

In 2008, 476,000 people were involved in an activity linked to research. Over the past five years, the number of researchers has risen more rapidly in companies (+29%) than in public administrative entities (8%). Women represent 31% of research staff.

In 2008, 476,000 people were involved in activities linked to research. They represented 388,300 full-time equivalents (FTE) showing a 12.2% increase in five years (Table 01). Between 2003 and 2008, the number of researchers increased rapidly, from 192,800 to 229,100 full-time researchers (an average increase of 3.5% per year). The increase in support staff was more limited with a 3.8% rise in 5 years (an average of 0.8% a year) Thus the proportion of researchers stood at 59% in 2008 compared to 56% in 2003, which was equivalent to a ratio of 0.80 support staff per researcher in 2003 compared to 0.69 in 2008.

In 2008, companies employed over FTE 130,000 researchers. Having risen by 29% since 2003, this number progressed faster than in public administrative entities where it reached 99,300 FTE (an increase of nearly 8% in five years). Since 2002, there have been more researchers in companies than in public administrative entities and in 2008, they represented 56.7% of all researchers.

In companies, five sectors of research constituted almost half (46%) of the research base: the "automotive industry", "Information technology and information services", "the aerospace industry", "the pharmaceutical industry" and "communications equipment manufacturing" (Graph 02). Between 2003 and 2008, service industries, including "Information technology and information services" increased four times faster than industries.

Numbers in the public research sector also became highly concentrated: researchers numbered 46,100 in universities, 18,300 in CNRS and 7,600 in CEA.

The share of women among research staff was 31% in 2008. They constituted a smaller proportion of researchers (27%) than of support staff (38%). They were also less numerous in companies (24%) than in public administrative entities (40%).

In companies, the share of women among researchers has remained stable since 2000. It reached 20.3% in 2008. This average conceals disparities among research sectors (Graph 03): women are more numerous in pharmaceutical research (56%) and in chemical research (44%).

The public research sector employs more women than the private sector. Women here represent 35% of researchers and 50% of other staff. Among researchers, the number of women is growing faster than the number of men (an annual average of 2.0% compared to 0.8% between 2003 and 2008) but their proportion is evolving slowly (0.26 points on average).

Within the European Union, France occupies third place, behind Germany and the United Kingdom, in terms of full-time researchers.

At world level, China occupies first place, ahead of the European Union and the United States.

When the number of researchers is compared to the economically-active population, with 8.2 researchers per thousand economically active individuals, France ranks below Japan and the United States but above Germany, the United Kingdom and Spain (Graph 04). Several less populated countries are among the world leaders, in particular Finland and Sweden.

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*In the public sector, the following are identified as Researchers: personnel holding a public service function of research directors, university professors, research fellows and lecturers, non-tenured staff recruited at a level equivalent to the above levels; personnel under private contracts (such as in EPICs), whose functions are equivalent to those enjoyed by the above officials, research engineers and equivalent bodies and the recipients of funding to conduct a PhD (funded doctorate); temporary teaching and research staff (ATER).*

*In companies, R&D researchers and engineers are scientists and engineers engaged in the conception or creation of new knowledge, products, processes, methods or new systems. All non-research staff contributing to the implementation of R&D projects are considered as support staff: technicians and assimilated staff carrying out scientific tasks under the supervision of researchers in addition to qualified or non-qualified workers, office staff and secretarial staff participating in the implementation of R&D projects or directly linked to them. The staff are distributed among one or more economic activity sectors benefiting from R&D work. These 32 research sectors are based on the revised French classification of economic activities (NAF 2).*

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Sources: MESR-DGESIP/DGRI-SIES and MEN-MESR-DEPP.  
Scope: All of France.

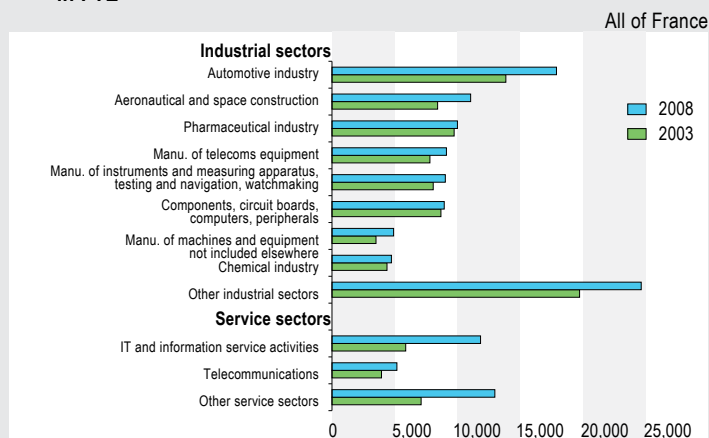
## 01 Research and development full-time equivalent staff

	All of France					
	2003	2004	2005	2006	2007	2008 (sd)
<b>Research staff: researchers + support</b>	<b>346,078</b>	<b>355,774</b>	<b>353,454</b>	<b>369,584</b>	<b>379,006</b>	<b>388,284</b>
<b>Public administrative entities</b>	<b>152,822</b>	<b>155,262</b>	<b>158,462</b>	<b>161,709</b>	<b>163,115</b>	<b>166,408</b>
State	80,904	82,225	84,304	86,533	87,162	88,590
Higher education *	65,702	66,743	67,856	69,044	70,161	72,197
NPO	6,216	6,294	6,302	6,131	5,792	5,621
<b>Business</b>	<b>193,256</b>	<b>200,512</b>	<b>194,992</b>	<b>207,875</b>	<b>215,891</b>	<b>221,876</b>
<b>Researchers</b>	<b>192,790</b>	<b>202,377</b>	<b>202,507</b>	<b>210,591</b>	<b>221,851</b>	<b>229,129</b>
<b>Public administrative entities</b>	<b>92,144</b>	<b>93,626</b>	<b>95,669</b>	<b>97,070</b>	<b>97,274</b>	<b>99,305</b>
State	41,275	42,182	43,739	44,206	44,317	45,719
Higher education *	47,669	48,094	48,440	49,370	49,661	50,550
NPO	3,200	3,349	3,491	3,494	3,296	3,036
<b>Business</b>	<b>100,646</b>	<b>108,752</b>	<b>106,837</b>	<b>113,521</b>	<b>124,577</b>	<b>129,824</b>
<b>Support staff</b>	<b>153,288</b>	<b>153,397</b>	<b>150,947</b>	<b>158,993</b>	<b>157,155</b>	<b>159,155</b>
<b>Public administrative entities</b>	<b>60,679</b>	<b>61,637</b>	<b>62,793</b>	<b>64,639</b>	<b>65,841</b>	<b>67,103</b>
State	39,629	40,043	40,566	42,327	42,845	42,871
Higher education *	18,033	18,649	19,416	19,674	20,500	21,647
NPO	3,016	2,945	2,811	2,637	2,496	2,585
<b>Business</b>	<b>92,610</b>	<b>91,761</b>	<b>88,154</b>	<b>94,354</b>	<b>91,314</b>	<b>92,052</b>

— Break in series. From 2006, companies employing less than 1 full-time equivalent researcher were included in the results.  
(sd) semi-definitive data (excl. CNRS)

Source: MESR-DGESIP/DGRI-SIES.

## 02 Number of researchers per research branch in 2003 and 2006 in FTE

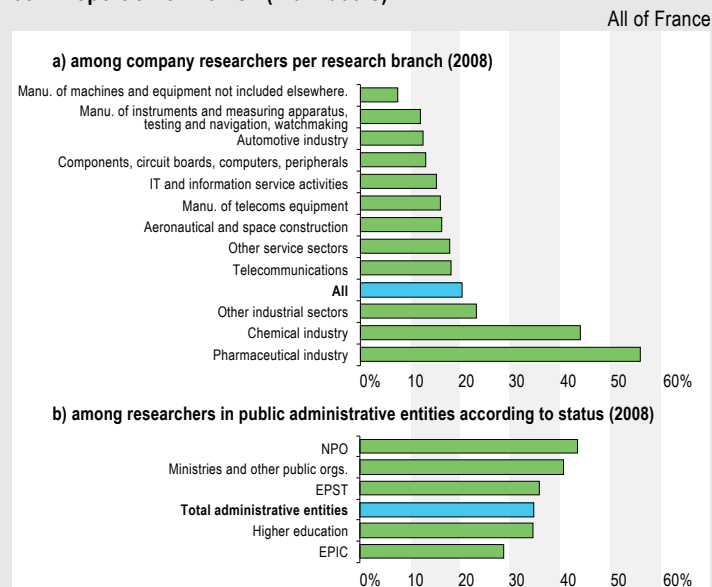


\* Semi-definitive data

Note: the chart data show the numbers of staff involved in the 10 most important research sectors in terms of GERD. The remaining 22 sectors are grouped under the headings "other industries" and "other service industries", based on revised French classification of economic activities (NAF.2).

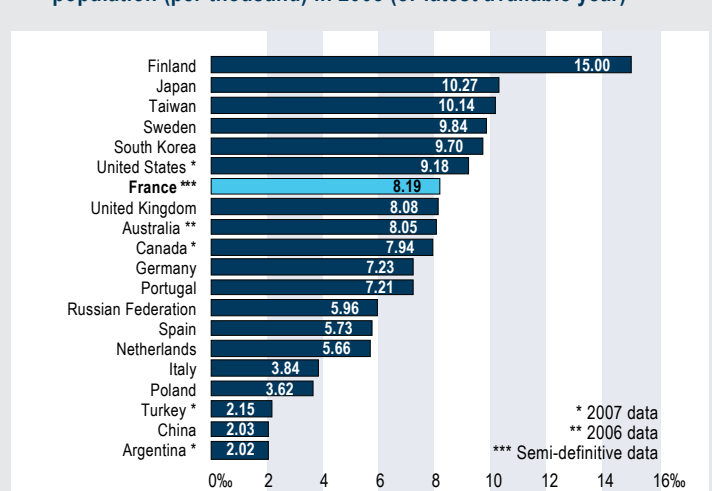
Source: MESR-DGESIP/DGRI-SIES.

## 03 Proportion of women (individuals)



Source: MESR-DGESIP/DGRI-SIES.

## 04 R&D researchers in proportion of the economically-active population (per thousand) in 2008 (or latest available year)



Commentary: The 20 countries shown are those with the largest number of researchers in FTE.

Sources: OCDE (PIST 2010-1) and MESR-DGESIP/DGRI-SIES.

At the beginning of 2009, nearly 66,500 students were enrolled in university doctoral programmes and 11,400 doctorates were awarded. Nearly half the students enrolled for the first time on doctoral courses had been on a Master's course the previous year.

Research studies are carried out in 290 doctoral schools located around France. Their goal is to train specialists and researchers at a very high level, in the course of the three-year thesis preparation. The spread of post-graduate schools, initiated in 2000, is designed to offer transparent and attractive training provision at European and international levels. Following on from a new reform carried out in France within the framework for European higher education development (August 2006), the scientific value of education delivered at PhD level is guaranteed by an accreditation procedure which is an integral part of the institutions' four-year contract. The scientific assessment of doctoral programmes is now conducted by AERES (*Agence d'évaluation de la recherche et de l'enseignement supérieur*: Evaluation agency for research and higher education).

In early 2009, nearly 66,500 students, including 26% new enrollees, were enrolled in doctoral programmes in French public universities. Their numbers have increased by 9% compared to 2000. Between 2000 and 2005, the number of doctoral students increased significantly (+15%) stabilising in 2006. Since 2007, numbers have again decreased (*Graph 01*).

In 2009, the decline was 2% compared to 2008. Enrolment has declined significantly in law, economics and economic and social administration (- 4%), more moderately in arts, languages and humanities (- 3%) and remained stable in science, the discipline that witnessed the largest increase in the number of PhD students between 2000 and 2009.

The distribution of students by discipline has been similar since September 2000 (*Graph 02*). In 2009, the proportion of incoming students in science (43%) was higher than those enrolled in arts, languages and social sciences (35%) or in law, economics and economic and social administration (19%).

In 2009, the majority of new PhD candidates enrolled in university (or equivalent) courses the previous year (51% of those registered) were in the second year of a

research Master's or DEA (*diplôme d'études approfondies*: advanced research-oriented graduate degree) during 2005 (29%). In addition, 3% were enrolled in a university engineering sector. The 49% not enrolled at the university in the previous year include students from non-university engineering schools (4%) and all those returning to education after a break at least one year or who graduated abroad.

At the beginning of 2009, 3100 students were preparing a PhD in a non-university engineering school, mostly in science, where 90% were enrolled.

11,400 doctorates were awarded in 2008 in French public universities. Their growth (44% since 2000), which had slowed in the previous two years, was still faster than that of doctoral students (*Graph 01*). In 2008, the number of graduates in all subjects increased compared to the previous year, slightly more in sciences (4%) than in in arts, languages and social sciences (3%) and law, economics and economic and social administration (2%), the discipline that has experienced the largest increase in the number of PhDs since 2000 (50%).

The breakdown of doctorates awarded by discipline did not change during the period. The proportion of science graduates (59% in 2008), greater than that of doctoral students in this discipline, is also the strongest. A quarter of graduates are in arts, languages, humanities and only 13% in law, economics and economic and social administration (*Graph 02*).

In 2008, 330 doctorates were also awarded in non-university engineering schools, mainly in sciences.

In September 2009, 69% of the students enrolled in the first year of doctoral courses, and whose financial situation is known, received funding for their thesis (*Table 04*): mainly from public funds (MoR, research organisations or regions) or research-related partnerships (CIFRE). In September 2008, this percentage was 66%.

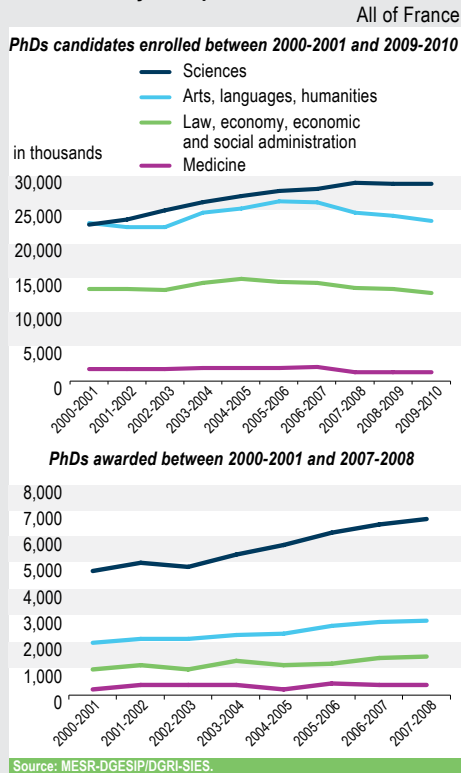
Graphs 01, 02 and Table 03: the data relate to students enrolled in doctoral theses and graduates in French universities - or in similar establishments - and in non-university engineering schools identified by the SMIS information system.

However, theses which are part of the preparation for the state diplomas Doctor of Medicine, Doctor of Pharmacy and Doctor of Dental Surgery are not taken into account. Sciences include STAPS. In order to identify the education pursued in the previous year by graduate students enrolled in 2009, a cohort was set up. The non-identified students were those who had not enrolled in a university or equivalent or non-university engineering school the previous year.

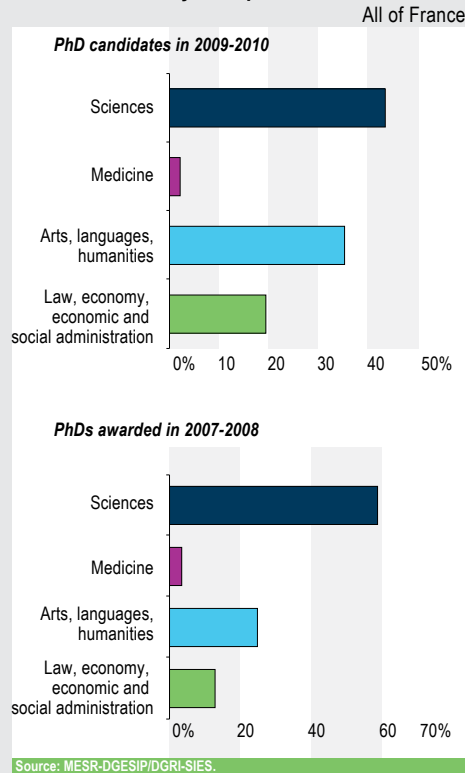
Table 04: Data are available for students enrolled in the 1st year of doctoral thesis in schools listed by the SIREDO information system (excluding medicine, dentistry and pharmacy).

Source: MESR-DGESIP/DGRI-SIES.  
Scope: All of France.

## 01 Trends by discipline



## 02 Breakdown by discipline



## 03 Training courses taken in 2008-2009, by doctoral students enrolled in 2009 (%)

All of France

Situation in 2008-2009	2009-2010
<b>Enrolled at university*</b>	<b>51%</b>
<i>Master's</i>	44% PhDs
<i>University engineering courses</i>	3% (students of
<i>Others**</i>	4% 1 <sup>st</sup> year)
<b>Not enrolled at university*</b>	<b>49%</b>
<i>Of which engineering schools</i>	4%
<b>All</b>	<b>100%</b>

\* University or equivalent institution.  
\*\* DU, Medical diplomas, preparation for teaching etc, etc.

Source: MESR-DGESIP/DGRI-SIES.

## 04a Funding of PhD candidates enrolled in the first year of thesis as observed at start of 2009 and 2010 academic years

	Total PhD candidates enrolled in first thesis year	Total PhD candidates with known financial status (thesis funded or working)	Total PhD candidates with thesis funding (excluding working PhD candidates)	% funded PhD candidates compared to total candidates	% funded PhD candidates compared to total candidates whose financial situation is known	Total PhD candidates working and without thesis funding
Total at start of 2009 academic yr.	18,509	16,868	11,131	60.1%	66.0%	3,153
Total at start of 2010 academic yr.	19,769	18,564	12,761	64.6%	68.7%	3,098

Source: Source: MESR-DGES (2008 and 2009 SIREDO survey on doctoral schools).

## 04b Breakdown of main types of funding for the academic years 2008-2009 and 2009-2010 (as a % compared to the total of doctoral students receiving thesis funding)

	MESR research grants	Industrial Agreement for Training through Research (CIFRE)	Funding from a research organisation	Regional authority grants	Funding for foreign PhD candidates	Other funding
Total at start of 2009 academic yr.	35%	10%	11%	10%	15%	20%
Total at start of 2010 academic yr.	32%	9%	11%	9%	16%	24%

Source: Source: MESR-DGES (2008 and 2009 SIREDO survey on doctoral schools).

Over 137,100 researchers are engaged in business R&D. The population is young and predominantly male. In 2007, their average age was under 40. More than half these researchers were trained in engineering schools.

The women were on average younger and more qualified than the men.

In France in 2007, over 137,100 researchers (individuals) were engaged in business R&D activity. The population of in-company researchers is young and predominantly male. On average, four out of five researchers are men. However, the younger generations are characterised by greater feminisation. Thus, over a quarter of researchers under age 30 are women (*Graph 01*). Contrary to the administrative sector, the population of in-company researchers decreases rapidly after age 50: 72% are under 45 and 16% are 50 and older. By comparison, among the general population of company employees, 66% are under 45 and 21% over 50. These statistics fuel the hypothesis that a large majority of business researchers conduct only the first part of their careers in private research. However, the age of researchers varies across the research sectors in which they work: in engineering and computer science, half the researchers are under 34 while in agriculture, the average age is over 42.

Over half of business researchers (52.5%) come from engineering schools (*Graph 02*). PhDs constitute 13.2% of researchers and almost one third of them have degrees in medicine. Moreover, among the doctors outside health-related disciplines, 22% have completed their doctorate from a school of engineering, which reinforces the weight of this sector. In the research area of pharmacy, more than half have PhDs while in automobile and aircraft construction the proportion of PhDs is 6% and 7% respectively. A unique feature of business research is that the proportion of researchers whose highest degree is below Bachelor's degree level (12%). These individuals are employed as researchers thanks to

their professional experience or continuing education, but are not validated by a diploma.

The percentage of women, which is 20.8% for all business researchers, varies widely depending on their training (*Graph 03*). Among doctors in the field of health, women are equal with men. They represent nearly 30% of PhDs outside the health sector and of university graduates (Masters, DEA, DESS). Courses in engineering school and those below Bachelor's degree level are the least feminised.

The percentage of women, which is 20.8% for all business researchers, varies widely depending on their training (*Graph 03*). Among doctors in the field of health, women are equal with men. They represent nearly 30% of PhDs outside the health sector and of university graduates (Masters, DEA, DESS). Courses in engineering school and those below Bachelor's degree level are the least feminised.

Male business researchers focus their research disciplines in three areas: "Engineering 1" (41%), "Engineering 2" (28%) and "Mathematics/software/physics" (15%) (*Graph 04*). The research disciplines exercised by women are much more varied than those of men. In addition to "engineering" and "mathematics/software/physics" which occupy 58% of them (as against 84% of men), "biological and medical sciences" and "chemistry" play an important role in female research activity.

In 2007, 5% of industrial researchers working in France were of foreign nationality. Over half of them are from European Union countries.

The 2007 data presented are definitive and derive from the **special investigation into scientific and engineering research and development in companies in 2007**. This survey is a component of the biennial annual survey of resources devoted to research and development companies. The special survey of researchers and engineers in research and development business accounts only for **natural persons**.

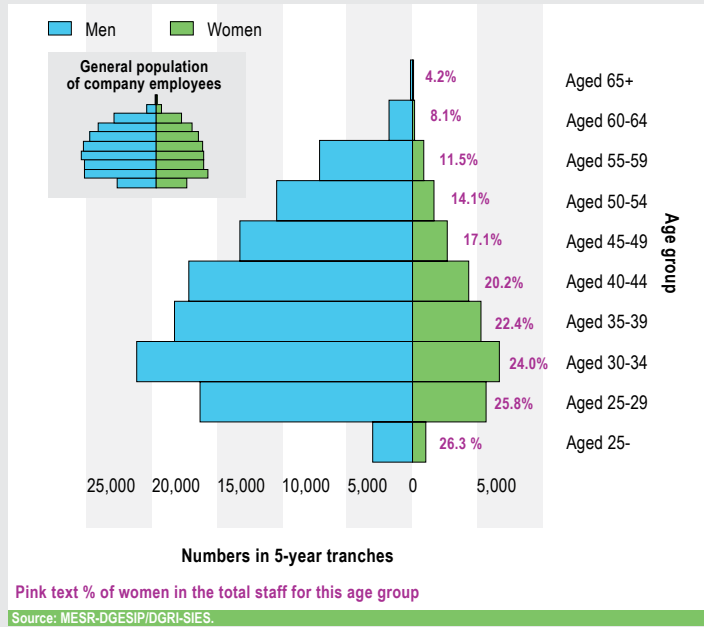
**Researchers and engineers in business R&D**, scientists and engineers are engaged in the conception or creation of new knowledge, products, processes, methods or new systems (including post-graduate students paid by the company as recipients of a CIFRE [Convention industrielle de formation par la recherche:- Industrial Agreement for Training through Research] agreement for example), and high-level personnel with responsibilities for managing teams of researchers.

**"Engineering 1"** includes: electrical, electronics, computer science, signal processing, photonics, optronics.

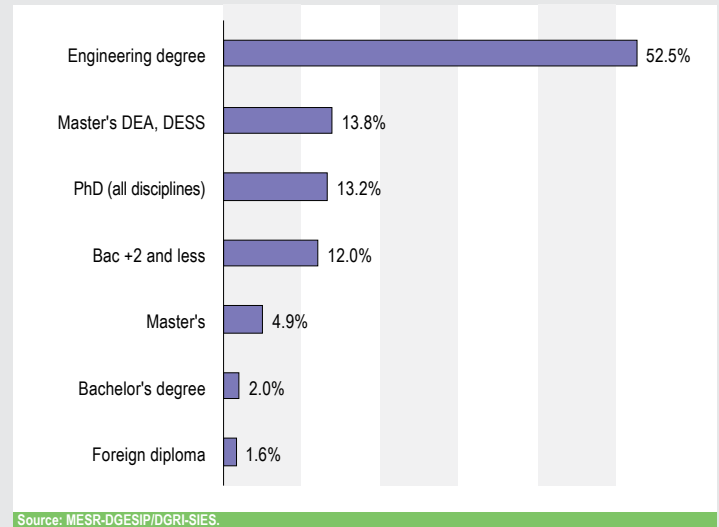
**"Engineering 2"** includes civil, mechanical, materials engineering, acoustics, fluid mechanics, thermodynamics, energetics, process engineering.

Source: MESR-DGESIP/DGRI-SIES.  
Scope: All of France.

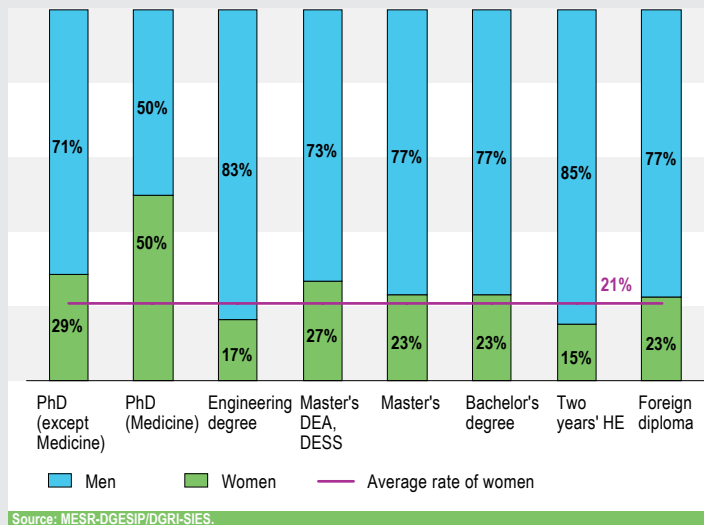
## 01 In-company researchers in 2007 (definitive figures): Age pyramid



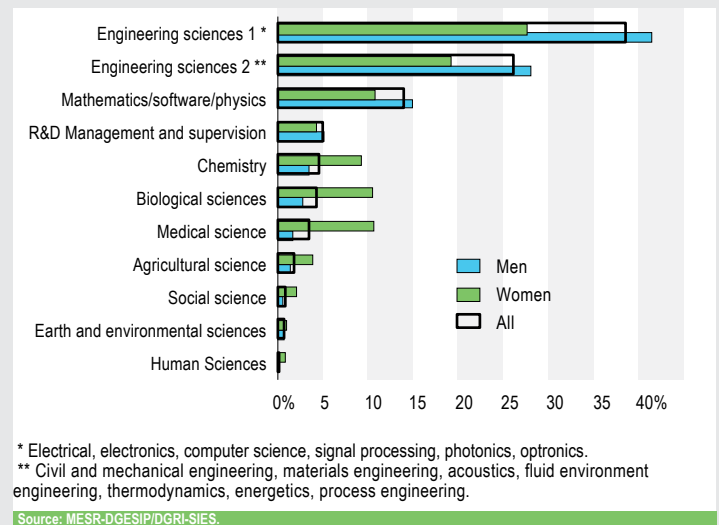
## 02 Researchers in companies in 2007 (definitive figures): breakdown by highest qualification



## 03 Researchers in companies in 2007 (definitive figures): proportion of women according to highest qualification



## 04 Researchers in companies in 2007 (definitive figures): breakdown by research discipline and gender



The status of Young Innovative Company (YIC) was established by the Finance Act of 2004 to enable small and medium enterprises engaged in research to face the considerable challenges of their early years.

In 2008, the research expenditure of YICs was €500 million, mostly concentrated in service industries.

**Y**oung Innovative Companies (YIC) are small businesses in terms of their workforce. In 2008, the average number of employees in a YIC was 10 with 90% of YICs having fewer than 20 employees. In 2008, firms conducting research and development (R&D) on French territory employed an average of 277 people (*Table 01*).

YICs were actively involved in research conducted in France by small and medium enterprises. In 2008, internal YIC expenditure on R&D was estimated at €500 million, which constitutes over 10% of the research spending of firms with fewer than 250 employees. Moreover, two thirds of YIC research is conducted in businesses with fewer than 20 employees. In 2008, each YIC invested an average of €400,000 in research (*Table 01*). This amount is twice larger than the average amount spent by companies with fewer than 20 employees conducting R&D due to the higher average numbers of R&D staff in YICs than in companies with fewer than 20 employees: 5.5 as against 3.0 full-time equivalent (FTE).

YICs often cooperate with other research actors. In fact, nearly 42% of them outsource research to public agencies or firms. This proportion is only 33% if we observe all firms with fewer than 20 employees.

In 2008, public funding (excluding indirect subsidies such as exemption from social security contributions or the research tax credit) received by the YICs for

research amounted to €121m. Like the other small and medium enterprises, the bulk of funding for YIC derives from incentive credits from ministries and agencies. These funds represent over 85% of all public funds received by YICs (*Table 02*). In contrast, YICs receive very little of the funding related to defence and large technology programmes (1.5% of public funds).

YICs in the first four research sectors represent 70% of GERD (*Graph 03*). Their expenses are more concentrated than in firms with fewer than 20 employees and companies with 20-249 employees, where the first four research sectors represent 57% and 37% of GERD respectively. Three sectors of service research receive more than half of YIC investment. These are "professional, scientific and technical", "computer activities and information services" and "publishing, broadcasting and distribution." With 14% of the research, the pharmaceutical industry is the main branch of YIC Industrial Research.

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The Finance Act for 2004 established the status of young innovative companies (YIC). To qualify, companies must meet five conditions:

- Being an SME in the European Union sense: employing fewer than 250 people and with a turnover of less than €50 million or total assets below €40 million;
- Be less than eight years old;
- Have a minimum volume of research spending: at least 15% of tax deductible expenses, at the close of each fiscal year;
- Be independent;
- Be truly new;

YIC status confers benefits:

- Exemptions from payroll taxes for researchers, technicians and project managers in R&D.
- Total exemption from income tax for three years, followed by a partial exemption of 50% for two years.
- Total exemption of fixed annual tax (IFA), throughout the period for which it retains the status of YIC.

The **research branch** is the branch of economic activity recipient of R&D, described here for 32 posts based on the 2008 revised classification of French activities (NAF 2)

The "Professional, scientific and technical services" research sector consists primarily of research and development and engineering services.

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In this file, the YICs are companies performing R&D on French territory.

Sources: MESR-DGESIP/DGRI-SIES and MEN-MESR-DEPP.

Scope: All of France.

## 01 Characteristics of companies by category in 2008 <sup>(1)</sup>

All of France

	YIC	Number of employees at 31 December 2008			Total companies
		Fewer than 20	20 to 249	250 or more	
Average workforce	9.6	7.8	79.8	1,822.4	276.5
Average GERD Amount in millions of euros	0.4	0.2	0.8	13.7	2.2
Average EERD * Amount in millions of euros	0.1	0.1	0.2	3.9	0.6
Average number of researchers (full-time)	3.7	1.8	5.3	62.3	11.2
Average number of R&D staff (full-time)	5.5	3.0	9.0	106.5	19.2
Average intensity of R&D **	41.8	31.3	11.6	8.8	19.6
Share of joint exporting companies *(%)	0.9%	0.2%	6.8%	37.5%	8.0%
Share of companies with an EERD > 0- (%)	42.3%	32.9%	37.5%	56.5%	38.0%

\* EERD: External Expenditure on Research and Development. \*\* Ratio average (GERD/numbers).

SOURCES: MESR-DGESIP/DGRI-SIES AND MEN-MESR-DEPP.

## 02 Public funding received in 2008 by category of company <sup>(1)</sup>

All of France

	Amount of public funding received	Share of public funding received under GERD	Nature of public funding received			
			Defence	Large technological programmes	Incentive credits	Other civilian funding**
			As a % of the total of each category of companies			
YIC	121	23.6%	1.4%	0.1%	85.5%	13.0%
Companies with fewer than 20 employees	227	23.6%	6.9%	0.0%	81.0%	12.1%
Companies with 20-249 employees	302	7.4%	9.0%	2.9%	72.7%	15.4%
Companies with 250 employees or more	2,573	12.4%	77.9%	11.5%	8.9%	1.7%
Total companies	3,102	12.0%	66.0%	9.8%	20.4%	3.8%
<b>Amount of public funding * spent on all companies (in € millions)</b>	<b>3,102</b>		<b>2,048</b>	<b>305</b>	<b>631</b>	<b>117</b>

€m: million euros

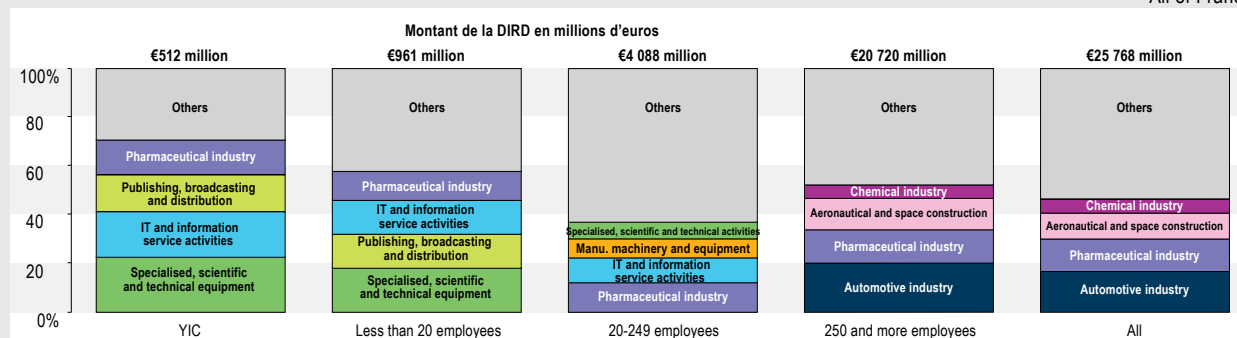
\* Indirect aid received by companies such as exemption from payroll taxes or research tax credits are not included

\*\* Funding from regional government and associations

SOURCES: MESR-DGESIP/DGRI-SIES AND MEN-MESR-DEPP.

## 03 Breakdown of the main GERD research sectors in companies by category in 2008 <sup>(1)</sup>

All of France



Sources: MESR-DGESIP/DGRI-SIES AND MEN-MESR-DEPP.

(1) Scope of companies conducting R&D activity in France.