

France ranks third in terms of participation in the Framework Programme for Research and Development (FP7) behind Germany and the United Kingdom. It is involved in 53.1% of FP7 projects listed in late March 2010 and coordinates more than a fifth of the projects in which it is implicated. France is particularly involved in the aeronautics and space and nuclear sectors.

The FP is a tool for funding research and development used by the European Commission to contribute to developing European research efforts. Since 1984, FP's have succeeded each other in 4-year periods, until FP7, due to last seven years (2007-2013). They comprise a certain number of programmes, sub-programmes and actions which give rise to specific calls for tender. These bids result in projects, which usually involve several research teams.

FP7, amounting to €53.2bn (including Euratom), lists 3,229 projects outside the Marie Curie fellowships and European Research Council (the specific "People" and "Ideas" programmes). France is heavily involved in FP7: French teams are involved in 53.1% of projects and coordinate 11.2%.

Nearly 87% of 40,729 research teams involved in all FP7 projects are part of the European Union (EU 27) (Graph 01). 51% of total participation is concentrated in five EU-27 countries: Germany with 13.5% participation, the United Kingdom and France (with 12.3% and 9.7 participation respectively) then Italy (9%) and Spain (6.9%). Among non-EU-27 Member States, Switzerland, Norway and Israel are the most involved. Together they account for nearly half the 13.3% participation of non EU-27 countries.

In FP7, Germany leads in six out of the twelve fields of application compared to British and French teams (Graph 02a). The United Kingdom leads in "biomedicine, health, biotechnologies for health", "environment and planning" and "innovation and technology transfer", with France leading in "aeronautics and space" and the "nuclear sector" (with a participation rate of 19.4% and 15.8% respectively). The predominance of Germany is especially marked in "science and information technology and communication", "production processes, materials, nanotechnology, sensors," "energy" and "land transport and inter-modality" sectors.

In six out of the twelve application fields, Germany is the leading coordinator in FP7 (Graph 02b). It coordinates about

one fifth of the projects in "production processes, materials, nanotechnology, sensors, "energy" and "environment and planning." France comes top in "aeronautics and space" and the "nuclear sector" coordinating around 30% and 40% respectively. The United Kingdom is the premier coordinator of projects in "agronomy, biotechnology, food and living resources", "social sciences", "Land transport and inter-modality" and "innovation and technology transfer." .

In FP7, teams of French public institutions predominate in the project areas of "Environment and Planning", "Biomedicine, health, biotechnology for health", "international cooperation, access to infrastructure and coordination, and agronomy, agro biotechnology - food and living resources" (with the total share of French interests approaching 75%) (Graph 03). These last two areas are also those in which the targeted research institutions participate the most (over 50%), with "environment and planning," "nuclear" and "biomedicine, health and biotechnology for health" (between 41% and 49%). The preferred fields of academic research institutions are "social sciences", "biomedicine, health and biotechnology for health" and "international cooperation, coordination and access to infrastructure" (a share of over 30%).

French private institutions dominate six areas: "Science and information technology and communication", "production processes, materials, nanotechnology, sensors", "energy", "aeronautics and space", "land transport and inter-modality" and "innovation and technology transfer" with the share of total French contributions between 52% and 72%.

FP7 source data are supplied by the of the European Commission's (EC) E-Corda database. They comprise all FP projects (including Euratom) available in the database as of 25 March 2010. The data supplied refer to projects which were the subject of a contract signed between the project participants and the EC.

Based on these data, the OST (Observatoire des sciences et techniques: Science and Technology Observatory) performs a reclassification of FP programmes according to a thematic classification in the twelve application fields. This ranking takes place in blocks at activity level under each of the FP programmes: all projects belonging to one programme activity have a single thematic classification.

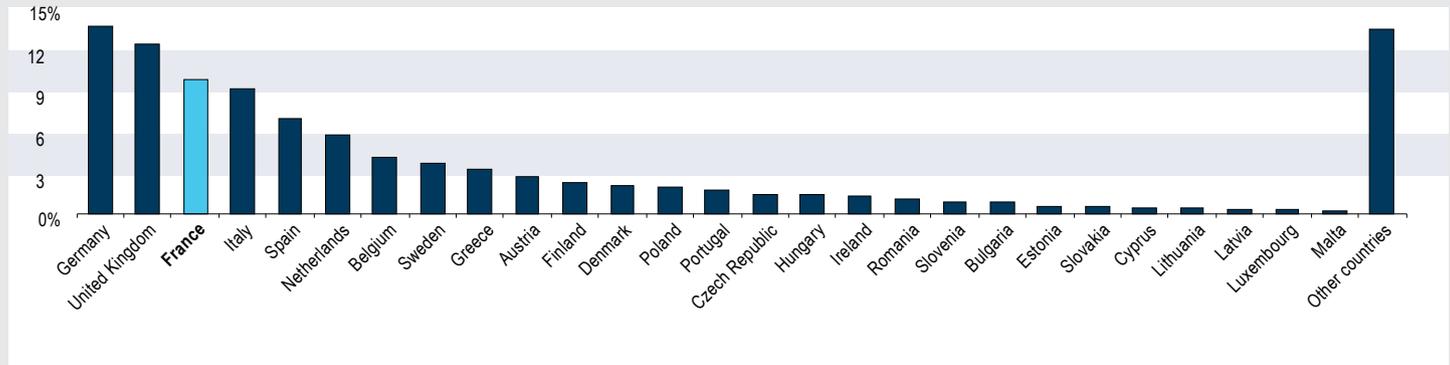
The totals presented at FP level count the FP projects which have actually received an EC funding contract. The Marie Curie fellowships and European Research Council grants (mainly attributed to individuals) are counted when calculating participation rates but not when calculating coordination rates.

Three types of data are used: project (consortia comprising several partners for a specific time and objectives, funded accordingly), coordination (one partner responsible for project management), and participation (involvement of a laboratory, institution or country in a project).

The **participation rate** of a country is the ratio between the number of teams from countries participating in the FP and the total number of participating teams. The **level of coordination** between countries is the ratio between the number of projects coordinated by the teams in the country and the total number of projects.

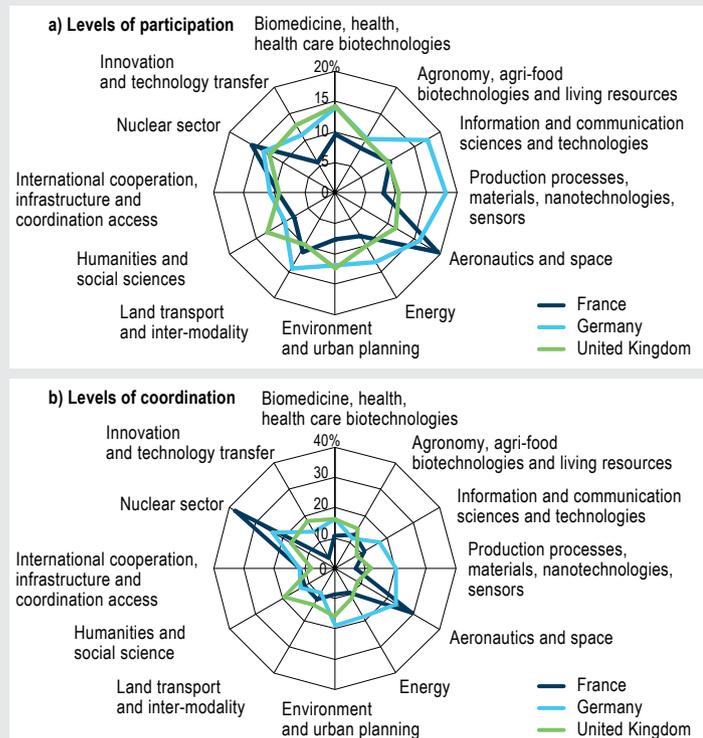
Source: OST-2010 Report.

01 Participation rates of the 27 European Union Member States' and other countries in FP7 (%)



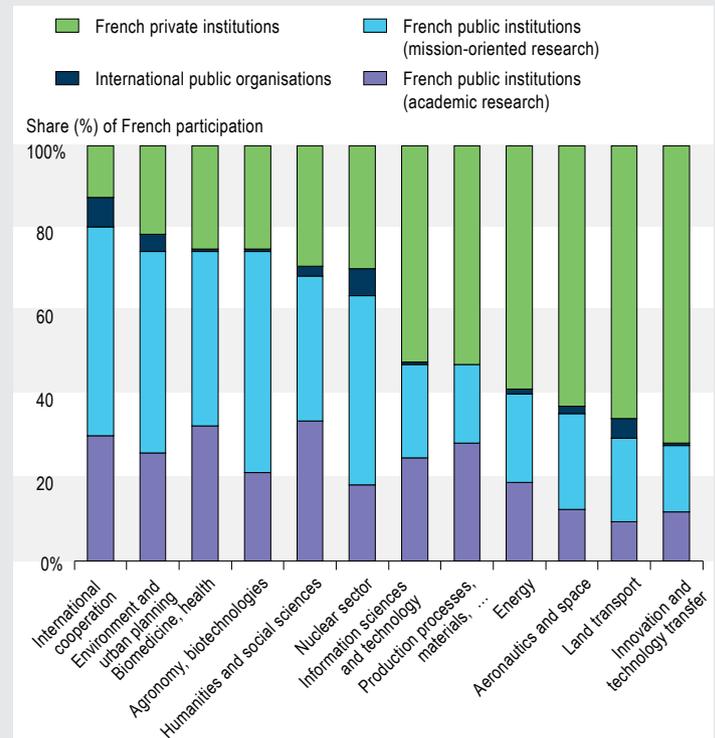
Source: OST, 2008 report (Thomson Reuters data, OST processing).

02 Rates of participation and coordination for France, Germany and the United Kingdom in FP7 projects according to field of application (%)



Source: Source: OST, 2008 report (Thomson Reuters data, OST processing).

03 Distribution of French participations in FP7 projects according to type of institution by field of application (in %)



Source: Source: OST, 2008 report (Thomson Reuters data, OST processing).

In 2008, France ranked sixth for its world share in scientific publications. Between 2003 and 2008, its impact factor increased but remained below the world average. French research has retained a strong specialisation in mathematics. In 2008, the EU and the US were France's premier partners.

In 2008, France's world share in scientific publications amounted to 4.2% and its citation index (within two years) to 4.2%. Its immediate impact factor (the relation between the share of citations and the share of publications) very slightly exceeds the global average, which is 1 per construction (*Graph 01*).

At the beginning of the '90s, France's world share in publications rose to reach 5.4% in 1995. It remained stable before falling regularly after 1999 – due in particular to the arrival of new countries on the international scientific scene. France's world share in citations progressed until 1997 before gradually falling as of 2001, then stabilising in 2007. France's impact factor improved over the period as a whole, rising from 0.91 in 1993 to 1.01 in 2008.

In this same year, France's disciplinary profile was balanced, with the exception of its strong specialisation in mathematics (specialisation index of 1.47). Its specialisation factors stood slightly above 1 in physics and astronomical sciences and lower than 1 in applied biology-ecology (*Graph 2a*). Between 2003 and 2008, France developed its specialisation in mathematics, physics, astronomical and engineering sciences. By contrast, its specialisation factor in chemistry and maths dropped.

In 2008, France's immediate impact factor was above the world average in applied biology-ecology (1.28), chemistry (1.12), physics (1.10), universe science (1.08) and engineering sciences (1.07) (*Graph 02b*). It was close to this average in mathematics and fundamental biology and below it in medical research. Between 2003 and 2008, growth in France's impact factor was the most significant in applied biology/ecology (+18%), physics (+14%) and medical and universe science research (+11%). In Mathematics, the discipline in which France is most specialised, its

impact factor has diminished slightly.

In 2008, the 27 member states of the European Union (except France) were involved in over half the international joint publications of France, in which it is by far the primary partner (*Table 3*). The United States are involved in a quarter of French joint publications. Within the EU, Germany and the United Kingdom were on a more or less equal footing being involved in around 15% of France's joint publications. They were followed by countries geographically close to France: Italy, Spain and Switzerland. Canada, with a share of 7.1%, is in eighth place.

The affinity factor cancels out any influence linked to the size of countries. It highlights privileged partnerships linked to linguistic or geographical closeness such as those existing between France and Belgium, Switzerland, Italy and Spain (a factor higher than 1).

In 2008, the United States produced more than a quarter of the world's scientific publications (24.4%). They were followed by China (8.8%), Japan (6.8%), the United Kingdom and Germany (5.7% each) (*Graph 04*). France ranked sixth (4.2%) above Italy (3.6%), Canada (3.3%), India and Spain (2.8% each). They were followed by South Korea, Australia and Russia.

Among the countries whose world share in publications rose the most sharply between 2003 and 2008, China's contributions doubled; those of Turkey and Brazil increased by more than 40%. They were followed by South Korea, Taiwan and India.

The bibliographic database used was developed on the basis of Thomson Reuters' Web of Science, Philadelphia (USA).

"French publications" refer to those where at least one of the authors is French. The publication count here results from a fraction calculation: when an article is signed by a single laboratory, e.g. French, one point is attributed to France; but if the article is jointly signed by laboratories in two different countries, half a point is attributed to each country.

Counting in this way measures a country's contribution to world production. To support their robustness, indicators are calculated in years averaged over a three-year period; the value for 2008 is the average of values for 2006, 2007 and 2008.

A country's **world share in publications** is the ratio between the number of its publications and the number of world publications.

The **world citation share** is calculated over two years including the year of publication.

A country's **immediate impact factor** is the ratio between its world citation index and its world share of publications.

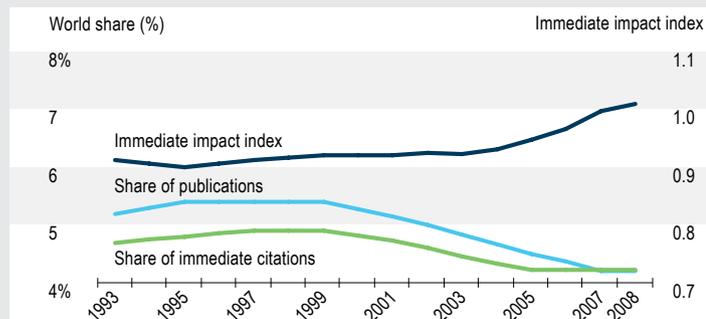
The **specialisation factor** is the ratio between the world share of publications in a given discipline and the world share all disciplines included.

France's **share in joint international publications** with a given country is the ratio between France's number of joint publications with this country and its total number of joint publications, in whole numbers (once an article is signed by at least one laboratory in the country, a whole point is attributed to the country in question, irrespective of the number of laboratories signing the article).

France's **affinity index** with a given country is its share of joint international publications weighted by the partner country's world share of joint international publications.

Source: Rapport OST-2010.

01 Evolution in France's world share in publications and citations and its impact factor between 1993 and 2008, all disciplines included



Source: s Source: OST, 2008 report (Thomson Reuters data, OST processing).

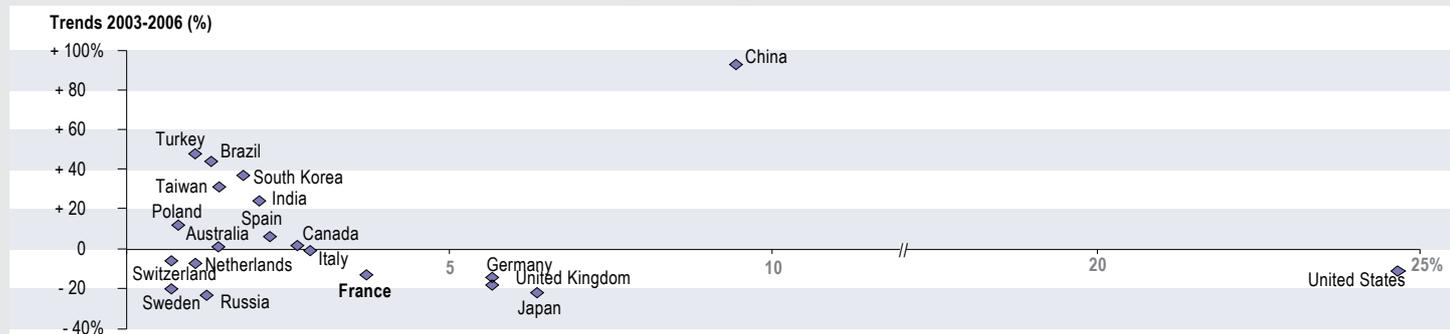
03 France's share in joint international publications and affinity index with its ten main partner countries, all disciplines included (2008)

| Rank | Zone/Country | Share of joint international publications with France in 2008 (%) | Affinity index of France in 2008 |
|------|---|---|----------------------------------|
| 1 | 27 European Union members (excl France) | 56.8% | na |
| 2 | United States | 24.7% | 0.59 |
| 3 | Germany | 16.1% | 0.88 |
| 4 | United Kingdom | 15.3% | 0.85 |
| 5 | Italy | 12.3% | 1.32 |
| 6 | Spain | 8.8% | 1.23 |
| 7 | Switzerland | 7.5% | 1.32 |
| 8 | Canada | 7.1% | 0.71 |
| 9 | Belgium | 6.8% | 1.69 |
| 10 | Netherlands | 6.1% | 0.98 |

* na = not available

Source: OST, 2008 report (Thomson Reuters data, OST processing).

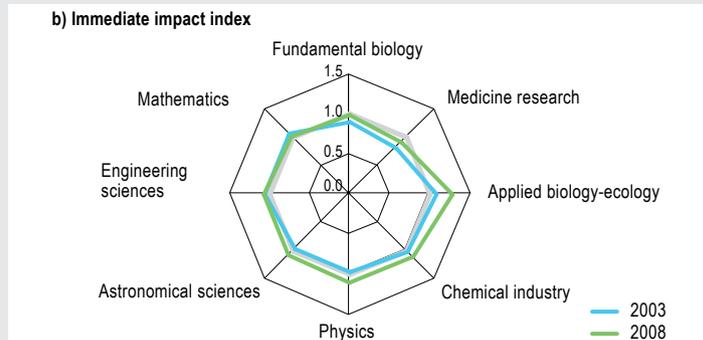
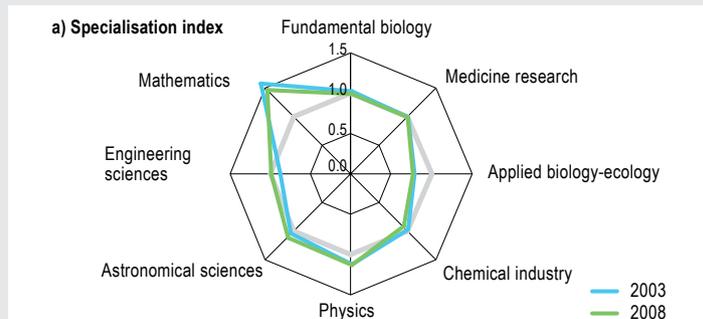
04 World share in scientific publications and trends in primary producing countries all disciplines included (%)



World share in 2008 (%): all countries with a share above or equal to 1%

Source: s Source: OST, 2008 report (Thomson Reuters data, OST processing).

02 Specialisation index and impact factor for scientific publications in France (1993, 2003 and 2008) by scientific discipline



Source: s Source: OST, 2008 report (Thomson Reuters data, OST processing).

In 2008, France ranked sixth worldwide in the European patent system with 6.3% of patent applications. It specialises in the "machinery/mechanical engineering/transport" sector.

In the US patent system, France occupies 8th place worldwide with 2% of patents filed across all sectors. It specialises in "pharmaceutical biotechnologies" and "chemical materials". In both systems, the French world share has been decreasing since 1994 but in terms of the US patent system it has stabilised since 2006.

A patent is a certificate of ownership granting its holder the exclusive rights of use of an invention for a limited period of time in a limited area. Rights associated with filing patents are linked to those countries covered by the office at which the patent holder made the request. Two patent systems are particularly attractive to applicants: the American and the European systems. According to their strategy, patent applicants may favour one system over another because the two systems patent and protect very differently on two different operating markets. These strategies largely explain why results in the two patent systems concerning indicators of production technology are different.

In 2008, the global share of European patent applications in France was 6.3%. This share was 8.3% in 1994 (Graph 01) Between 1994 and 2008, it diminished steadily, resulting in a 2-point fall over the period. In the American patent system, France's world share in patents granted was 2%. In 1994, France's world share in this system stood at 2.9%. It then declined until 2006, by nearly a point, and has levelled off since. The decline in France's global share in the two systems is partly due to the dynamism in the production technology of new countries, resulting in a significant increase in patent applications in the U.S. and European patents systems.

In the European patent system, in 2008 France specialised in machinery, mechanics and transport equipment (specialisation factor of 1.42) and household goods, construction and public works (factor of 1.25). Instrumentation was a sub-specialisation (factor of 0.77) as was chemistry and materials (0.80) (Graph 02a).

In the American patent system, in 2008, France was highly specialised in pharmaceuticals and biotechnologies (specialisation factor of 1.80) followed by chemistry and materials (1.56), machinery, mechanics and transport equipment and industrial processes (factors of 1.37

and 1.24 respectively). (Graph 02b). Electronics and electricity (0.75) and instrumentation (0.79) were sub-specialisations. Between 2003 and 2008, with the exception of "pharmaceutical-biotechnology", France strengthened its position in all its areas of specialisation and in particular "machine/mechanical engineering/transport" (index up 19%).

In 2008, the United States, Japan and Germany accounted for the largest world share of European patent applications (with 26.6%, 17.8% and 17.1% of applications respectively) (Graph 03a). They were followed by France (6.3%) and the United Kingdom (4.3%). Between 2003 and 2008, South Korea substantially increased its world share, by a factor of more than 2. Japan increased its share by more than 20% while the United States, France, Germany and the United Kingdom saw a reduction in their share of at least 15%.

In 2008, the United States (50.2%) and Japan (21.3%) were the leading countries in terms of American patents granted (Graph 03b). Germany (5.7%), ranked third, was the leading European country. Taiwan and South Korea ranked fourth and fifth with respective shares of 4% and 3.8%. They were followed by Canada and the United Kingdom (2.1 each) and France (2%) Between 2003 and 2008, there was a significant increase in the world share of American patents granted to South Korea (80%) and Taiwan (20%) and a decrease in France's (-18%) and the United Kingdom's (-10%) share of American patents. There share of U.S. patents from Germany (- 15%), France (- 16%) or the United Kingdom (- 10%) also declined.

The indicators are calculated using data constructed and delivered by the OECD from the European Patent Office (EPO) PATSTAT database, and enriched by data from the OECD REGPAT database (January 2010).

They refer to the dates of publication of patent applications (not the date when patents were granted) in order to relate to the research on which the application is based. A patent request is published 18 months after filing and only requests for patents published are taken into account. Historically, for **American patents** delivered by the United States Patent and Trademark Office (USPTO), only patents actually granted are published. This leads to a significant lapse of time between the initial filing process and publication: publication of a granted patent may take place up to five years after the filing of the application.

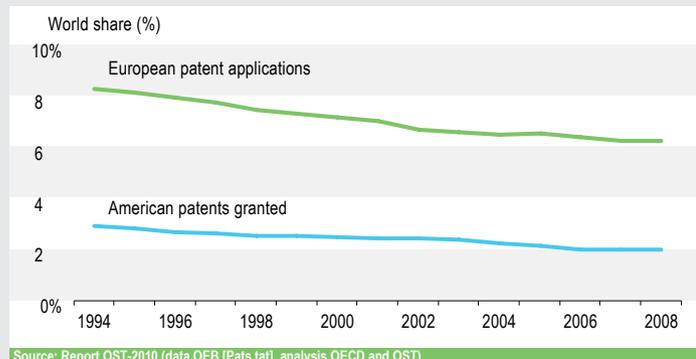
The patent count is carried out on the basis of the inventor's address (where the research was performed) and not that of the applicant (where the institution or company filing the application is located). To strengthen their robustness, indicators are calculated in years averaged over a three-year period; the value for 2008 is the average of values for 2006, 2007 and 2008.

A country's world share of patent applications (European or American) is the ratio between that country's patent applications and the total number of patent applications.

A country's specialisation factor is the ratio between the country's world share in a given field and its world share of all fields combined.

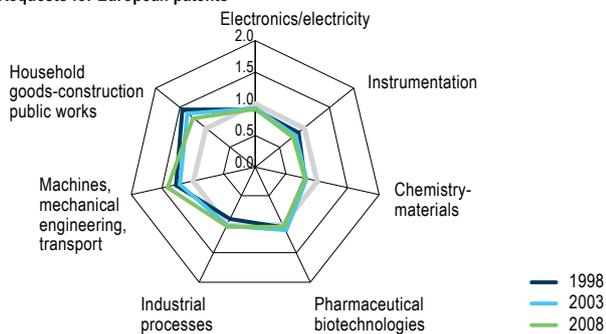
Source: Rapport OST-2010.

01 Trends in France's world share in patents between 1994 and 2008, all fields included

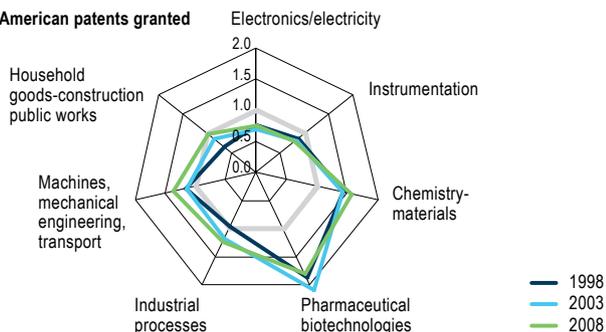


02 France's specialisation factor for technology patents (1998, 2003 and 2008)

a) Requests for European patents



b) American patents granted



Source: Report OST-2010 (data OEB [Pats tat], analysis OECD and OST).

03a World share of European patent applications and evolution, all fields included (%)



03b World share of American patents granted and trends, all fields included (%)

