DATA BRIEF

KEY BIOTECHNOLOGY & NANOTECHNOLOGY INDICATORS: A COMPARISON

(November 2013)

Biotechnology/nanotechnology active firms

1. Number of biotechnology/nanotechnology active firms
2. Percentage of dedicated biotechnology/nanotechnology active firms

Biotechnology/nanotechnology R&D

3. Biotechnology/nanotechnology R&D expenditures in the business sector
4. Biotechnology/nanotechnology R&D intensity

Public-sector biotechnology/nanotechnology R&D

5. Biotechnology/nanotechnology R&D expenditure in the government and higher education sectors
6. Biotechnology/nanotechnology R&D expenditure in the government and higher education sectors as a percentage of total government and higher education sectors R&D expenditures

Biotechnology/nanotechnology patents

7. Share of countries in biotechnology/nanotechnology patents filed under PCT
8. Revealed technological advantage in biotechnologies/nanotechnologies

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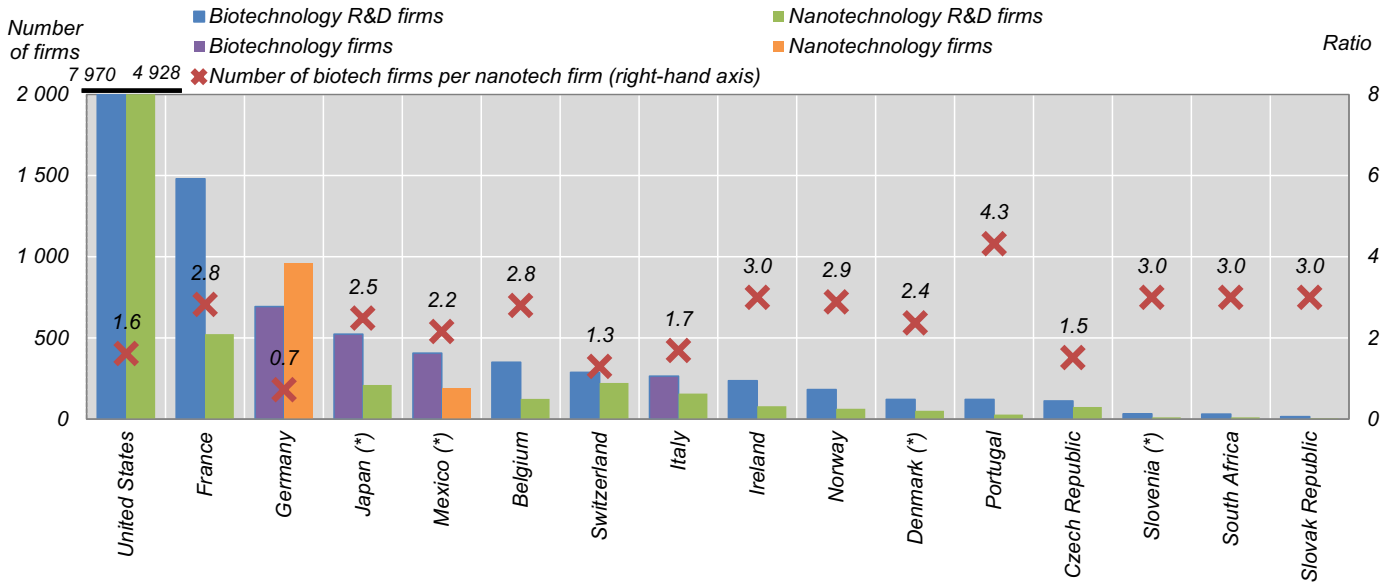
http://oe.cd/kbi and http://oe.cd/kni

The OECD has been collecting data on biotechnology since 2001. The *Key Biotechnology Indicators* have been published online annually since 2009.

In 2013, the OECD undertook a first data collection on nanotechnology R&D, the results of which were published in *Key Nanotechnology Indicators*. In a number of countries, firm data can be reported in multiple research areas. For this reason, there may be some overlap between biotechnology and nanotechnology firm and R&D data. As this is the first collection, international comparability may be limited and results should be interpreted with caution.

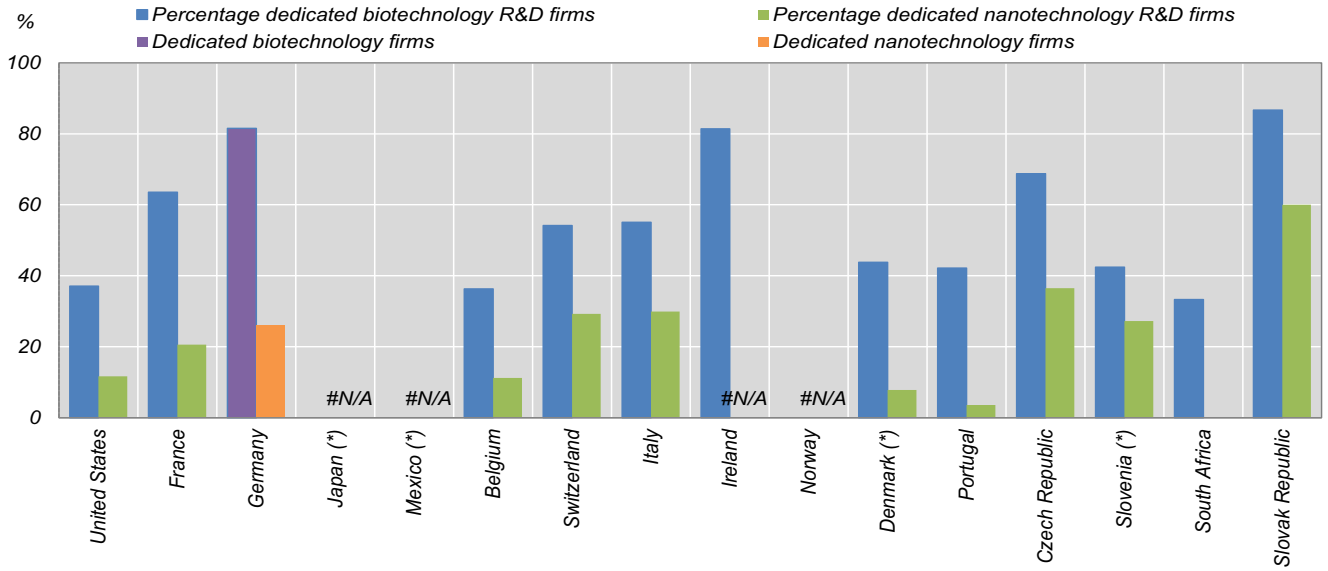
OECD

1. Number of biotechnology/nanotechnology active firms, 2011 or latest available year



(*) Notes at the end of this document.

2. Percentage of dedicated biotechnology/nanotechnology active firms, 2011 or latest available year



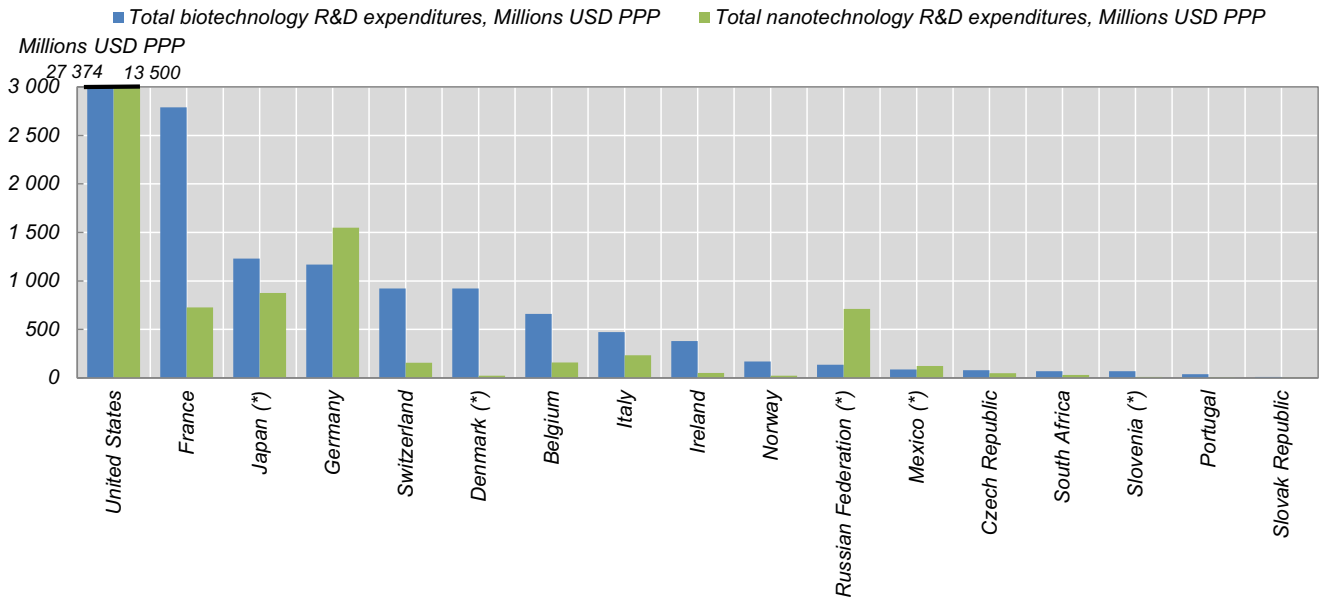
(*) Notes and methodology at the end of this document.

Source: OECD, Key Biotechnology Indicators, http://oe.cd/kbi, and Key Nanotechnology Indicators, http://oe.cd/kni, June 2013.

The United States has the largest number of biotechnology active firms (7 970 firms) and nanotechnology active firms (4 928 firms). France (1 359 firms) ranks second in terms of biotechnology firms but only third for nanotechnology. Germany ranks second for nanotechnology firms (960 firms). The ratio shows that Germany has more nanotechnology firms than biotechnology firms - the only country in this situation. All other countries have a larger number of biotechnology firms.

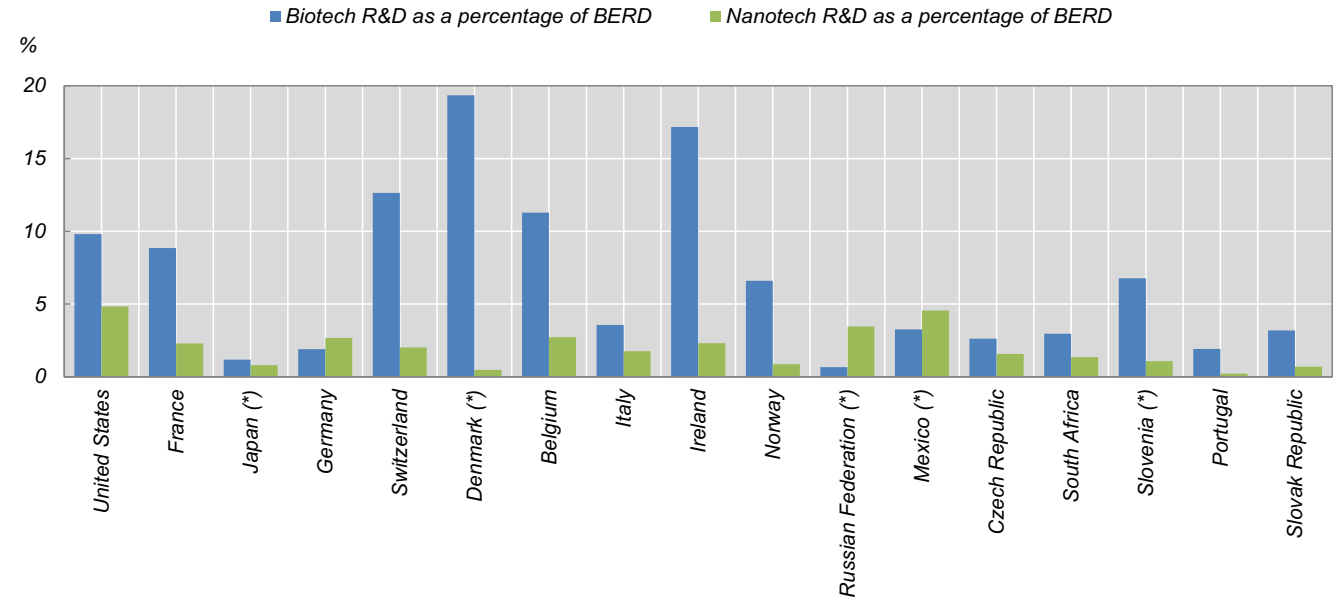
Dedicated firms devote at least 75% of their production of goods and services, or R&D, to biotechnology or nanotechnology. The share of dedicated firms out of all firms shows that biotechnology firms have a higher share than nanotechnology firms. This suggests that nanotechology firms have a more diversified R&D/production porfolio and are less focused on just nanotechnology.

3. Biotechnology/nanotechnology R&D expenditures in the business sector, 2011 or latest available year
Millions of USD PPP



(*) Notes and methodology at the end of this document.

4. Biotechnology/nanotechnology R&D intensity, 2011 or latest available year
As a percentage of Business Enterprise R&D (BERD)



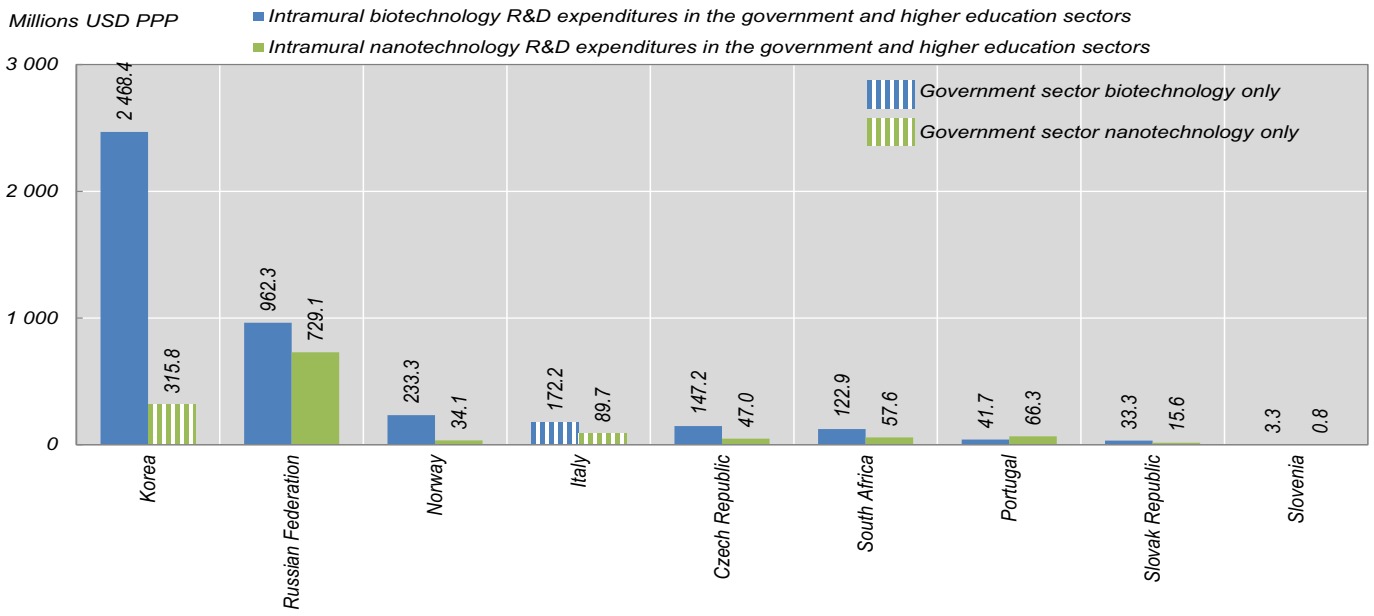
(*) Notes and methodology at the end of this document.

Source: OECD, Key Biotechnology Indicators, http://oe.cd/kbi, and Key Nanotechnology Indicators, http://oe.cd/kni, June 2013.

The United States spent USD 27 374 million PPP on biotechnology R&D and USD 13 500 million PPP on nanotechnology R&D. This accounts for 75% of the total biotechnology/nanotechnology R&D expenditures by firms in the countries where data are available. In most countries, biotechnology R&D expenditures exceed nanotechnology R&D expenditures. The exceptions are Germany, the Russian Federation and Mexico.

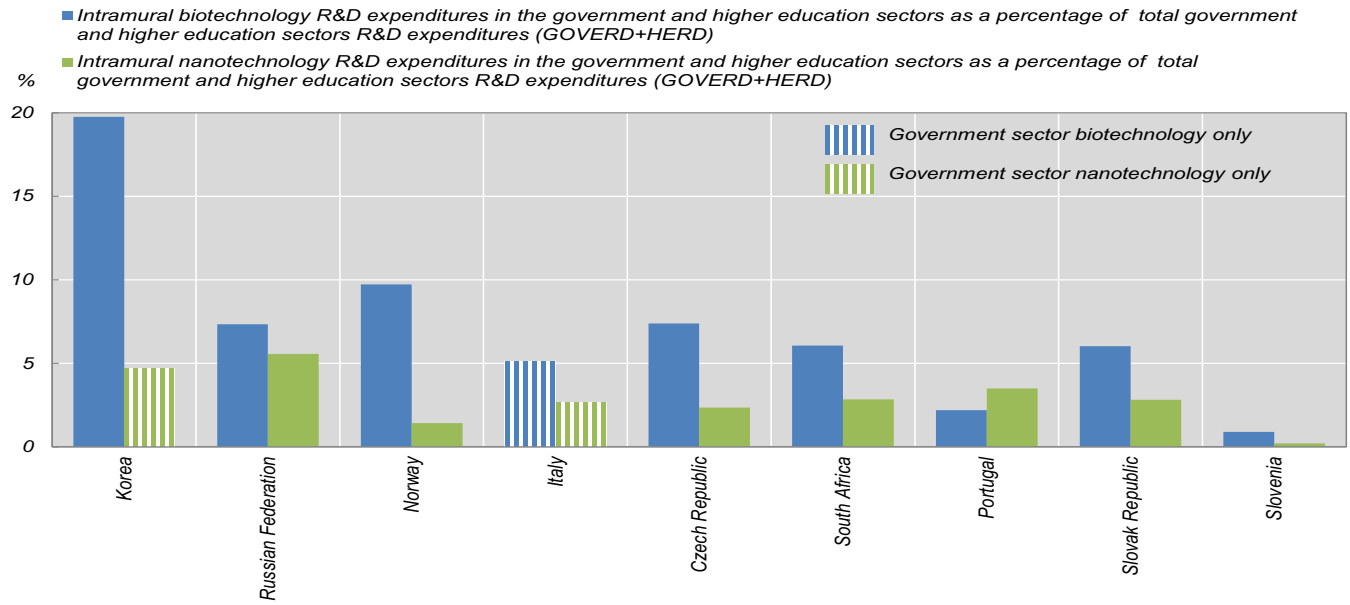
Biotechnology/nanotechology BERD as a share of total BERD is an indicator of country's research focus in the business sector. On average, biotechnology BERD was higher than nanotechnology BERD and accounted for 7% of total BERD, while nanotechnology BERD accounted for 2% of total BERD. Again Germany, the Russian Federation and Mexico are exceptions.

5. Biotechnology/nanotechnology R&D expenditure in the government and higher education sectors, 2011 or latest available year
Millions of USD PPP



(*) Notes and methodology at the end of this document.

6. Biotechnology/nanotechnology R&D expenditure in the government and higher education sectors, 2011 or latest available year
As a percentage of total government and higher education sectors R&D expenditures



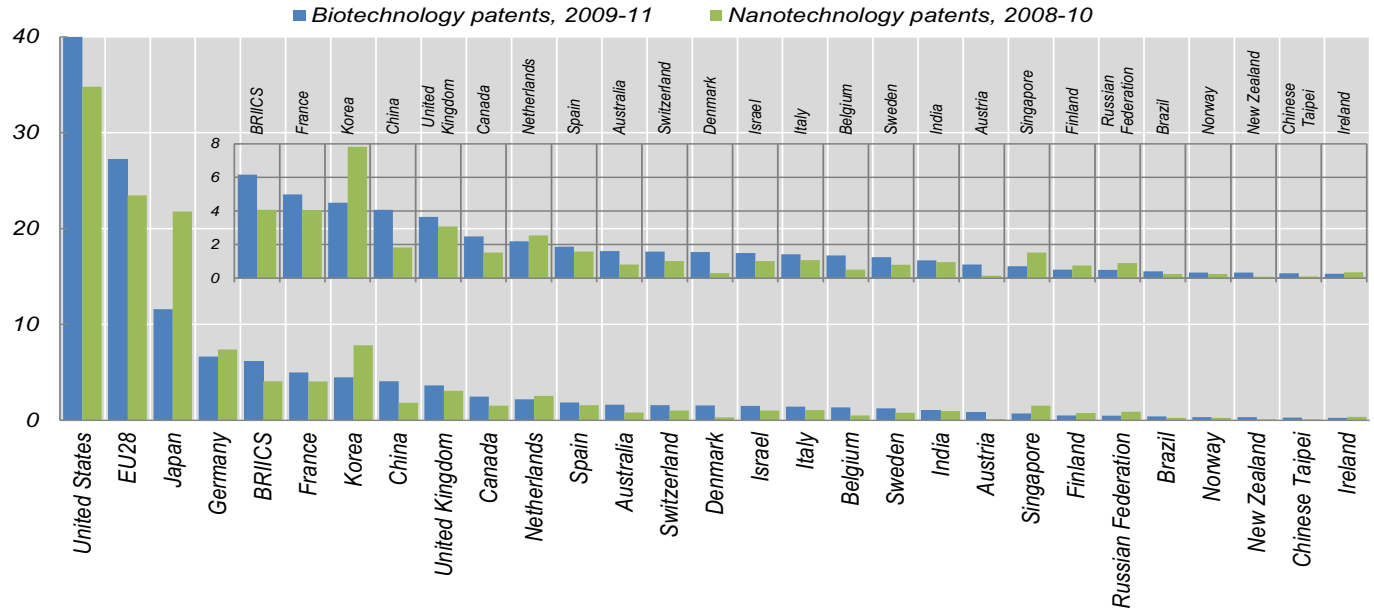
Government Expenditure on R&D (GOVERD), Higher Education Expenditure on R&D (HERD).

Source: OECD, Key Biotechnology Indicators, http://oe.cd/kbi, and Key Nanotechnology Indicators, http://oe.cd/kni, June 2013.

Public biotechnology/nanotechnology R&D has been defined as the sum of government and higher education biotechnology/ nanotechnology R&D. The highest level of public sector expenditures on biotechnology R&D is found in Korea, followed by the Russian Federation. For nanotechnology, the Russian Federation leads and Korea ranks second. For all countries combined, the total biotechnology R&D spent is about three times that of nanotechnology R&D.

The share of public biotechnology/nanotechology R&D in total public R&D spending provides an indicator of the importance governments place on biotechnology/nanotechnology R&D. The biotechnology share of all public R&D expenditures is highest in Korea, followed by Norway. The average for reporting countries is 7.2%. For nanotechnology R&D, the Russian Federation leads. The average for reporting countries is 2.9%.

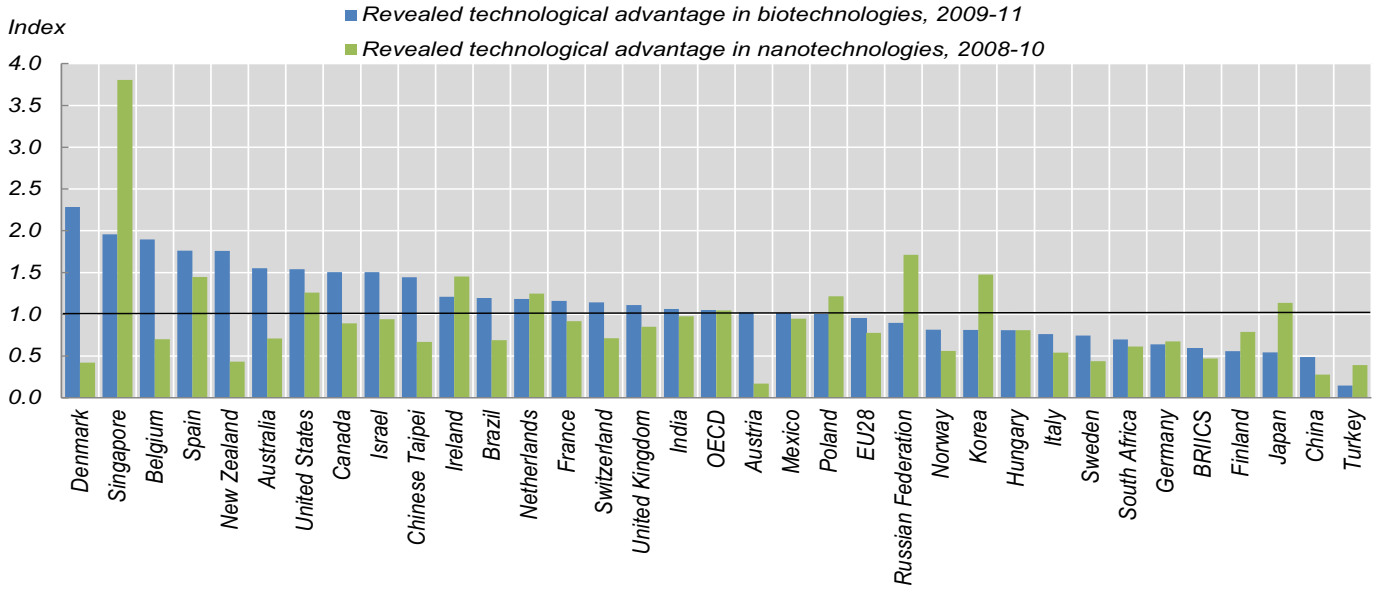
7. Share of countries in biotechnology/nanotechnology patents filed under PCT



Only countries with a share of patents equal to 0.25% or higher are shown in the figure. BRIICS: Brazil, the Russian Federation, India, Indonesia, China and South Africa.

8. Revealed technological advantage in biotechnologies/nanotechnologies

Index based on patent applications filed under the PCT



BRIICS: Brazil, the Russian Federation, India, Indonesia, China and South Africa.

Source: OECD, Key Biotechnology Indicators, http://oe.cd/kbi, and Key Nanotechnology Indicators, http://oe.cd/kni, June 2013.

The United States contributed to 40.2% of all biotechnology PCT patent applications and 34.8% of all nanotechnology PCT applications. In general, a country's share of biotechnology PCT patent applications is larger than that of nanotechology. The exceptions are Singapore, Japan, the Russian Federation, Korea, Finland, Ireland, the Netherlands and Germany.

The revealed technological advantage is defined as a country's share of patents in a particular technology field divided by the country's share in all patent fields. The index is equal to zero when the country holds no patents in a given sector; is equal to 1 when the country's share in the sector equals its share in all fields (no specialisation); and above 1 when a positive specialisation is observed. Denmark has the largest specialisation ratio in biotechnology followed by Singapore. The specialisation ratio in nanotechnology is largest in Singapore followed by the Russian Federation, then Korea and Ireland.

Notes

Key Biotechnology Indicators methodological information (http://www.oecd.org/sti/sci-tech/Methodology_Biotech_2013_1.xls)

Key Nanotechnology Indicators methodological information (http://www.oecd.org/sti/Methodology_Nano_2013_1.xls)

In a number of countries, firm data can be reported in multiple research areas. For this reason, there may be some overlap between biotechnology and nanotechnology firm and R&D data from the following countries: Belgium, Denmark, France, Italy and the United States.

Figure 1. and Figure 2.

KBI 1. Number of firms active in biotechnology

Biotechnology firms use biotechnology to produce goods or services and/or to perform biotechnology R&D. These firms are captured by biotechnology firm surveys.

Biotechnology R&D firms perform biotechnology R&D. These firms are captured by R&D surveys.

Dedicated biotechnology firms devote at least 75% of their production of goods and services, or R&D, to biotechnology. These firms are captured by biotechnology firm surveys.

Dedicated biotechnology R&D firms devote at least 75% of their total R&D to biotechnology. These firms are captured by R&D surveys.

For Denmark and Slovenia data are preliminary.

For Mexico, data include firms with some biotechnology activity over the 2010-11 period. The data are overestimated as they cover two years and as a result exclude firm exit. Data are for firms with 20 or more employees only.

KNI 1. Number of firms active in nanotechnology

Nanotechnology firms use nanotechnology to produce goods or services and/or to perform nanotechnology R&D. These firms are captured by nanotechnology firm surveys.

Nanotechnology R&D firms perform nanotechnology R&D. These firms are captured by R&D surveys.

Dedicated nanotechnology firms devote at least 75% of their production of goods and services, or R&D, to nanotechnology. These firms are captured by nanotechnology firm surveys.

Dedicated nanotechnology R&D firms devote at least 75% of their total R&D to nanotechnology. These firms are captured by R&D surveys.

For Japan, number of business enterprises with a paid-in capital of 100 million Yen or more.

For Mexico, data include firms with some nanotechnology activity over the 2010-11 period. The data are overestimated as they cover two years and as a result exclude firm exit. Data are for firms with 20 or more employees only.

Figure 3. and Figure 4.

KBI 3. Biotechnology R&D expenditures in the business sector

For Denmark and Slovenia data are preliminary.

For Germany, 2010 Business Expenditures on R&D (BERD) was used to calculate the biotech R&D intensity, 2011 BERD was not available.

For Mexico, firms with 20 or more employees only, 2010 Business Expenditures on R&D (BERD) was used to calculate the biotech R&D intensity, 2011 BERD was not available.

For the Russian Federation, a proxy indicator is used: R&D expenditure by priority areas of S&T (Life sciences) which includes: Bioengineering; Biocatalysis, biosynthesis and biosensor technologies; Biomedical and veterinary technologies; Genomics and pharmaco-genetics; Living cell technologies.

Notes

KNI 3. Nanotechnology R&D expenditures in the business sector

For Japan and Mexico, 2010 Business Expenditures on R&D (BERD) was used to calculate the R&D intensity, 2011 BERD was not available.

For Japan, number of business enterprises with a paid-in capital of 100 million Yen or more.

For the Russian Federation, preliminary estimates based on data gathered by the R&D survey.

Figure 4.

Numerator: Biotechnology/Nanotechnology R&D expenditures in the business sector
Denominator: Business Enterprise Expenditure on R&D -- BERD (source: OECD, MSTI Database)

Figure 5. and Figure 6.

KBI 7. Intramural biotechnology R&D expenditures in the government and higher education sectors

For the Russian Federation, a proxy indicator is used: R&D expenditure by priority areas of S&T (Life sciences).
For Slovenia data are provisional.

KBI 8. Intramural biotechnology R&D expenditures in the government and higher education sectors as a percentage of total government and higher education sectors R&D expenditures

For the Russian Federation, a proxy indicator is used: R&D expenditure by priority areas of S&T (Life sciences).
For Slovenia data are provisional.

KNI 8. Intramural nanotechnology R&D expenditures in the government and higher education sectors as a percentage of total government and higher education sectors R&D expenditures

For Japan, 2010 Government Expenditure on R&D (GOVERD) and 2010 Higher Education Expenditure on R&D (HERD) was used to calculate the R&D intensity, 2011 data was not available.

Figure 6.

Numerator: Biotechnology/nanotechnology R&D expenditures in the government and higher education sectors
Denominator: Government Expenditure on R&D (GOVERD) + Higher Education Expenditure on R&D (HERD). (source: OECD, MSTI Database)

Figure 7. and Figure 8.

Data relate to patent applications filed under the Patent Co-operation Treaty (PCT), at international phase. Patent counts are based on the priority date, the inventor's country of residence and fractional counts.

Israel "The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law."
"It should be noted that statistical data on Israeli patents and trademarks are supplied by the patent and trademark offices of the relevant countries."

Figure 8.

Only countries with more than 500 patents are included.

KBI 11. Share of countries in biotechnology patents filed under PCT

Data for 2011 are OECD estimates.