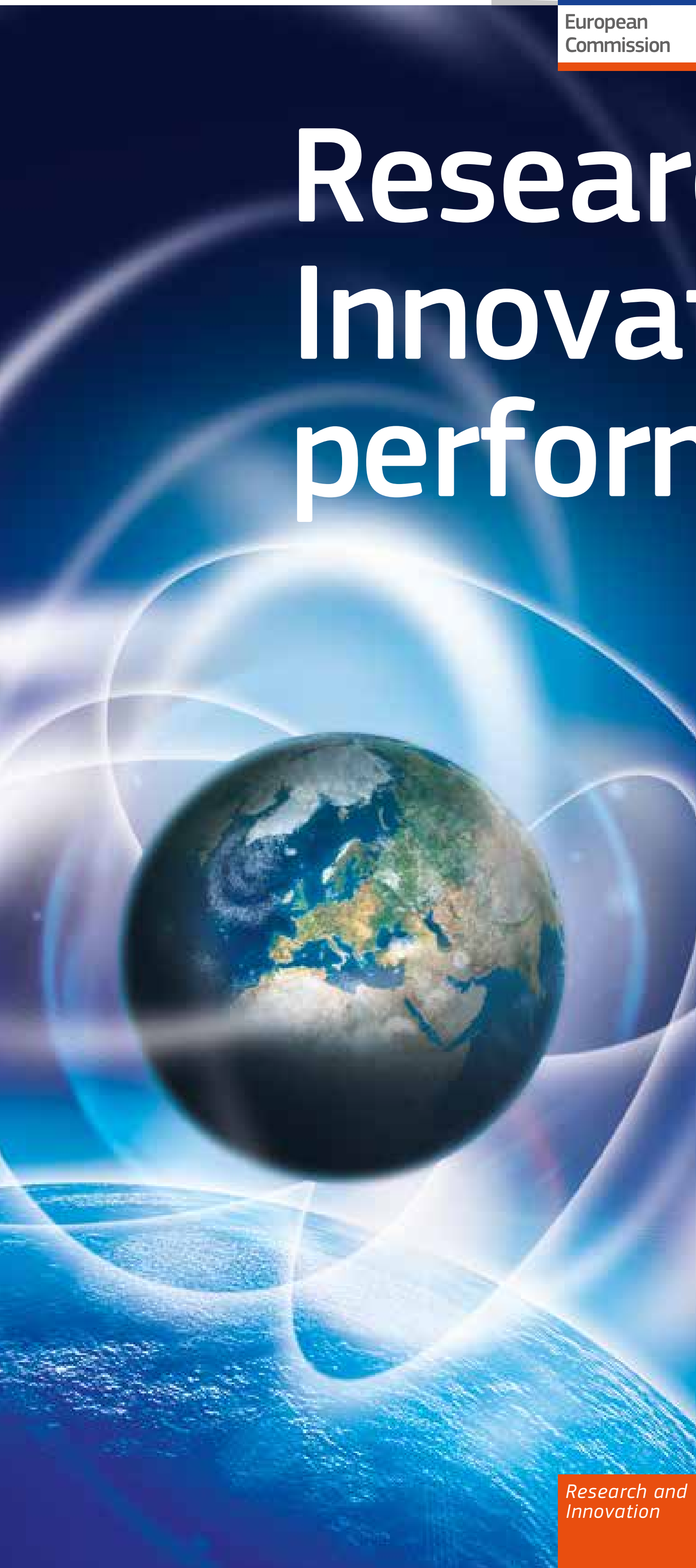
European Commission

Research and Innovation performance in

France

Country Profile

2014



Research and Innovation

EUROPEAN COMMISSION

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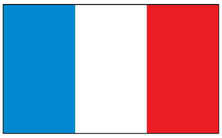


France

The challenge to revitalise industry

Summary: Performance in research and innovation

The indicators in the table below present a synthesis of research and innovation (R&I) performance in France. They relate knowledge investment and input to performance and economic output throughout the innovation cycle. They show thematic strengths in key technologies and also the high-tech and medium-tech contribution to the trade balance. The indicator on excellence in science and technology takes into consideration the quality of scientific production as well as technological development. The Innovation Output Indicator covers technological innovation, skills in knowledge-intensive activities, the competitiveness of knowledge-intensive goods and services, and the innovativeness of fast-growing enterprises, focusing on innovation output. The indicator on the knowledge-intensity of the economy focuses on the economy's sectoral composition and specialisation and shows the evolution of the weight of knowledge-intensive sectors and products.

Key indicators of research and innovation performance	
R&D intensity 2012: **2.29 %** (EU: 2.07 %; US: 2.79 %) 2007-2012: **+1.0 %** (EU: 2.4 %; US: 1.2 %)	***Excellence in S&T***[1] 2012: **49.5** (EU: 47.8; US: 58.1) 2007-2012: **+3.4 %** (EU: +2.9 %; US: -0.2)
Innovation Output Indicator 2012: **105.6** (EU: 101.6)	***Knowledge-intensity of the economy***[2] 2012: **58.1** (EU: 51.2; US: 59.9) 2007-2012: **+0.5 %** (EU: +1.0 %; US: +0.5 %)
Areas of marked S&T specialisations: Energy, ICT, materials, nanotechnologies, new production technologies, and the environment	***HT + MT contribution to the trade balance*** 2012: **5.2 %** (EU: 4.23 %; US: 1.02 %) 2007-2012: **+2.2 %** (EU: +4.8 %; US: -32.3 %)

France is a major R&D country. It ranks sixth among world countries for gross domestic expenditure in R&D. It has a large science base, is well equipped with large world-class research infrastructures, and is well connected in Europe and internationally. However, France's scientific performance is average in terms of high-impact scientific work and its industrial base continues to be eroded.

The level of business R&D intensity is relatively low in France in comparison with other R&D-intensive countries. This reflects primarily the sectoral composition of the economy, where medium-high and high-tech manufacturing sectors represent a relatively modest share.

In recent years, France has substantially reformed its R&I system – new funding and evaluation agencies and mechanisms[3], *pôles de compétitivité* policy, more autonomy for universities, amplified research tax credit (CIR), innovation tax credit, *Investissements d'Avenir programme* and increased funding for the valorisation of public research results.

However, there is a limited use of evaluation and assessment tools to monitor the socio-economic impacts of research and innovation policies in France.

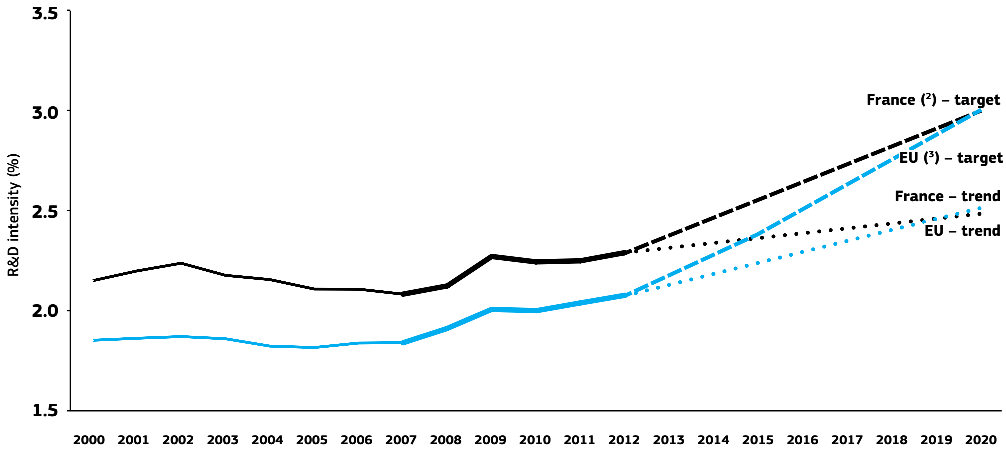
1 Composite indicator that includes PCT per population, ERC grants per public R&D, top universities and research institutes per GERD and highly cited publications per total publications.

2 Composite indicator that includes R&D, skills, sectoral specialization, international specialization and internationalization sub-indicators.

3 Agence Nationale de la Recherche, BPI France, Agence d'Evaluation de la Recherche et de l'Enseignement Supérieur.

Investing in knowledge

France – R&D intensity projections: 2000–2020 (1)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: DG Research and Innovation, Eurostat, Member State
Notes: (1) The R&D intensity projections based on trends are derived from the average annual growth in R&D intensity for 2007–2012 in the case of the EU, and for 2010–2012 in the case of France.
(2) FR: The projection is based on a tentative R&D intensity target of 3.0 % for 2020.
(3) EU: The projection is based on the R&D intensity target of 3.0 % for 2020.
(4) FR: There is a break in series between 2004 and the previous years and between 2010 and the previous years.

France has set a national R&D intensity target for 2020 of 3 %. In 2012, the country's R&D intensity was 2.29 %, with an average annual growth rate of 1.0 % over the period 2010-2012. As shown above, this trend will not allow France to reach its target by 2020.

With EUR 46.5 billion of global R&D expenses representing 17.3 % of EU total, France is a major player in the EU. It ranks second, behind Germany (EUR 79.4 billion, 29.5 % of the total) and ahead of the UK (EUR 33.3 billion, 12.4 % of the total). Having peaked in 2009-2010, public R&D intensity stabilised at 0.78 % in 2011 and 2012, at the same level as at the beginning of the 2000s and slightly over the EU average of 0.74 %.

France is one of the few countries where R&D expenditure in the business sector progressed in 2009, in spite of the economic crisis. Amplification of the R&D tax credit in 2008 may have contributed to that. Together with a decline in GDP, this progress caused a marked increase in overall business R&D intensity from 1.33 % in 2008 to 1.40 % in 2009. In 2010, 2011 and 2012, business R&D intensity further progressed to 1.48 % of GDP. The country's business R&D intensity is above the EU average (1.31 % in 2012) but below that of other knowledge-intensive countries. It should be noted that a significant part of business R&D is publicly funded (public direct and indirect funding of business R&D was 0.38 % of GDP in 2011[4], which ranks France as number 1 in the EU for this indicator). In terms of economic activities, business R&D expenditure in France is dominated by motor vehicles (15.0 % of total business R&D expenditures), aircraft and spacecraft (10.6 %) and pharmaceuticals (10.3 %)[5].

The 2013 EU Industrial R&D Investment Scoreboard has registered 124 French companies among the top 1000 EU R&D investors worldwide (252 in the UK and 224 in Germany). In 2012, their R&D expenses worldwide increased by 2.3 %, whereas the total growth in R&D expenses for the sample is 6.0 % (11.6 % for Germany, 0.5 % for the UK). Among the 2000 top world business R&D investors in 2012, the worldwide R&D expenses of French companies represented 5.2 % of the total R&D expenses of the top 2000 world R&D investors (10.5 %, 4.2 % and 35.1 % for Germany, the UK and the USA, respectively).

France's industrial base has been continuously eroded for more than a decade. The country's share of industry in the total value added fell from 17.8 % in 2000 to 12.5 % in 2012. France is now ranked 16th among the 18 euro-area countries, behind the UK (14.6 %), Italy (18.4 %), Finland (19.1 %) and Germany (25.8 %).

4 Cf. Maximising the benefits of R&D tax incentives for innovation, OECD, 2013.

5 2012. Data from the French Ministère de l'Enseignement supériEUR et de la Recherche.

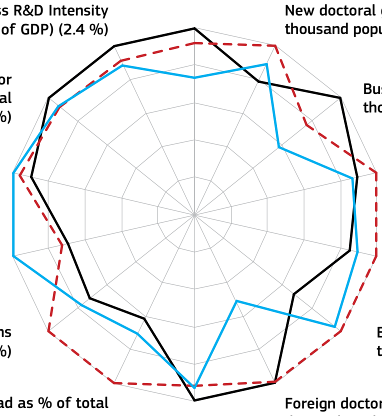
Of the EUR 13.4 billion of Structural Funds allocated to France over the 2007-2013 programming period, around EUR 2.2 billion (16.4 % of the total) related to RTDI[6]. Almost 11 700 partners from France are participating in FP7, receiving a financial contribution from the EC of nearly EUR 4.5 billion.

An effective research and innovation system building on the European Research Area

The graph below illustrates the strengths and weaknesses of France's R&I system. Reading clockwise, it provides information on human resources, scientific production, technology development and innovation. Average annual growth rates from 2007 to the latest available year (2012) are given in brackets.

France, 2012 (1)

In brackets: average annual growth for France, 2007–2012 (2)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: DG Research and Innovation, Eurostat, OECD, Science-Metrix/Scopus (Elsevier), Innovation Union Scoreboard.
Notes: (1) The values refer to 2012 or to the latest available year.
(2) Growth rates which do not refer to 2007–2012 refer to growth between the earliest available year and the latest available year for which comparable data are available over the period 2007–2012.
(3) Fractional counting method.
(4) EU does not include EL.

The graph shows that France rates well for many skills-related indicators: new graduates in science and engineering, business enterprise researchers (in spite of an eroding industrial base), and foreign doctoral students. With a rate of 4.2 % for PCT patent applications per billion GDP, France is slightly above the EU average (3.9 %), well behind Germany (7.5 %) and Sweden (13.3 %), but ahead of the UK (3.3 %). The country's performance is average for employment in knowledge-intensive activities and for new doctoral graduates, and slightly below average for highly cited scientific publications and for new doctorates. It is significantly under the average for BERD financed by abroad, as is Germany, but in France foreign-owned companies

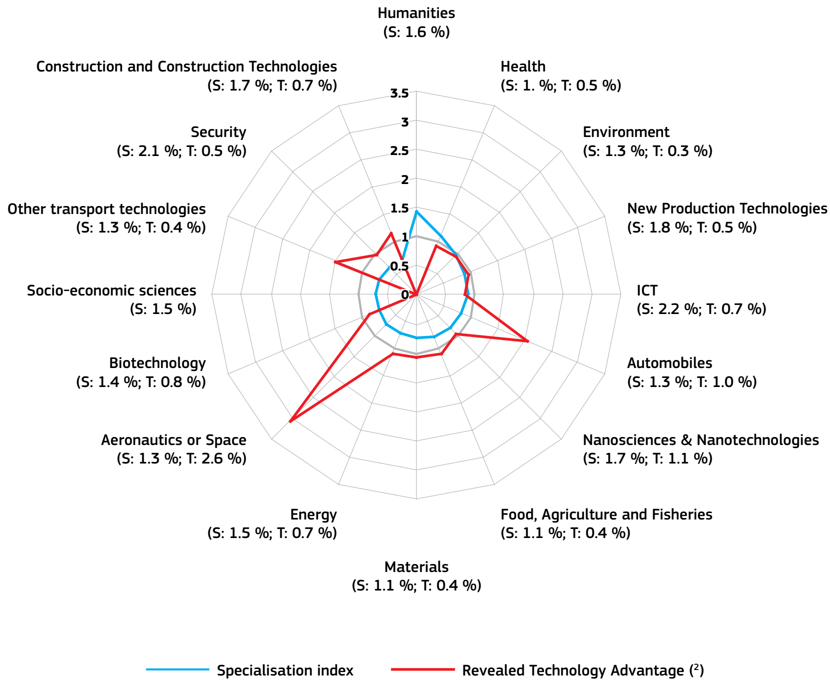
6 TDI includes the following sectors: (01) RTD activities in research centres, (02) RTD infrastructures and centres of competence, (03) Technology transfer and improvement of cooperation of networks, (04) Assistance to RTD, particularly in SMEs (and RTD services in research centres), (06) Assistance to SMEs for the promotion of environmentally friendly products and processes, (07) Investment in firms directly linked to research and innovation, (09) Other methods to stimulate research and innovation and entrepreneurship in SMEs, and (74) Developing human potential in the field of research and innovation.

perform 20 % of BERD[7]. France is also significantly below average for public expenditure on R&D financed by businesses. Public-private research relationships take place rather in the form of collaborative research (where research is done by all collaborating parties and costs are shared among participants), which is highly state subsidised[8], than in the form of contract research (where businesses finance public research without performing research themselves).

France's scientific and technological strengths

The graph below illustrates the areas, based on the Framework Programme thematic priorities, where France shows scientific and technological specialisations. Both the specialisation index (SI, based on the number of publications) and the revealed technological advantage (RTA, based on the number of patents) measure the country's scientific (SI) and technological (RTA) capacity compared to that at the world level. For each specialisation field it provides information on the growth rate in the number of publications and patents.

France – S&T National Specialisation (¹) in thematic priorities, 2000–2010
in brackets: growth rate in number of publications (³) (S) and in number of patents (⁴) (T)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Science-Metrix Canada; Bocconi University, Italy
Notes: (¹) Values over 1 show specialisation; values under 1 show a lack of specialisation.
(²) The Revealed Technology Advantage (RTA) is calculated based on the data corresponding to the WIPO-PCT number of patent applications by country of inventors. For the thematic priorities with fewer than 5 patent applications over 2000–2010, the RTA is not taken into account. Patent applications in 'Aeronautics or Space' refer only to 'Aeronautics' data.
(³) The growth rate index of the publications (S) refers to the periods 2000–2004 and 2005–2009.
(⁴) The growth rate in number of patents (T) refers to the periods 2000–2002 and 2003–2006.

7 2010. Data from the French Ministère de l'Enseignement supérieur et de la Recherche.

8 In 2011, public-private collaborative research represented a significant part of all R&D expenditure in France (about 10 %) with a public co-funding rate of around 75 % (Government Report: Mission sur les Dispositifs de Soutien à la Recherche Partenariale, 2013).

The methods are as follows:

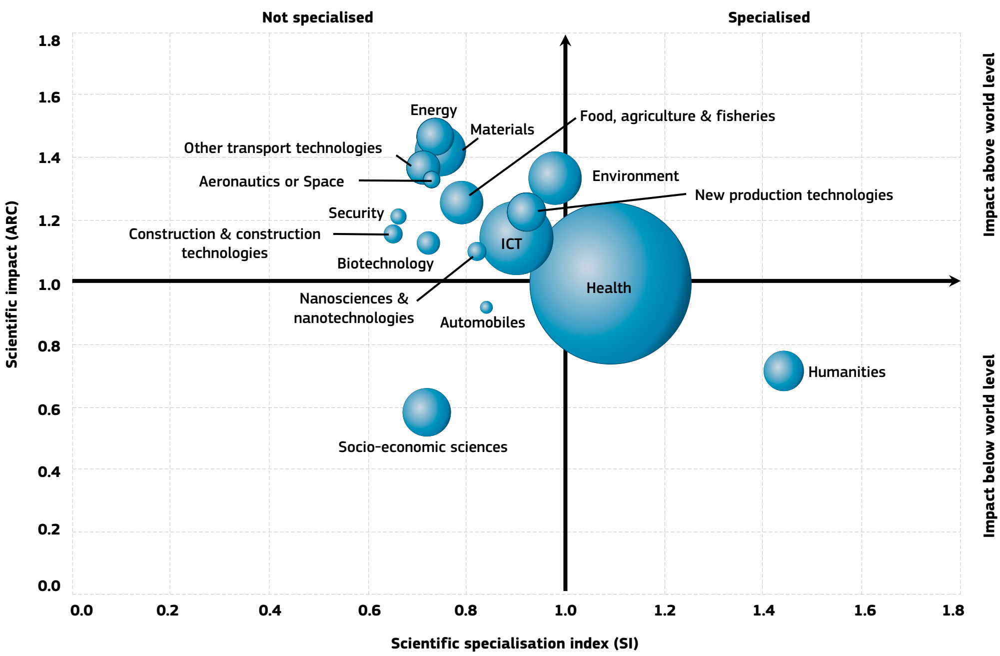
- *Specialisation index*[9]: The scientific journals indexed in Scopus have been classified according to a three-tier taxonomy of six scientific domains, 22 fields and 176 subfields, each journal being assigned to a subfield. Then, through expert judgment supported by relevant statistics, the most relevant scientific fields and subfields were identified for each of the 16 FP7 thematic priorities. The number of publications in Scopus for the FP7 thematic priorities corresponds to about 70 % of the total number in Scopus. In particular, the publications in the journals assigned to the scientific fields of mathematics & statistics and physics & astronomy are not assigned to any of the FP7 thematic priorities. The specialisation indexes refer to world publications in Scopus.

- *Revealed technology advantage*[10]: For the FP7 thematic priorities (except socio-economic sciences and humanities), search keys have been developed. The delineation of search keys used existing technological classifications as a starting point. Based on content analysis of the different thematic priorities, the existing classifications have been refined and adapted. The latter step benefited from input provided by EC experts involved in the thematic priority initiatives and programmes. Some technology fields in existing classifications are not related directly to FP7 categories.

In scientific production, France has high specialisation indexes for publications that can be related to humanities and health. The revealed technology advantage is high in following sectors: automobiles, aeronautics or space, and other transport technologies.

The graph below illustrates the positional analysis of French publications showing the country's situation in terms of scientific specialisation and scientific impact over the period 2000-2010. The scientific production of the country is reflected by the size of bubbles, which corresponds to the share of scientific publication from a science field in the country's total publications.

France – Positional analysis of publications in Scopus (specialisation versus impact), 2000–2010



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Science-Metrix Canada, based on Scopus
Note: Scientific specialisation includes 2000–2010 data; the impact is calculated for publications of 2000–2006, citation window 2007–2009.

The above graph shows that for most of the Framework Programme thematic priorities, the scientific impact of the scientific publications related to them is above the world level. The impact is particularly high for the energy, materials, and other transport technologies sectors.

9 http://ec.europa.eu/research/innovation-union/pdf/scientific-production-profiles.pdf#view=fit&pagemode=none

10 http://ec.europa.eu/research/innovation-union/pdf/technological-specialization-of-countries.pdf#view=fit&pagemode=none

Policies and reforms for research and innovation

A new law on research and higher education was promulgated in July 2013. Preparation of the law started with a large consultation process among the interested parties, which resulted in a report used as the key input for the law. The ongoing reformation modifies some components of the system's organisation and deals with knowledge transfer.

Organisation of the system is meant to change as regards the following five aspects:

- *Strategy*: A new National Strategy for Research will replace the present National Research Strategy for Research and Innovation. Together with the National Strategy for Higher Education, the government will present them to the parliament every five years.

- *'Site policy' and higher education institution groupings*: PRES (Higher education and research institutions clusters, which used to stand for *Pôles de Recherche et d'Enseignement Supérieur)* have been replaced by Communities of Universities and Institutions (*CUE, Communautés d'Universités et d'Etablissements*) which comprise a board of directors, an academic council and board members. A single contract per site is to be signed with the Minister of Higher Education and Research. Current PRES have a year to change status.

- *Roles of regions*: The law transfers both the mission and the budget to regions to develop and disseminate scientific, technical and industrial culture, especially among young audiences. The regions will also define "a regional plan for higher education, research and innovation, which determines the principles and priorities of its activities"; the regions' initiatives shall fit into "the context of national strategies".

- *University governance*: One new initiative is the acceptance of 'externals' as voters for the election of the university's president. In addition, an Academic Council is established, reuniting the Scientific Council and the Board of Studies and University Life, and is given a decisive role. The Academic Council is responsible for the allocation of resources, the adoption of rules for examinations and for the evaluation of teaching, laboratory operation or examination of individual issues relating to recruitment, placement, and teachers and researchers' careers. Board composition is rebalanced in favour of students, technicians and support functions. Parity is set for the elections.

- *High Council of the Evaluation of Research and Higher Education:* The Agency for the Evaluation of Research and Higher Education is replaced by the High Council of the Evaluation of Research and Higher Education, which is an independent administrative authority.

As regards PhDs, and knowledge transfer:

- *PhDs*: The law requires that 'A Class' competitions for civil servants are adjusted to allow for the participation of PhDs. A new opportunity is also given to PhD holders to access the National School of Administration (ENA), provided that they have at least three years of professional experience, and to access ENA internal competition provided that PhD holders are funded through a "doctoral contract". In the private sector, negotiations for the recognition of the PhD in sectoral collective agreements should be completed by 1 January 2016.

- *Knowledge transfer*: The transfer of research results for the service of society is added to the mission of public higher education. The law provides that preferably inventions from public research should be commercialised through SMEs and intermediate-size enterprises, in the EU.

Enhancing research and innovation was confirmed as a priority with the following recent measures announced since 2012:

- 15 measures to increase the dynamism of knowledge transfer from public research (November 2012): better monitoring, training, simplification of regulatory framework, and a new research centre for innovation economy;

- New innovation tax credit for SMEs (December 2012): EUR 160 million tax debt expected in 2014, which will add to the EUR 5.8 billion expected for the R&D tax credit;

- Shift of the *poles de compétitivité* policy to more support for economic opportunities and job creation (January 2013);

- An additional EUR 12 billion allocated to the Investment for the Future Programme (July 2013);

- Build-up of 34 sectorial industrial plans (*plans industriels de reconquête*) led by industry managers, with a strong focus on innovation in sectors where France has competitive assets, partially relying on EUR 4 billion of funding from the Investment for the Future Programme budget (September 2013);

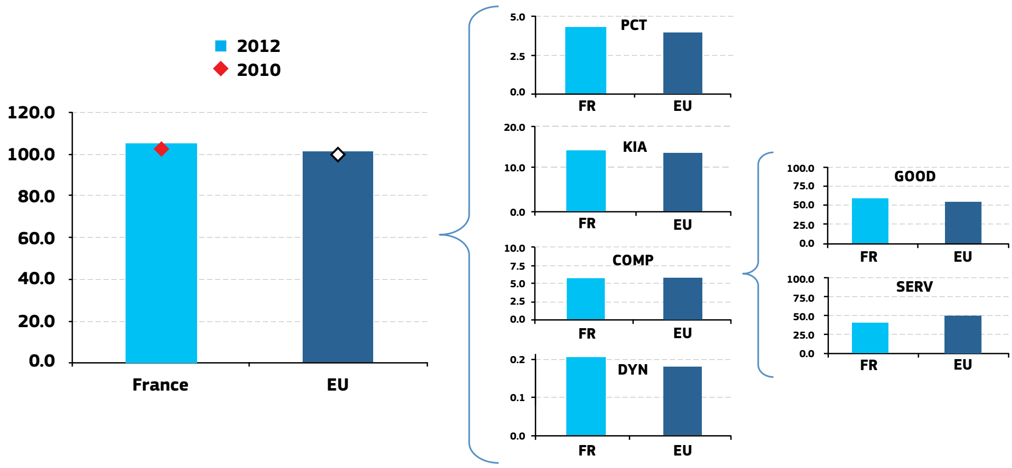
- An innovation contest in seven fields, open to all types of enterprises with EUR 300 million of funding from the Investment for the Future Programme (October 2013).

- A New Deal for Innovation plan, with 40 measures to "promote innovation for all", to be implemented by ministries and public agencies (November 2013): new R&D programmes within the existing budgets, measures to foster innovative public procurement, a programme to foster entrepreneurship in secondary school, new public late-stage VC fund, a new commission for the evaluation of innovation policies, a new "mediator for innovation", new inter-ministerial commission for coordination of innovation and knowledge-transfer policies.

Innovation Output Indicator

The Innovation Output Indicator, launched by the European Commission in 2013, was developed at the request of the European Council to benchmark national innovation policies and to monitor the EU's performance against its main trading partners. It measures the extent to which ideas stemming from innovative sectors are capable of reaching the market, providing better jobs and making Europe more competitive. The indicator focuses on four policy axes: growth via technology – (patents); jobs (knowledge-intensive employment); long-term global competitiveness (trade in mid/high-tech commodities); and future business opportunities (jobs in innovative fast-growing firms). The graph below enables a comprehensive comparison of France's position regarding the indicator's different components:

France – Innovation Output Indicator



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat, OECD, Innovation Union Scoreboard 2014, DG JRC
Notes: All data refer to 2012 except PCT data, which refer to 2010.
PCT = Number of PCT patent applications per billion GDP, PPS.
KIA = Employment in knowledge-intensive activities in business industries as % of total employment.
DYN = Innovativeness of high-growth enterprises (employment-weighted average).
COMP = Combination of sub-components GOOD and SERV, using equal weights.
GOOD = High-tech and medium-high-tech products exports as % total exports. EU value refers to EU-28 average (extra-EU = 59.7 %).
SERV = Knowledge-intensive services exports as % of total service exports. EU value refers to EU-28 average (extra-EU = 56 %).

France ranks eighth in the European innovation indicator. It has particular strengths in the share of medium-high and high-tech goods in total goods exports and in the innovativeness of fast-growing innovative firms. Performance stagnated in the period 2010-2012.

Industries contributing most to the high share of medium-high and high-tech exports in France are other transport equipment (aeroplanes and trains), medicinal & pharmaceutical products, essential oils & resinoids & perfume materials, and power generating machinery & equipment.

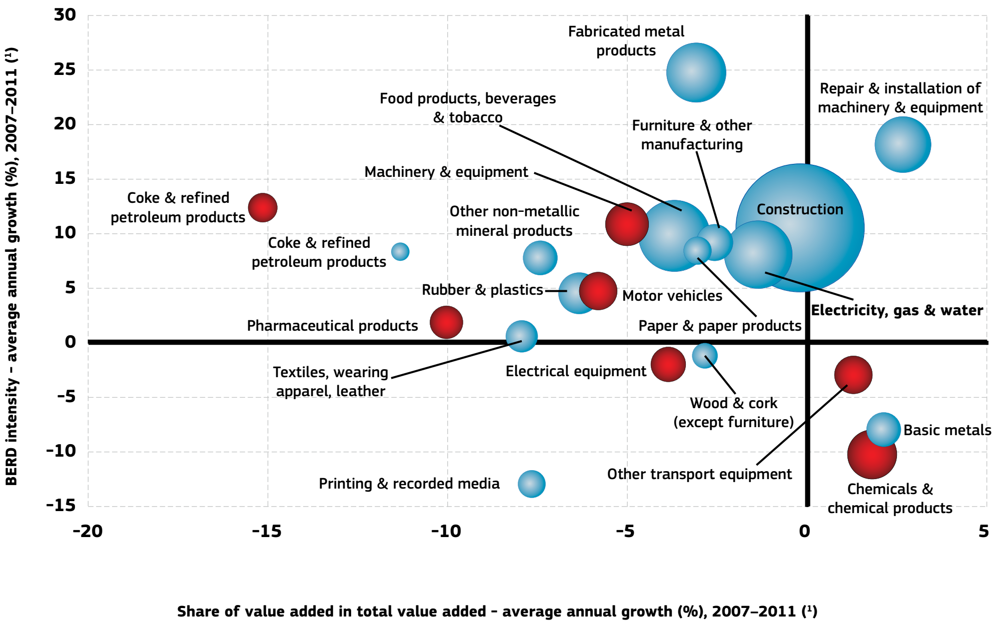
Tourism (leading to corresponding service exports) is an important economic sector in France, which partly explains the relatively low share of knowledge-intensive service exports. Furthermore, French companies collect a relatively high amount of royalties and licence fees, which are classified as not knowledge intensive.

France performs well as regards the average innovativeness scores of fast-growing firms in relation to the total employment in fast-growing firms. This is a result of a high share of employment in ICT and in professional, scientific and technical activities in employment in fast-growing enterprises. However, the growth of these innovative fast-growing firms might be dampened by the administrative thresholds once they reach a specific size (10 or 50 for instance, as was highlighted in the Commission's 2014 in- depth review of France).

Upgrading the manufacturing sector through research and technologies

The graph below illustrates the upgrading of knowledge in different manufacturing industries for the period of 2007-2011. The position on the horizontal axis illustrates the changing weight of each industry sector in value added over the period. The general trend to the left-hand side reflects the decline of manufacturing in the overall economy of France. The sectors above the x-axis are those where research intensity has increased over time. The size of the bubble represents the sector share (in value added) in all sectors presented on the graph. The red sectors are high-tech or medium-high-tech sectors.

France – Share of value added versus BERD intensity: average annual growth, 2007–2011 (1)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat
Notes: (1) 'Coke and refined petroleum products': 2010–2011.
(2) High-tech and medium-high-tech sectors (NACE Rev. 2 – two-digit level) are shown in red.

The graph above shows that almost all manufacturing sectors have seen their weight in the economy decrease (horizontal axis) between 2007 and 2012. The only exceptions are basic metals, other transport equipment, and chemicals & chemical products, the last two belonging to high- or medium-high-tech sectors. Since manufacturing high-tech and medium-high-tech sectors (in red) are the most research-intensive sectors in the economy, the shrinking of these sectors in particular has a negative effect on total business R&D intensity in France. In contrast, research intensity (vertical axis) has increased in the majority of the manufacturing sectors, including a majority of high-tech and medium-high-tech sectors. This of course enhances the overall business R&D intensity.

Overall, the second effect has proved stronger than the first – overall business R&D intensity increased from 1.31 % of GDP to 1.44 % between 2007 and 2011. France's manufacturing industry is dominated by food products, beverages and tobacco, and the fabricated metal products sector, which do not belong to high-tech and medium-high-tech sectors. This contributes to limiting the R&D intensity of the French business sector. The graph above shows very significant growth in the BERD intensity in the fabricated metal products sector.

Key indicators for France

FRANCE	2000	2005	2006	2007	2008	2009	2010	2011	2012	Average annual growth 2007–2012 (1) (%)	EU average (2)	Rank within EU
ENABLERS												
Investment in knowledge												
New doctoral graduates (ISCED 6) per thousand population aged 25–34	1.19	1.16	1.20	1.30	1.40	1.49	1.59	:	:	6.9	*1.81*	16
Performance in mathematics of 15-year-old students: mean score (PISA study)	:	:	496	:	:	497	:	:	495	-0.6 (3)	495 (4)	12 (4)
Business enterprise expenditure on R&D (BERD) as % of GDP	1.34	1.31	1.33	1.31	1.33	1.40	1.42	1.44	*1.48*	*2.4*	1.31	8
Public expenditure on R&D (GOVERD + HERD) as % of GDP	0.78	0.77	0.75	0.75	0.77	0.84	0.80 (5)	0.78	*0.78*	*-1.1*	*0.74*	9
Venture capital as % of GDP	0.37	0.42	0.56	0.67	0.44	0.18	0.31	0.46	0.25	-17.9	0.29 (6)	5 (6)
S&T excellence and cooperation												
Composite indicator on research excellence	:	:	:	41.9	:	:	:	:	49.5	3.4	47.8	10
Scientific publications within the 10% most cited scientific publications worldwide as % of total scientific publications of the country	:	9.8	10.0	10.0	10.3	10.4	:	:	:	1.8	11.0	12
International scientific co-publications per million population	:	509	537	569	601	648	668	699	707	4.4	343	15
Public–private scientific co-publications per million population	:	:	:	41	41	42	45	49	:	4.7	53	10
FIRM ACTIVITIES AND IMPACT												
Innovation contributing to international competitiveness												
PCT patent applications per billion GDP in current PPS (EUR)	3.5	4.1	4.0	4.0	4.0	4.3	4.2	:	:	1.8	3.9	7
License and patent revenues from abroad as % of GDP	0.17	0.29	0.28	0.34	0.39	0.54	0.53	0.58	0.47	6.7	0.59	10
Community trademark (CTM) applications per million population	56	75	85	94	95	102	109	114	113	3.6	152	16
Community design (CD) applications per million population	:	24	26	26	27	27	27	27	28	1.6	29	11
Sales of new-to-market and new-to-firm innovations as % of turnover	:	:	:	:	13.2	:	14.7	:	:	5.5	14.4	9
Knowledge-intensive services exports as % total service exports	:	:	:	30.7	29.8	31.2	33.7	33.7	:	2.4	45.3	13
Contribution of high-tech and medium-tech products to the trade balance as % of total exports plus imports of products	3.88	4.95	5.11	4.70	5.32	4.76	4.78	4.65	5.23	-	4.23 (7)	4
Growth of total factor productivity (total economy): 2007 = 100	97	99	100	100	99	96	97	98	97	-3 (8)	97	11
Factors for structural change and addressing societal challenges												
Composite indicator on structural change	:	:	:	56.7	:	:	:	:	58.1	0.5	51.2	7
Employment in knowledge-intensive activities (manufacturing and business services) as % of total employment aged 15–64	:	:	:	:	13.5	13.6	13.8	14.4	14.3	1.5	13.9	12
SMEs introducing product or process innovations as % of SMEs	:	:	:	:	32.1	:	30.6	:	:	-2.4	33.8	16
Environment-related technologies: patent applications to the EPO per billion GDP in current PPS (EUR)	0.26	0.31	0.33	0.36	0.40	0.46	:	:	:	12.4	0.44	7
Health-related technologies: patent applications to the EPO per billion GDP in current PPS (EUR)	0.63	0.59	0.55	0.54	0.57	0.55	:	:	:	1.5	0.53	9
EUROPE 2020 OBJECTIVES FOR GROWTH, JOBS AND SOCIETAL CHALLENGES												
Employment rate of the population aged 20–64 (%)	67.8	69.4	69.3	69.8	70.4	69.4	69.2	69.2	69.3	-0.1	68.4	12
R&D intensity (GERD as % of GDP)	2.15	2.11	2.11	2.08	2.12	2.27	2.24 (5)	2.25	*2.29*	*1.0*	*2.07*	7
Greenhouse gas emissions: 1990 = 100	101	102	100	98	97	93	94	89	:	-9 (9)	83	15 (10)
Share of renewable energy in gross final energy consumption (%)	:	9.5	9.6	10.2	11.3	12.3	12.8	11.5	:	3.0	13.0	16
Share of population aged 30–34 who have successfully completed tertiary education (%)	27.4	37.7	39.7	41.4	41.2	43.2	43.5	43.3	43.6	1.0	35.7	9
Share of population aged 18–24 with at most lower secondary education and not in further education or training (%)	13.3	12.2	12.4	12.6	11.5	12.2	12.6	12.0	11.6	-1.6	12.7	20 (10)
Share of population at risk of poverty or social exclusion (%)	:	18.9	18.8	19.0	18.5 (11)	18.5	19.2	19.3	19.1	0.8	24.8	8 (10)

Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat, DG JRC – Ispra, DG ECFIN, OECD, Science Metrix / Scopus (Elsevier), Innovation Union Scoreboard

Notes:
(1) Average annual growth refers to growth between the earliest available year and the latest available year for which compatible data are available over the period 2007–2012.
(2) EU average for the latest available year.
(3) The value is the difference between 2012 and 2006.
(4) PISA (Programme for Internatonal Student Assessment) score for EU does not include CY and MT. These Member States were not included in the EU ranking.
(5) Break in series between 2010 and the previous years. Average annual growth refers to 2010–2012.
(6) Venture capital: EU does not include EE, HR, CY, LV, LT, MT, SI and SK. These Member States were not included in the EU ranking.
(7) EU is the weighted average of the values for the Member States.
(8) The value is the difference between 2012 and 2007.
(9) The value is the difference between 2011 and 2007. A negative value means lower emissions.
(10) The values for this indicator were ranked from lowest to highest.
(11) Break in series between 2008 and the previous years. Average annual growth refers to 2008–2012.
(12) Values in italics are estimated or provisional.

2014 Country-specific recommendation on R&I adopted by the Council in July 2014

"Take steps to simplify and improve the efficiency of innovation policy, in particular through evaluations, taking into account the latest reforms and if necessary an adaptation of the 'crédit d'impôt recherche'. Ensure that resources are focused on the most effective competitiveness poles and further promote the economic impact of innovation developed in the poles."

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Máire Geoghegan-Quinn
European Commissioner for Research, Innovation and Science

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