

24 November 2022

**R&D Statistics**  
Year 2021. Final data

**Internal R&D spending reached 17,249 million euros in 2021, 1.43% of GDP**

**In per capita terms, spending on internal R&D amounts to 363.66 euros per inhabitant**

**For the first time in this Statistic, INE has implemented the statistical concept of Enterprise**

In accordance with the European Statistical System, the Statistics on Research and Development Activities (R&D) in the business sector implemented the new statistical concept of business<sup>1</sup>. Under this modification, the statistical enterprise can coincide with the legal unit, the business group or part of a group of companies (the last two cases represent around 3% of the total). The results of the operation in said sector and their distribution by activities, company sizes and autonomous communities of the registered offices are affected

Due to the methodological change, the indicators for the business sector are not comparable with those of previous years. However, the methodological annex offers a comparative analysis under the assumption of considering Legal Units as an operational approach to enterprises.

### **Internal R&D expenses**

Internal Research and Development (R&D) expenditure amounted to 17,249 million euros in 2021.

This expenditure represented 1.43% of the Gross Domestic Product (GDP), compared to 1.41% in 2020.

By implementing sector, the *Business* sector represented the highest percentage of *internal R&D* expenditure, with 56.2% (which meant 0.80% of GDP). It was followed by the *Higher Education* sector, with 26.6% (0.38% of GDP).

In turn, internal R&D expenditure in the *General Government* sector accounted for 16.9% of national expenditure (0.24% of GDP). The remaining 0.3% corresponded to the *Non-Profit Private Institutions* (NPI) sector.

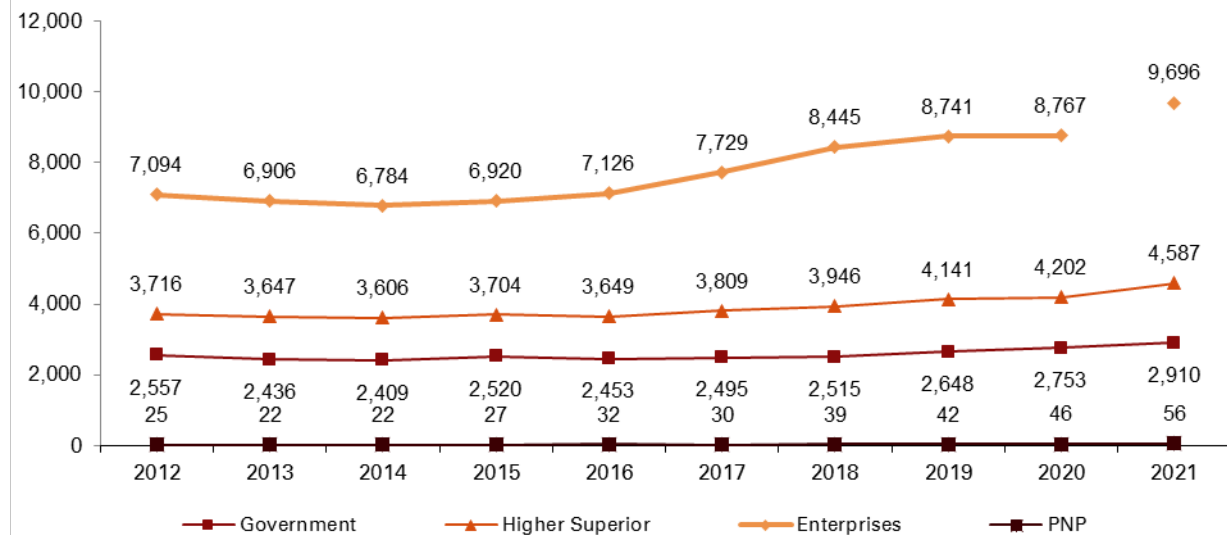
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<sup>1</sup> The reasons why the INE has adapted the definition of enterprise, from a statistical perspective, were communicated in press release published on December 17, 2019.

Expenditure on R&D increased by 9.2% compared to the previous year in *Higher Education* and by 5.7% in *Public Administration*.

## Evolution of internal R&D expenditure. Implementing Sectors

Millions of euros



Enterprises: legal units until 2020 and statistical enterprises in 2021

## Funding of internal R&D activities

Internal R&D activities were mainly financed in 2021 by the *Business* sector (50.2% of the total) and the *General Government* (37.5%).

Funds from the Rest of the World (7.5%), from *Higher Education* (4.0%) and from IPSFL (0.9%) completed the funding.

By implementing sectors, internal R&D expenditure in the *General Government* and *Higher Education* was mainly financed by the *General Government* (80.0% and 71.5%, respectively).

On the other hand, 84.0% of the financing of internal R&D expenditure in the *Business* sector came from the sector itself.

## Internal R&D expenditure by implementing sector and by source of funds

Year 2021. Thousand euros

Execution sector	Total	Source of Funds				
		Government	Higher Education	Enterprises	PNP	Rest of the World
TOTAL	17,249,250	6,461,184	686,743	8,666,064	149,604	1,285,655
Government	2,910,025	2,328,280	5,609	240,616	57,794	277,725
Higher Education	4,586,993	3,280,703	677,966	243,835	63,846	320,643
Enterprises	9,696,150	846,270	2,810	8,147,944	16,421	682,705
PNP	56,081	5,931	358	33,667	11,543	4,582

### Personnel employed in internal R&D

A total of 249,474 full-time equivalent persons were engaged in internal R&D activities in 2021, representing 12.6 per thousand of the total employed population.

The group of researchers reached the figure of 154,125 full-time equivalent persons, which represented 7.8 per thousand of the total employed population.

40.5% of full-time equivalent personnel in internal R&D were women. The highest percentages of female participation were in *General Government* (54.0% of total employment) and in the *IPSFL* (52.3%). In *Higher Education*, this percentage stood at 46.0%, whereas in the *Business* sector it was 31.1%.

### Personnel employed in R&D by implementing sector by occupation and sex

Year 2021. In full-time equivalent

Execution Sector	Total			Researchers		
	Total	Women	%	Total	Women	%
<b>TOTAL</b>	<b>249,473.9</b>	<b>100,998.5</b>	<b>40.5</b>	<b>154,125.3</b>	<b>61,262.2</b>	<b>39.7</b>
Government	44,147.2	23,845.8	54.0	23,418.0	11,836.5	50.5
Higher Education	88,227.4	40,605.5	46.0	69,984.1	30,175.6	43.1
Enterprises	116,465.1	36,215.3	31.1	60,374.3	19,077.0	31.6
PNP	634.2	331.9	52.3	348.9	173.1	49.6

## Expenditure and personnel in internal R&D by Autonomous Community

The Autonomous Communities with the highest expenditure on internal R&D activities in 2021 were Cataluña (26.3% of the total), Comunidad de Madrid (23.7%) and Andalucía (9.9%).

On the other hand, the autonomous cities of Ceuta and Melilla (with a share of total internal R&D spending of less than 0.1%) and La Rioja (0.4%) invested the least.

## Internal R&D expenditure and total FTE personnel by Autonomous Community where the expenditure was made

Year 2021. Thousand euros

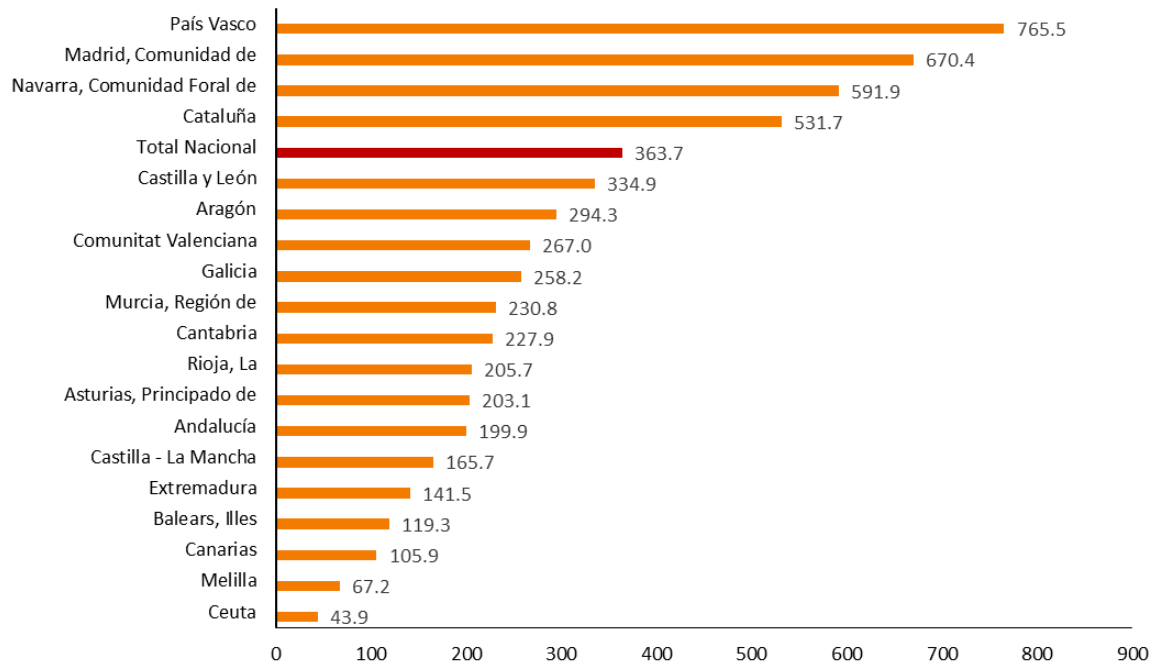
Regions	R&D Expenditures		Total R&D personnel	
	Total sectors	Distribution Spending	Total sectors	Distribution personnel
<b>TOTAL</b>	<b>17,249,250</b>	<b>100.0</b>	<b>249,473.9</b>	<b>100.0</b>
Andalucía	1,702,682	9.9	27,007.5	10.8
Aragón	386,939	2.2	6,673.4	2.7
Asturias, Principado de	204,327	1.2	3,385.4	1.4
Balears, Illes	146,044	0.8	2,996.6	1.2
Canarias	238,542	1.4	4,009.1	1.6
Cantabria	133,210	0.8	2,160.1	0.9
Castilla y León	795,932	4.6	11,117.6	4.5
Castilla-La Mancha	339,734	2.0	3,862.9	1.5
Cataluña	4,083,036	23.7	55,907.4	22.4
Comunitat Valenciana	1,354,194	7.9	22,084.1	8.9
Extremadura	149,078	0.9	2,766.3	1.1
Galicia	694,942	4.0	11,373.8	4.6
Madrid, Comunidad de	4,538,085	26.3	61,116.7	24.5
Murcia, Región de	351,429	2.0	6,788.2	2.7
Navarra, Comunidad Foral de	390,206	2.3	5,301.0	2.1
País Vasco	1,666,672	9.7	21,498.5	8.6
Rioja, La	64,987	0.4	1,305.9	0.5
Ceuta	3,620	0.0	54.3	0.0
Melilla	5,589	0.0	65.0	0.0

In per capita terms, spending on internal R&D amounted to 363.66 euros per inhabitant

The Autonomous Communities with the highest spending on internal R&D activities per inhabitant were País Vasco (765.5 euros), Comunidad de Madrid (670.4) and Comunidad Foral de Navarra (591.9).

On the other hand, those that registered the lowest expenditure per inhabitant were the autonomous cities of Ceuta (43.9 euros) and Melilla (67.2), and Canarias (105.9).

**Spending on internal R&D per inhabitant and by autonomous communities**  
Year 2021. Euros

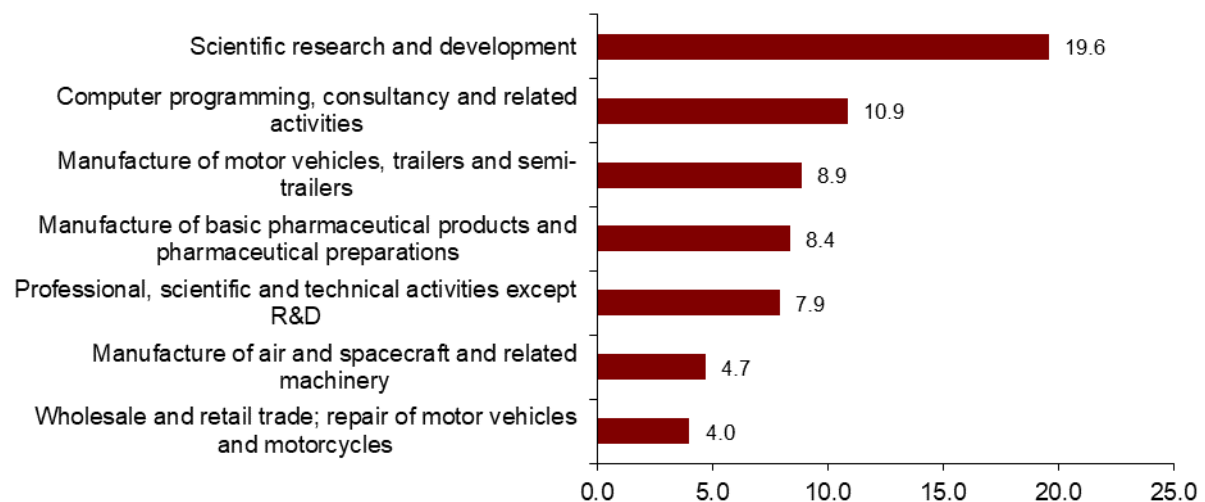


**Distribution of internal R&D expenditure by branch of activity in the *Business Sector***

Companies in the *Services* sector accounted for 51.6% of expenditure on business internal R&D in the year 2021, while those in *Industry* sector accounted for 46.4%.

By activity branches, *R&D Services* (with 19.6% of total spending), *Programming, consulting and other IT activities* (10.9%) and *Motor vehicles* (8.9%) stood out.

**Distribution of internal R&D expenditure by branch of activity**  
Year 2021. Percentage



## Data Review and Update

The data published today are final. All results are available on INEBase.

## Methodological annex

### New practical implementation of the statistical unit 'Enterprise'

The statistical definition of the “Enterprise” statistical unit is established by a regulation of the European Union (696/93) that defines it as the *“smallest combination of legal units that produces goods or services and that enjoys a certain degree of decision-making autonomy, particularly when using the resources available to it.”*

Up to and including the 2020 reference period, for operational purposes, the INE has identified the Enterprise statistical unit with the Legal Unit (through the NIF) in the Statistics on R&D Activities. Thus, each Legal Unit formed a Enterprise for statistical purposes.

However, the progressive complexity of the way in which enterprise groups operate internally nowadays caused the European Statistical System (ESS) to search for an improvement as regards the way in which the activity of these groups is reflected in enterprises’ official statistics. Legal Units that belong to enterprise groups sometimes sell their products or provide their services exclusively or mainly within the group, without being market-oriented or having decision-making power over the entire production process.

For these reasons, and in accordance with the European Statistical System (SEE), based on data with reference 2021, the Statistics on R+D activities in companies establishes a new practical application of the statistical concept of Enterprise, by which an 'Enterprise' can be:

- An independent Legal Unit that is not part of the enterprise group, meaning that it should have decision-making autonomy.
- An enterprise group made up of one or more Legal Units, which operate together.
- A subset of one or more Legal Units of an enterprise group.

This change in the treatment of enterprises -which was also implemented in the Statistical Use of the Central Enterprise Register (DIRCE)- was announced by the INE in a December 17, 2019 Press Release:

[https://www.ine.es/prensa/nueva\\_definicion\\_empresa.pdf](https://www.ine.es/prensa/nueva_definicion_empresa.pdf)

For more information on the delineation of the statistical unit Enterprise within enterprise groups, please see the following link:

[https://www.ine.es/metodologia/t37/t3730200\\_profiling.pdf](https://www.ine.es/metodologia/t37/t3730200_profiling.pdf)

## Effects of the implementation of the Statistical Enterprise on the Statistics on R&D Activities (Company sector)

The adoption of the concept of the Statistical Enterprise in the Statistics on R&D Activities implies that, when the Enterprise is made up of more than one Legal Unit (LU), its LUs must be grouped, condensing all values of each indicator into the Statistical Enterprise.

This consolidation produces a reclassification effect on the results of the 2021 statistics, based on the Statistical Enterprise defined below:

**Reclassification effect**, due to the grouping of Legal Units that are part of the Enterprise and their reassignment to the main activity, autonomous community where the headquarters is located, and size of said Enterprise. Defined as the variation rate of the variables calculated for the Statistical Enterprises before consolidation, with respect to those obtained based on the LUs; both referring to the 2021 period.

## Impacts of the implementation of the Statistical Enterprise on the S. on R&D Activities (Enterprises) 2021

	N of R&D enterprises	Expenditures on internal R&D	R&D Personnel (FTE)	Researchers (FTE)
	Rec effect	Rec effect	Rec effect	Rec effect
Agriculture	-6.3	-4.9	-2.5	-2.5
Industry	-4.9	2.6	2.6	1.9
Construction	-6.5	2.0	1.8	0.5
Services	-4.2	-2.2	-1.9	-1.1

## Statistical results based on Legal Units

The following tables show the differences compared to the previous period of the main variables studied in the Enterprise sector of the Statistics on R&D Activities if the Legal Unit were taken as an approximation to the enterprise concept.

### Main variables by Legal Unit

	2021	2020	Annual rate
N. of R&D enterprises	11,828	11,188	5.7
Expenditures on internal R&D*	9,696,149.2	8,767,459.9	10.6
R&D Personnel (FTE)	116,639.0	104,727.8	11.4
Researchers (FTE)	60,395.8	55,299.2	9.2

\*thousands of euros

Within the Enterprise sector, spending on internal R&D stood at 9,696 million euros in 2021, which represented an increase of 10.6%.

Full-time equivalency (FTE) personnel who carried out R&D tasks in companies increased by 11.4%, going from 116,639.0 to 104,727.8 people.

The number of FTE researchers who carry out internal R&D increased by 9.2%, reaching 60,395.8.

**Comparison of internal R&D spending by branch of activity and Legal Unit**

	Distribution		Distribution		Annual rate
	2021	2021	2020	2020	
<b>TOTAL</b>	<b>9,696,149.2</b>	<b>100.0</b>	<b>8,767,459.9</b>	<b>100.0</b>	<b>10.6</b>
Agriculture	97,468.5	1.0	103,450.4	1.2	-5.8
Industry	4,383,545.6	45.2	4,051,764.8	46.2	8.2
Construction	98,863.1	1.0	90,388.5	1.0	9.4
Services	5,116,272.0	52.8	4,521,856.2	51.6	13.1

By activity branches, spending on internal R&D increased by 13.1% in *Services*, 9.4% in *Construction* and 8.2% in *Industry*.

On the other hand, compared to 2020, it fell 5.8% in *Agriculture*.



## Methodological note

The main objective of the Statistic on scientific research and technological development (R&D) activities is to measure the economic and human resources allocated to research by all the economic sectors into which the economy is divided (companies, general government, higher education and private non-profit institutions) for the purpose of:

- To provide an instrument for the management, planning, decision-making and control of national science policy.
- To provide statistical bodies with the information they request, obtained in accordance with international standards that allow comparability between countries.

**Type of survey:** annual continuous survey.

**Population scope:** companies, public bodies, universities and higher education institutions and private non-profit institutions that carry out R&D activities.

**Geographical scope:** the entire national territory.

**Reference period of the results:** year prior to the year of data collection.

**Reference period of the information:** for expenditure, the calendar year; for staff, the annual average and full-time equivalence (persons/year).

**Sample size:** 45,000 companies, 541 public administration centres (including public hospitals), 86 universities, 109 higher education centres and 140 private non-profit institutions.

**Type of sampling:** comprehensive for directory units and by random sampling of non-included companies.

**Collection method:** mixed system with mail and interviewer participation.

For more information you can access the methodology and the standardized methodological report at:

[https://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica\\_C&cid=1254736176754&menu=metodologia&idp=1254735576669](https://www.ine.es/dyngs/INEbase/en/operacion.htm?c=Estadistica_C&cid=1254736176754&menu=metodologia&idp=1254735576669)

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