnology and pharmaceuticals, show on average relatively lower patent quality.

Definitions

The patent quality index is a composite indicator based on six dimensions of patents' underlying quality: forward citations (number of citations a patent receives); backward citations (number of patents and scientific papers a patent cites); patent family size, i.e. the number of countries in which the patent is taken; number of claims; generality index, measuring the dispersion of citing patents over technology classes; and grant lag. The index does not use weights. All components are normalised and given equal importance. Data refer to EPO patents granted for which the application document was published during 1990-95 and 2000-05. Forward citations are counted up to five years after the publication date. This means considering citation lengths of 6.5 years, as publication normally occurs 18 months after the patent filing date. Self-citations are not controlled for. Technology fields are defined according to Schmoch's classification (WIPO, 2010) and rely on the International Patent Classification (IPC) codes contained in the patent document.

Patent quality index by technology field, 2000-10

Composite index based on patents granted by the EPO



Source: OECD, calculations based on the Worldwide Patent Statistical Database, EPO, April 2011. See chapter notes.

StatLink <http://dx.doi.org/10.1787/888932488217>**Measurability**

Patent cohorts are stratified by year and sector. All six components of the patent quality index are normalised on the basis of the cohort's maximum values. For each patent, the grant lag indicator is calculated as follows: $1 - [\Delta t / \max(\Delta t)]$, where Δt is the number of days between application and granting date; and $\max(\Delta t)$ is the maximum number of days it has taken any patent belonging to the same cohort to be granted. The patent quality indicator is bounded between 0 (not included) and 1 (maximum value). Zone aggregates are based on weighted averages over the periods considered. The patent quality indicator is an experimental index of the OECD and may be subject to further refinement. It builds on Lanjouw and Shankerman (2004) and incorporates the generality measure proposed by Hall and Trajtenberg (2004), and a measure accounting for the length of the examination process (Régibeau and Rockett, 2010). Using different data sources, e.g. US Patent and Trademark Office or Japan Patent Office, different methodologies or observation periods may affect patents' scores, countries' rank and sectors' positions.



From:

OECD Science, Technology and Industry Scoreboard 2011

Access the complete publication at:

http://dx.doi.org/10.1787/sti_scoreboard-2011-en

Technology performance: quality

Please cite this chapter as:

OECD (2011), "Technology performance: quality", in *OECD Science, Technology and Industry Scoreboard 2011*, OECD Publishing.
http://dx.doi.org/10.1787/sti_scoreboard-2011-67-en