Research and development statistics at regional level

Statistics Explained

Data extracted in May 2025.
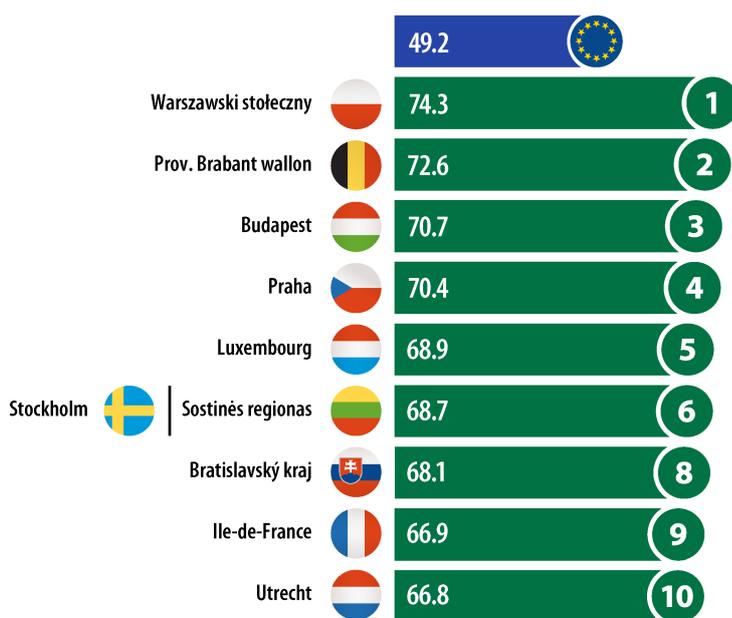*Planned article update: September 2026.*

This article forms part of the *Eurostat regional yearbook – 2025*, an annual flagship publication . It provides a detailed picture relating to a broad range of statistical topics across the regions of the EU, EFTA and candidate countries.
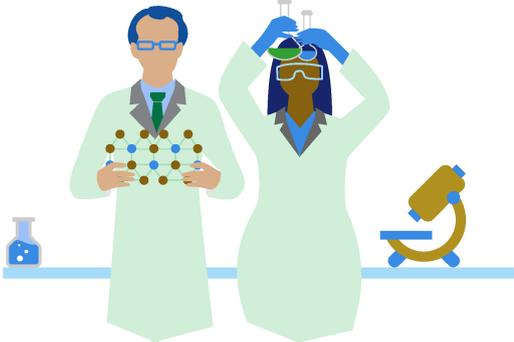
Highlights

In 2024, the French capital region of Ile-de-France had the highest number of people employed in high-technology sectors (498 000); it was followed by the Spanish capital region of Comunidad de Madrid (304 000) and the northern Italian region of Lombardia (282 000).

The French capital region of Ile-de-France had 327 000 female
scientists and engineers in 2024; the next highest count was in the German region of Nordrhein-Westfalen (286 000).

Region		Value	Rank
	EU	49.2	
Warszawski stołeczny		74.3	1
Prov. Brabant wallon		72.6	2
Budapest		70.7	3
Praha		70.4	4
Luxembourg		68.9	5
Stockholm / Sostinės regionas		68.7	6
Bratislavský kraj		68.1	8
Ile-de-France		66.9	9
Utrecht		66.8	10

Which EU regions had the highest shares of human resources in science and technology?

(% of the labour force, by NUTS 2 regions, 2024)
Note: Mayotte (FRY5), not available.
Source: Eurostat (online data code: hrst_st_rcat)

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Source: Eurostat (hrst_st_rcat)

Research and development (R&D) is a driver of economic growth, productivity and long-term competitiveness, both within the European Union (EU) and beyond. It has the potential to help solve some of the world's largest economic, societal and ecological challenges; in doing so, it can improve the daily lives of millions of people.

Education, training and lifelong learning play a vital role in developing a region's capacity to innovate. To build and expand its knowledge-based economy , the EU requires a consistent supply of highly skilled and qualified individuals. This chapter presents key statistics on human resources in science and technology (HRST) and employment in high-technology sectors, with a special focus on the role of women in research and development, where EU-wide initiatives aim to increase female participation in science and technology through mentorship, education and targeted support.

The infographic above shows that the Polish capital region of Warszawski stołeczny had the highest share of HRST across NUTS level 2 regions, with nearly 3 out of 4 of its labour force classified as such (74.3%) in 2024. Prov. Brabant wallon (Belgium), along with 2 other capital regions – Budapest (Hungary) and Praha (Czechia) – were the only other regions to report shares above 70.0%.

Core human resources in science and technology

In 2024, there were 126.2 million people aged 15 to 74 years in the EU classified as HRST, representing 49.2% of the EU's labour force. Among them, 101.1 million people met the HRST educational criterion, 80.5 million met the occupational criterion and 55.4 million met both the educational and occupational criteria. This latter group – those who are both qualified in science and technology and employed in related occupations – constitutes what is often referred to as 'core HRST'. These people are the main focus of the information presented in this section.

Map 1 shows the distribution of core HRST across NUTS level 2 regions. Regions with high shares of core HRST in their labour force are likely to experience a number of benefits, such as higher productivity, higher wage levels, and clusters of research and technology activity. Factors such as these, in turn, are likely to reinforce their attractiveness to graduates and to (new) businesses, thereby generating spillover effects.

More about the data: statistics on core human resources in science and technology

The criteria used to define human resources in science and technology statistics (HRST) are generally broader than those used to delineate R&D personnel and researchers; the latter refer specifically to occupations. R&D personnel include all people directly engaged in R&D as well as people providing direct services for R&D activities (such as R&D managers, administrators, technicians and clerical staff). Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, as well as in the management of the projects concerned.

HRST are defined as people who meet at least 1 of the following criteria.

- HRST by education – have successfully completed a tertiary education , as defined by the international standard classification of education (ISCED) levels 5 to 8.

- HRST by occupation – are employed in a science and technology occupation, as defined by the international standard classification of occupations (ISCO) major groups 2 and 3.

Core HRST are defined as people who meet both of the above criteria. These individuals are particularly relevant as they combine formal qualifications with practical engagement in the field. Common roles taken by people classified as core HRST include scientists and engineers, teaching professionals, health professionals, business and administration professionals, information and communications technology (ICT) professionals, lab technicians, medical and pharmaceutical technicians, business and administration associate professionals, and ICT technicians.

In 2024, some of the EU's most populous NUTS level 2 regions were also home to large numbers of core HRST (as denoted by the size of the circles in **Map 1**). The French regions of Ile-de-France and Rhône-Alpes (2.4 million and 1.1 million, respectively), the Spanish regions of Comunidad de Madrid, Cataluña and Andalucía (1.2 million, 1.1 million and 0.9 million, respectively), the Italian region of Lombardia (0.9 million), the German region of Oberbayern (0.8 million) and the Polish region of Warszawski stołeczny (also 0.8 million) were the only EU regions to report more than 0.75 million core HRST. An additional 15 regions each had between 0.50 and 0.75 million core HRST. This group included 5 regions from Germany, 2 regions from each of the Netherlands and Poland, and a single region from each of Ireland, Greece, Spain, France, Italy and Sweden.

Core HRST accounted for approximately 1 in 4 (25.2%) of the EU's labour force in 2024. The regional distribution was uneven: around 1 out of 3 NUTS level 2 regions (88 out of 243 regions for which data are available) reported a share of core HRST above the EU average, while 154 regions had below-average shares and a single region had a share that matched the EU average.

In 2024, there were 60 NUTS level 2 regions where the share of core HRST in the labour force was at least 27.5% (as shown by the darkest shade of green in **Map 1**). This group included:

- all 3 regions in Ireland

- 7 out of 8 regions in Sweden

- 9 out of 11 regions in Belgium

- the capital region of every multi-regional EU country, except Lazio (Italy)

- at least 1 other region in Denmark, Germany, Spain, France, the Netherlands, Poland and Finland

• Cyprus and Luxembourg.

Looking in more detail, Luxembourg (48.4%) and the Hungarian capital region of Budapest (47.3%) recorded the highest shares of core HRST in their labour forces in 2024. There were 5 other regions that had shares of at least 40.0%:

- 3 capital regions – Warszawski stołeczny in Poland (44.8%), Stockholm in Sweden (41.4%) and Grad Zagreb in Croatia (41.0%)

- Prov. Brabant wallon in Belgium (40.7%)

- Utrecht in the Netherlands (40.0%).

At the lower end of the distribution, 62 NUTS level 2 regions had a share of core HRST in the labour force below 18.5% in 2024 (as shown by the lightest shade of green in **Map 1**). These regions were mostly rural and/or peripheral and were predominantly located in eastern and southern EU countries. Among others, they included:

- 18 out of 21 regions in Italy

- 10 out of 13 regions in Greece

- 6 out of 8 regions in Hungary

- 6 out of 8 regions in Romania
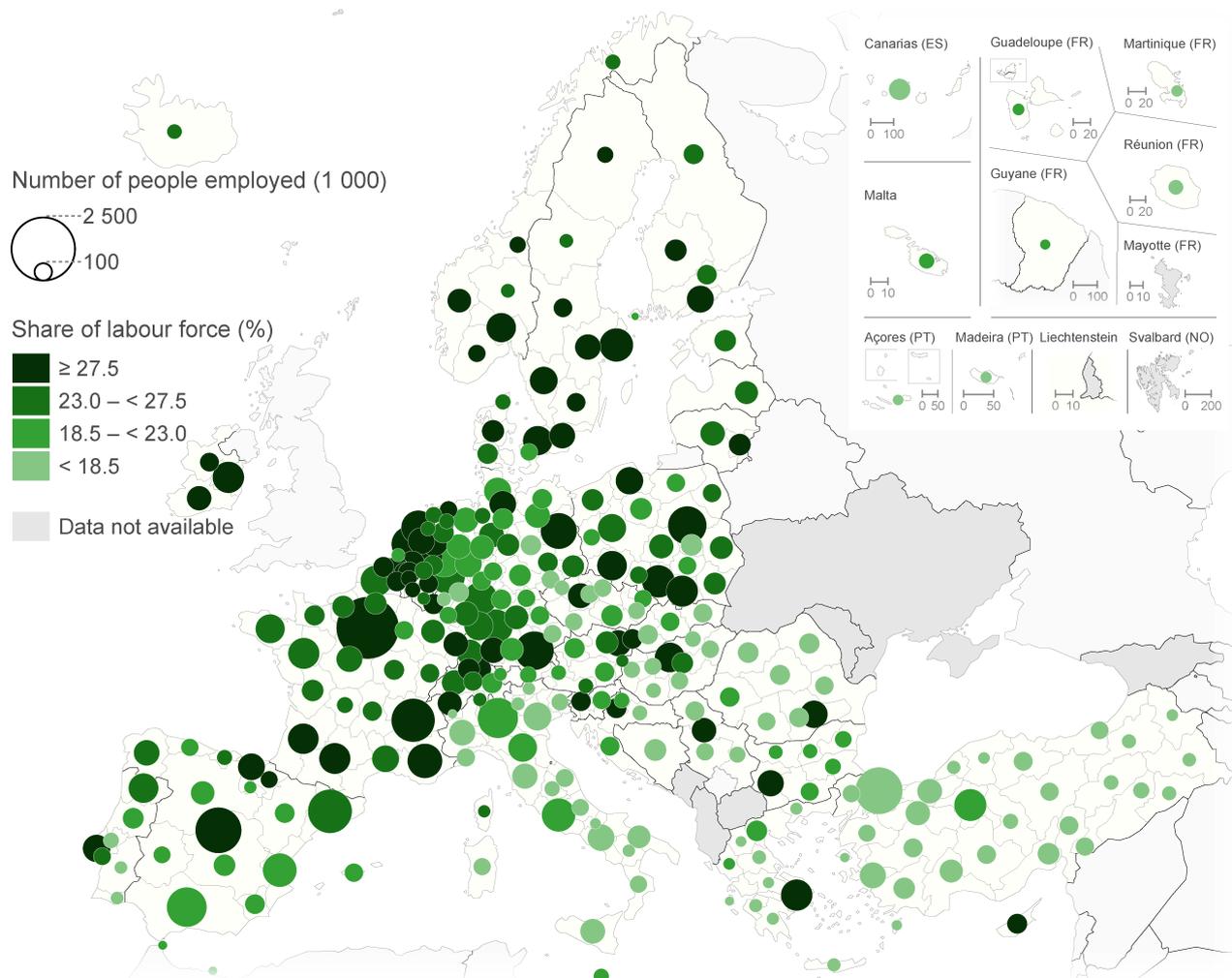
- 5 out of 8 regions in Czechia.

Looking more closely, the Greek region of Sterea Elláda recorded the lowest share of core HRST in its labour force in 2024, at 10.9%. There were 4 other regions that recorded shares below 12.5%:

- 2 more regions from Greece – Ionia Nisia (11.1%) and Notio Aigaio (12.2%)

- Sud-Muntenia in Romania (11.7%)

- Severozápad in Czechia (12.4%).

Core human resources in science and technology

(by NUTS 2 regions, 2024)

Number of people employed (1 000)

- 2 500
- 100

Share of labour force (%)

- ≥ 27.5
- 23.0 – < 27.5
- 18.5 – < 23.0
- < 18.5
- Data not available

Note: EU = 55.4 million people employed as core human resources in science and technology, equivalent to 25.2% of the labour force. Prov. Vlaams-Brabant (BE24), Corse (FRM0) and Åland (FI20): low reliability.
Source: Eurostat (online data code: hrst_st_rcat)

Administrative boundaries: © EuroGeographics © OpenStreetMap
Cartography: Eurostat – IMAGE, 07/2025

Map 1: Core human resources in science and technology Source: Eurostat (hrst_st_rcat)

Figure 1 provides a summary of the NUTS level 2 regions with the highest numbers of core HRST, as well as those with the highest shares of core HRST in the labour force. In 2024, the capital regions of France, Poland, Germany, the Netherlands and Sweden were the only ones to appear in both rankings:

- Ile-de-France had 2.4 million core HRST, equivalent to 38.8% of its labour force

- Warszawski stołeczny had 0.8 million core HRST, equivalent to 44.8% of its labour force
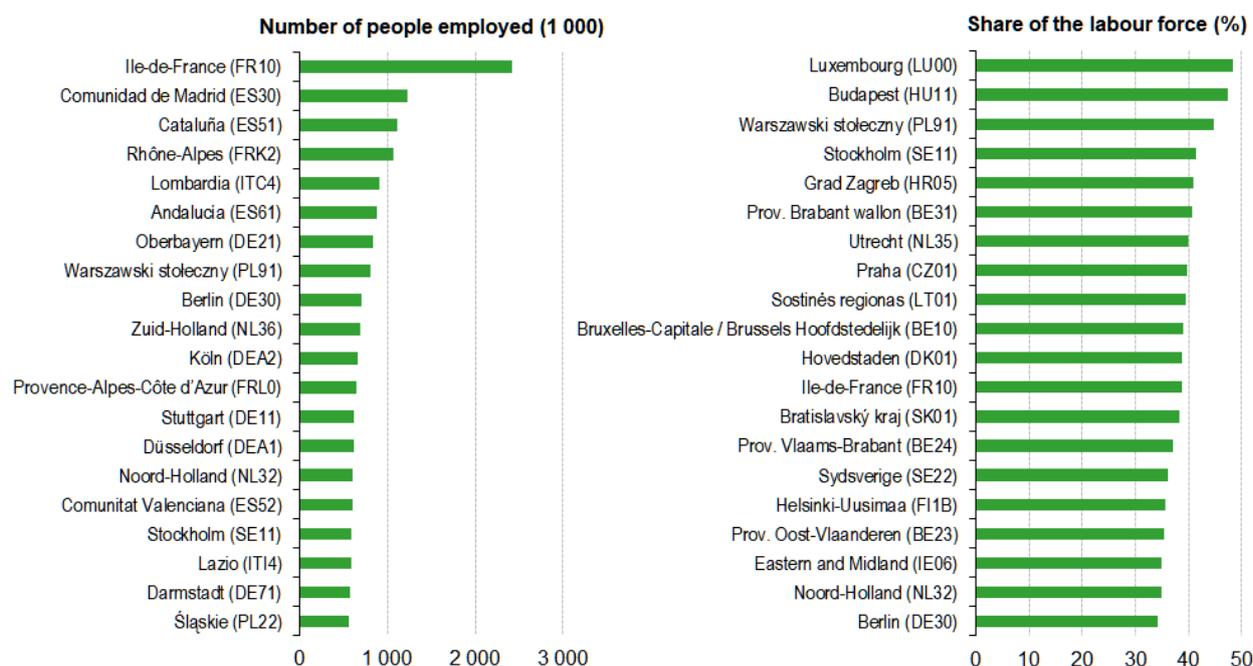
- Berlin had 0.7 million core HRST, equivalent to 34.2% of its labour force

- Noord-Holland had 0.6 million core HRST, equivalent to 34.9% of its labour force

- Stockholm had 0.6 million core HRST, equivalent to 41.4% of its labour force.

The data shown in Figure 1 highlight 2 main patterns: 1st, the absolute number of core HRST is generally higher in the EU's most populous metropolitan regions; 2nd, capital regions often register the highest proportions of core HRST relative to their labour force. Among the 20 NUTS level 2 regions with the highest shares of core HRST, only a few were non-capital regions, namely:

- Prov. Brabant wallon, Prov. Vlaams-Brabant and Prov. Oost-Vlaanderen in Belgium

- Utrecht in the Netherlands

- Sydsverige in Sweden.

Core human resources in science and technology
(by NUTS 2 regions, 2024)

Number of people employed (1 000)

Region	
Ile-de-France (FR10)	
Comunidad de Madrid (ES30)	
Cataluña (ES51)	
Rhône-Alpes (FRK2)	
Lombardia (ITC4)	
Andalucia (ES61)	
Oberbayern (DE21)	
Warszawski stołeczny (PL91)	
Berlin (DE30)	
Zuid-Holland (NL36)	
Köln (DEA2)	
Provence-Alpes-Côte d'Azur (FRL0)	
Stuttgart (DE11)	
Düsseldorf (DEA1)	
Noord-Holland (NL32)	
Comunitat Valenciana (ES52)	
Stockholm (SE11)	
Lazio (ITI4)	
Darmstadt (DE71)	
Śląskie (PL22)	

Share of the labour force (%)

Region	
Luxembourg (LU00)	
Budapest (HU11)	
Warszawski stołeczny (PL91)	
Stockholm (SE11)	
Grad Zagreb (HR05)	
Prov. Brabant wallon (BE31)	
Utrecht (NL35)	
Praha (CZ01)	
Sostinés regionas (LT01)	
Bruxelles-Capitale / Brussels Hoofdstedelijk (BE10)	
Hovedstaden (DK01)	
Ile-de-France (FR10)	
Bratislavský kraj (SK01)	
Prov. Vlaams-Brabant (BE24)	
Sydsverige (SE22)	
Helsinki-Uusimaa (FI1B)	
Prov. Oost-Vlaanderen (BE23)	
Eastern and Midland (IE06)	
Noord-Holland (NL32)	
Berlin (DE30)	

Note: the figure shows the 20 EU regions with the highest number of core human resources in science and technology and the highest share of core human resources in science and technology in the labour force. Mayotte (FRY5): not available.

Source: Eurostat (online data code: hrst_st_rcat)

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Figure 1: Core human resources in science and technology Source: Eurostat (hrst_st_rcat)

Employment in high-technology sectors

In 2024, there were 10.7 million people employed in high-technology sectors across the EU

High-technology sectors drive economic growth and productivity, and often provide well-paid employment opportunities. In 2024, there were 10.7 million people employed in high-technology sectors across the EU, which represented 5.2% of total employment.

More about the data: employment in high-technology sectors

High-technology sectors comprise high-technology manufacturing sectors and knowledge-intensive high-technology services . The statistics presented for these sectors cover all people (including support staff) who work for enterprises in these sectors, not the number of highly qualified workers.

High-technology sectors are identified in terms of a sectoral approach. Based on division level data:

- high-technology manufacturing covers NACE Divisions 21 and 26 (manufacture of basic pharmaceutical products and pharmaceutical preparations; manufacture of computer, electronic and optical products)

- high-tech knowledge-intensive services cover NACE Divisions 59 to 63 and 72 (motion picture, video and television programme production, sound recording and music publish activities; programming and broadcasting activities; telecommunications; computer programming, consultancy and related activities; information service activities; scientific research and development).

A distinction is made between high-technology manufacturing sectors and knowledge-intensive high-technology services due to the existence of 2 different methodologies:

- R&D intensities are used to distinguish between high, medium-high, medium-low and low-technology manufacturing industries

- the proportion of the workforce that has completed a tertiary education is used to distinguish between knowledge-intensive services and other services.

In 2024, 22 NUTS level 2 regions employed at least 100 000 people in high-technology sectors (as shown by the largest circles in **Map 2**). In line with most science and technology indicators, these regions were principally located in some of the EU's largest metropolitan regions, with half of this group (11 out of the 22) being capital regions.

- Almost 0.5 million people (498 000) were employed in high-technology sectors in the French capital region of Ile-de-France.

- There were 2 other regions in the EU where more than 250 000 people were employed in high-technology sectors: the Spanish capital region of Comunidad de Madrid and Lombardia in northern Italy.
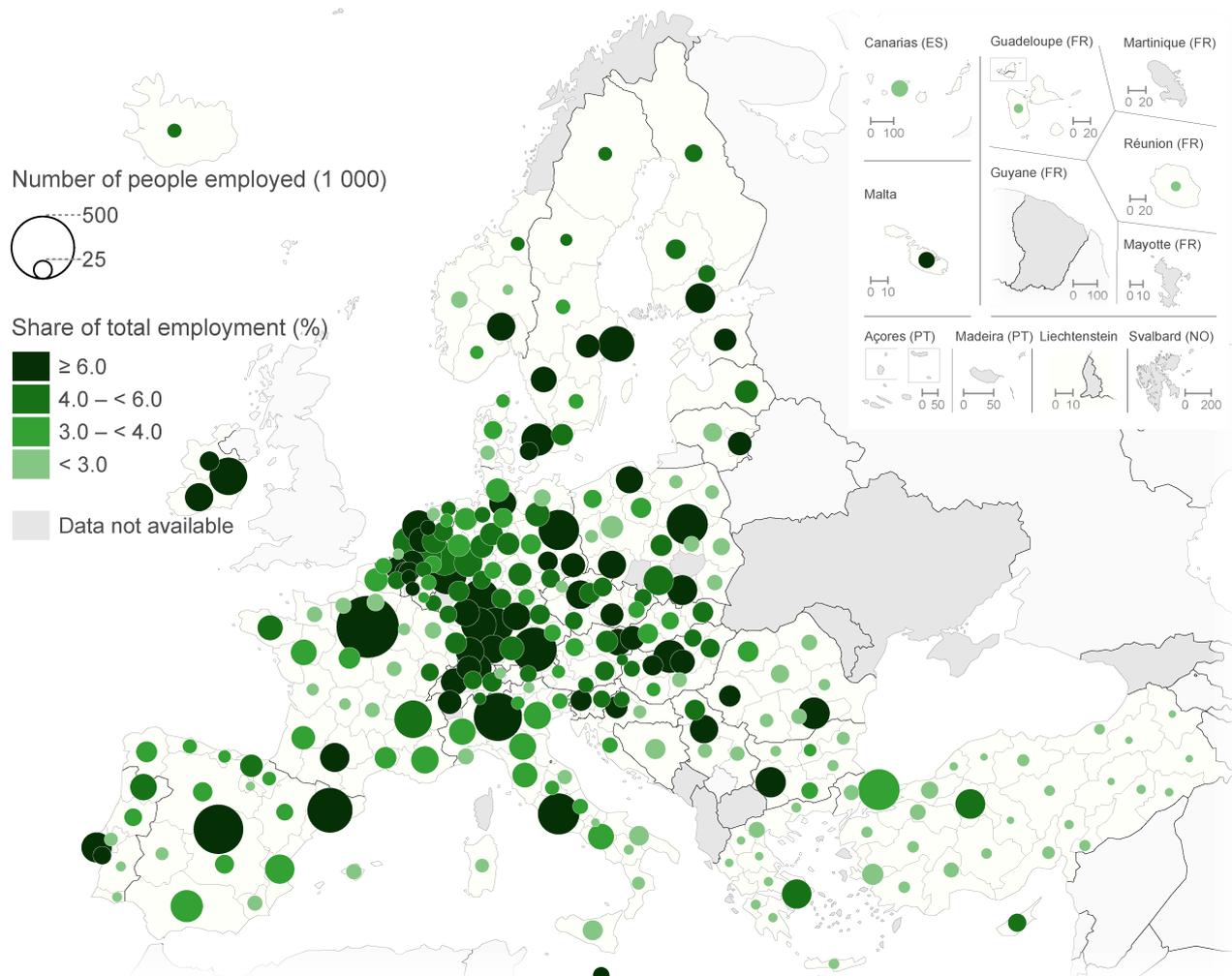
To illustrate the skewed nature of the distribution, the 22 regions with at least 100 000 people employed in their high-technology sectors together accounted for 4.0 million people in 2024, equivalent to 37.7% of the EU total. This was similar to the cumulative share of the 175 regions where fewer than 60 000 people were employed in these sectors, which together accounted for 4.2 million people (39.1%).

At the lower end of the distribution, the lowest counts across the EU of people employed in high-technology sectors in 2024 – all around 2 000 people – were observed in the Greek regions of Dytiki Makedonia, Ipeiros and Thessalia, as well as in the southern Italian region of Molise.

Employment in high-technology sectors
(by NUTS 2 regions, 2024)

Number of people employed (1 000)
- 500
- 25

Share of total employment (%)
- ≥ 6.0
- 4.0 – < 6.0
- 3.0 – < 4.0
- < 3.0
- Data not available

Canarias (ES) Guadeloupe (FR) Martinique (FR)
0 100   0 20   0 20

Malta   Réunion (FR)
                Guyane (FR)   0 20

0 10   0 100   Mayotte (FR)
                                 0 10

Açores (PT) Madeira (PT) Liechtenstein Svalbard (NO)
0 50   0 50   0 10   0 200

Note: EU = 10.7 million people employed in high-technology sectors, equivalent to 5.2% of total employment. High-technology sectors: high-technology manufacturing and knowledge-intensive high-technology services. Ipeiros (EL54) and Guadeloupe (FRY1): 2023. Includes data with low reliability (too many regions to document).
Source: Eurostat (online data code: htec_emp_reg2)

Administrative boundaries: © EuroGeographics © OpenStreetMap
Cartography: Eurostat – IMAGE, 07/2025

Map 2: Employment in high-technology sectors Source: Eurostat (htec_emp_reg2)

In 2024, more than 100 000 females were employed in high-technology sectors in the French and Spanish capital regions

In addition to identifying the regions with the highest numbers of people employed in high-technology sectors for both sexes, **Figure 2** also highlights the importance of these sectors in providing female and male employment.

- In absolute terms, the highest counts of females working in high-technology sectors in 2024 were recorded in the French and Spanish capital regions of Ile-de-France (197 000) and Comunidad de Madrid (114 000).

- 8 other EU regions had more than 50 000 females employed in high-technology sectors in 2024: the capital regions of Berlin (Germany), Eastern and Midland (Ireland), Lazio (Italy) and Warszawski stołeczny (Poland), as well as Oberbayern and Köln (Germany), Cataluña (Spain) and Lombardia (Italy).

- For men, Ile-de-France (302 000), Lombardia (194 000) and Comunidad de Madrid (190 000) recorded the highest counts of male employment in high-technology sectors in 2024.

- 10 other EU regions reported more than 100 000 males employed in high-technology sectors in 2024. This group included all of the regions mentioned above with the highest counts of female employment, as well as Darmstadt (Germany), Rhône-Alpes (France) and the Swedish capital region of Stockholm.

Across the EU, high-technology sectors accounted for 5.2% of total employment in 2024. This share peaked, among NUTS level 2 regions, in the Slovak capital region of Bratislavský kraj (14.1%).

There were 10 other regions – all capital regions – with at least 1 in 10 people from their respective workforces employed in high-technology sectors: those of Hungary, Czechia, Croatia, Ireland, Sweden, Denmark, Poland, Lithuania, Finland and Bulgaria. 5 more capital regions ranked among the top 20 regions with the highest shares – those of Germany, Portugal, Romania, Spain and France.

There was a considerable gender gap in the share of employment within high-technology sectors in 2024. While 3.7% of the EU's female workforce was employed in these sectors, the corresponding share among males was notably higher, at 6.4%.

- The Hungarian capital region of Budapest recorded the highest share of female employment in high-technology sectors, at 9.6%. It was followed by 2 other capital regions – Grad Zagreb in Croatia (9.3%) and Eastern and Midland in Ireland (8.9%) – which were the only other regions in the EU with shares exceeding 8.0% for females.

- For men, the Slovak capital region of Bratislavský kraj had the highest share, at 20.3%. There were 3 other regions that recorded shares above 15.0% for males: Budapest (16.5%), the Czech capital region of Praha (15.7%) and Stockholm (15.1%).

- Among the 20 regions with the highest shares of female employment in high-technology sectors, 17 were capital regions. The only exceptions were Karlsruhe (Germany), Southern (Ireland) and Pest (Hungary).

- A similar pattern was observed for men, with 16 of the 20 regions with the highest male employment shares being capital regions. The exceptions included Karlsruhe and Southern (which also appeared in the female rankings), as well as Oberbayern (Germany) and Prov. Brabant wallon (Belgium).

Employment in high-technology sectors
(% of total employment, by sex and NUTS 2 regions, 2024)
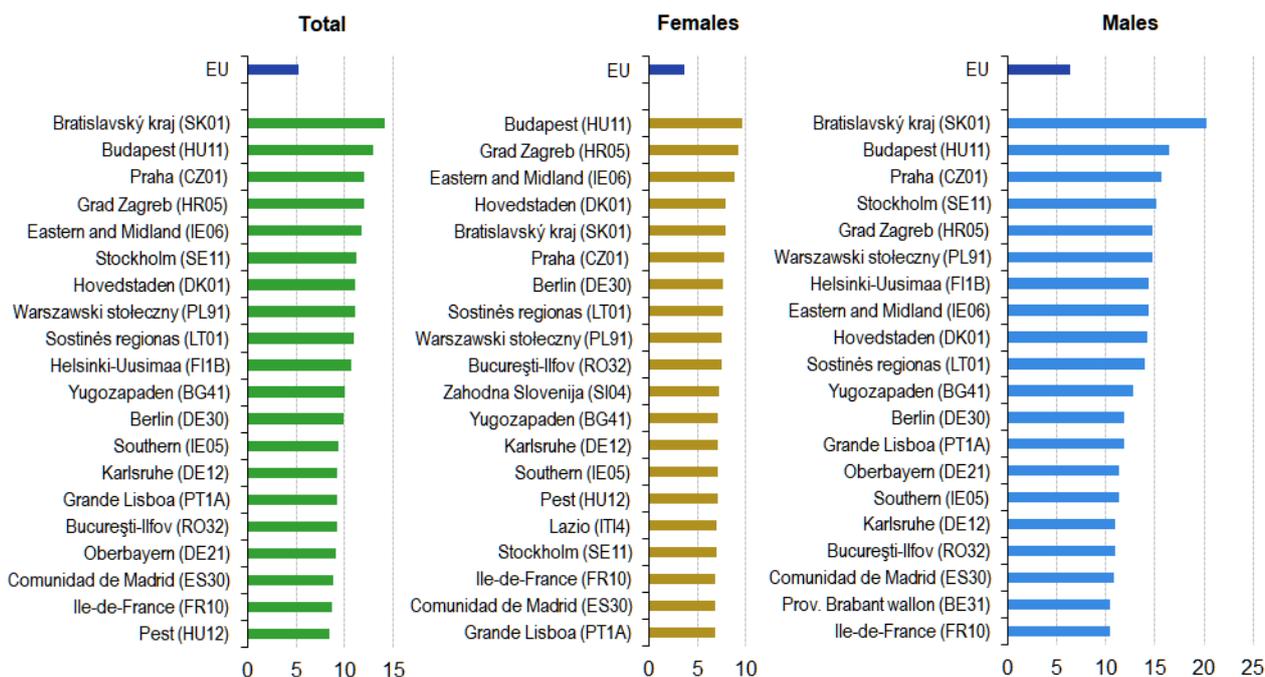
Figure 2: Employment in high-technology sectors Source: Eurostat (htec_emp_reg2)

Women in research and innovation

In 2024, the EU had 19.6 million people employed as scientists and engineers , this equated to 8.9% of the total labour force.

More about the data: scientists and engineers

Scientists and engineers refer to people who, working in those capacities, use or create scientific knowledge and engineering and technological principles, in other words:

- people with scientific or technological training who are engaged in professional work on science and technology activities
- high-level administrators and personnel who direct the execution of science and technology activities.

Within the context of statistics on human resources in science and technology (HRST), scientists and engineers are people who conduct research, improve or develop concepts, theories and operational methods and/or apply

scientific knowledge relating to fields which are covered by the following occupations – as defined in the International standard classification of occupations (ISCO-08) :

- science and engineering professionals (ISCO 2-digit code 21)

- health professionals (ISCO 2-digit code 22)

- information and communications technology professionals (ISCO 2-digit code 25).

HRST indicators on scientists and engineers are compiled as head counts; these data may be used to derive the share of scientists and engineers in the total population or their share of the labour force. Statistics are collected for NUTS level 1 and NUTS level 2 regions and cover people aged 15 to 74 years. The data presented here – analysed by sex – are only available at the more aggregated level of detail.

Monitoring female participation in the fields of science and technology provides insight into gender gaps and supports efforts to promote equality and make full use of the potential talent available within the labour force. In 2024, of the 19.6 million people employed across the EU as scientists and engineers, 7.9 million were female – equivalent to 40.4% of the total.

Map 3 presents information on the number and share of female scientists and engineers across NUTS level 1 regions. In 2024, the highest counts of female scientists and engineers were recorded in the French capital region of Ile-de-France (327 000) and the western German region of Nordrhein-Westfalen (286 000). There were 5 other regions across the EU where more than 200 000 females were employed as scientists and engineers:

- Este in Spain

- West-Nederland in the Netherlands

- Bayern and Baden-Württemberg in Germany

- Continente in Portugal.

Female scientists and engineers are generally underrepresented across the EU. Out of 91 NUTS level 1 regions for which data are available, 79 had a higher number of male than female scientists and engineers. The 12 regions where females made up a majority of the scientists and engineers in employment (as shown by the darkest shade of green in **Map 3**) included:

- 4 of the 7 regions in Spain – Canarias, Centro, Noroeste and Sur

- Makroregion centralny and Makroregion wschodni in Poland

- Regiões Autónomas dos Açores e da Madeira in Portugal

- Severna i Yugoiztochna Bulgaria in Bulgaria

- Corse in France (2023 data)

- Norra Sverige in Sweden

- Latvia.

As mentioned above, females accounted for 40.4% of all scientists and engineers in the EU. The 3 regions with the highest shares of female scientists and engineers in 2024 were all island regions: Canarias (58.8%), Região Autónoma dos Açores (57.3%) and Região Autónoma da Madeira (56.4%). Several factors may, at least in part, explain this pattern in island regions:

- public sector institutions – such as universities and research institutes – often dominate the local labour market, focusing on fields like environmental science, marine biology or sustainable tourism, which tend to attract more women

- public employers may be more likely to adopt gender equality measures in recruitment and employment

- higher rates of male outward migration may leave a greater share of women in the local workforce

- as some of these island regions are among the least populated regions in the EU, the relatively small size of their labour force may influence the data; relatively small populations may result in greater year-on-year fluctuations and make proportional measures – such as the share of female scientists and engineers – more sensitive to local labour market dynamics.

Indeed, despite having high proportions of female scientists and engineers, many island regions have relatively low overall employment in these professions. For example, the lowest numbers of female scientists and engineers among NUTS level 1 regions were recorded in Região Autónoma da Madeira (4 000), Região Autónoma dos Açores (5 000) and Corse (6 000; 2023 data).

In 2024, females made up fewer than 37.0% of all scientists and engineers in 23 NUTS level 1 regions across the EU (as shown by the lightest shade of green in **Map 3**). This group included:

- 10 regions in Germany, including the capital region of Berlin

- 4 regions in France

- 3 regions in Italy

- all 3 regions of Hungary

- Manner-Suomi in Finland

- Luxembourg

- Slovakia.

Looking in more detail, there were 9 NUTS level 1 regions where women accounted for fewer than 1 in 3 scientists and engineers in 2024. The lowest shares were recorded in the Hungarian region of Közép-Magyarország (30.0%), Manner-Suomi in Finland (30.7%) and Sud in Italy (31.1%). This group of 9 regions also included 4 German regions – Baden-Württemberg, Saarland, Hessen and Bremen – as well as Luxembourg and Bretagne (France).

Female scientists and engineers

(by NUTS 1 regions, 2024)
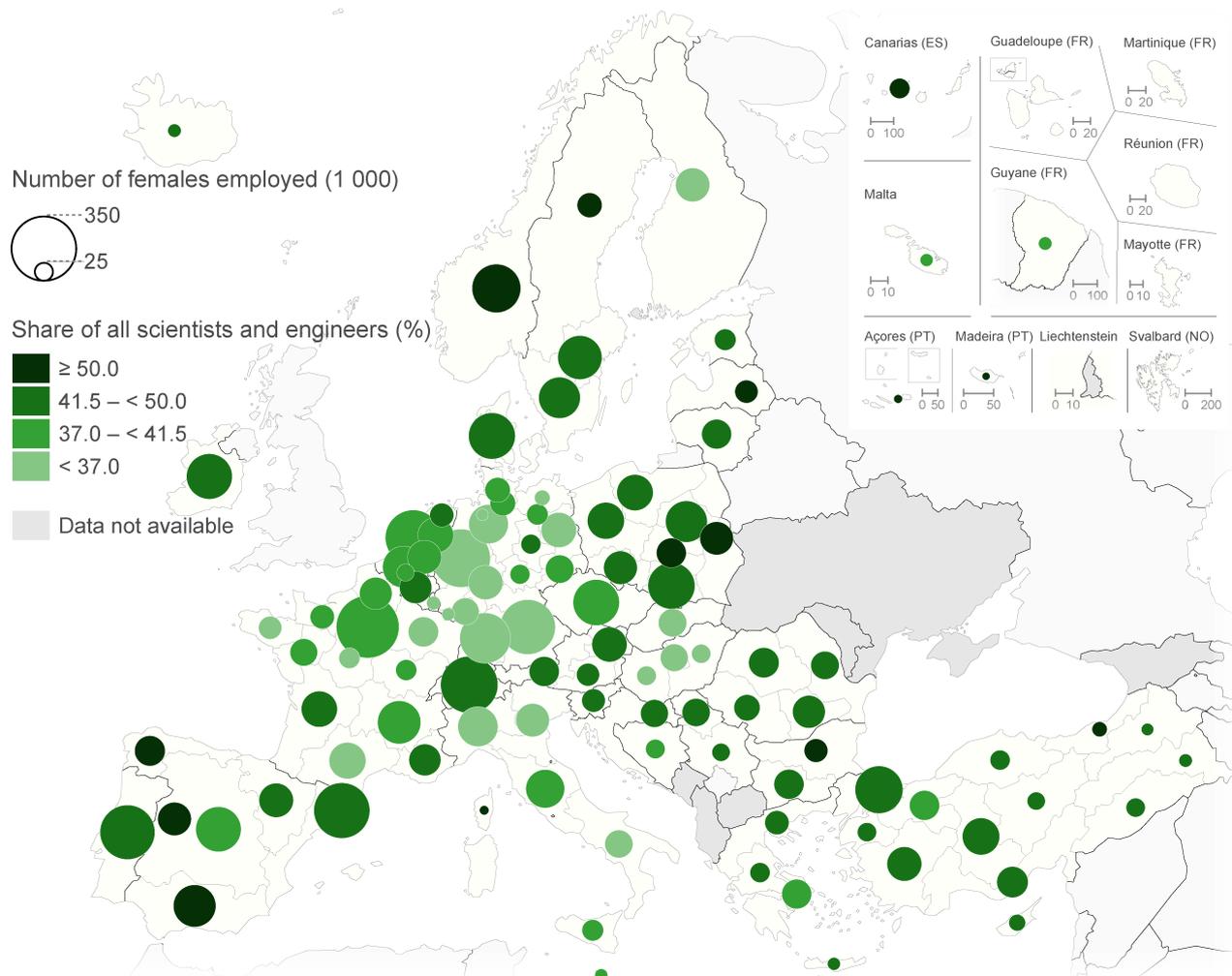
Note: EU = 7.9 million female scientists and engineers, equivalent to 40.4% of all scientists and engineers. Corse (FRM): 2023. Bremen (DE5), Mecklenburg-Vorpommern (DE8), Saarland (DEC), Corse (FRM), Região Autónoma dos Açores (PT2) and Região Autónoma da Madeira (PT3): low reliability.
Source: Eurostat (online data code: hrst_st_rsex)

Administrative boundaries: © EuroGeographics © OpenStreetMap
Cartography: Eurostat – IMAGE, 07/2025

Map 3: Female scientists and engineers Source: Eurostat (hrst_st_rsex)

High-technology sectors include high-technology manufacturing and knowledge-intensive high-technology services. These activities employed 3.6 million females in 2024, equivalent to just over 1 in 3 (33.4%) people employed in high-technology manufacturing and knowledge-intensive high-technology services.

In 2024, the highest numbers of females employed in high-technology sectors were, unsurprisingly, found in some of the EU's most populous and research-intensive regions. There were 10 NUTS level 2 regions where more than

50 000 females worked in high-technology sectors. Together, these regions accounted for almost 900 000 females in employment – around 25% of the EU's total female workforce in high-technology sectors. This was roughly equal to the cumulative number of females employed in high-technology sectors across the 138 regions with the lowest counts. The 10 regions with more than 50 000 females employed in high-technology sectors included 6 capital regions.

- The highest employment counts were recorded in the French and Spanish capital regions of Ile-de-France (197 000 females employed in high-technology sectors) and Comunidad de Madrid (114 000).

- Other capital regions with more than 50 000 females employed in high-technology sectors included Lazio (Italy), Berlin (Germany), Warszawski stołeczny (Poland) and Eastern and Midland (Ireland).

- The 4 non-capital regions with a high count of females employed in high-technology sectors were all densely populated, metropolitan areas from some of the largest EU countries: Lombardia (northern Italy), Cataluña (eastern Spain), Oberbayern and Köln (both Germany).

Although some progress has been made in terms of female participation, men continued to dominate the workforce. Among the 218 NUTS level 2 regions for which data are available in 2024, men had a majority of the high-technology workforce in every region (see **Map 4**), underlining the gender employment gap in these sectors.

In 2024, almost 50.0% of Haute-Normandie's high-technology workforce were women

In 2024, there were 55 NUTS level 2 regions where females accounted for more than 36.5% of all employment in high-technology sectors (as shown by the darkest shade of green in **Map 4**). In several eastern EU countries, a large proportion of their regions had relatively high female shares, including:

- all 8 regions of Hungary

- both regions in Slovenia

- 3 out of 4 regions in Croatia

- 4 out of 6 regions in Bulgaria.

In addition, there were several regions with relatively high female shares in some of the larger western and southern EU countries, including 8 regions in France, 6 regions in Germany and 4 regions in each of Spain and Italy.

At the top end of the distribution, there were a few cases where female participation in high-technology sectors approached parity with men. The highest share was recorded in the northern French region of Haute-Normandie, where females accounted for almost 1 in 2 (49.5%) people employed across high-technology sectors in 2024. The next highest shares were observed in the Hungarian regions of Észak-Magyarország and Észak-Alföld (both 48.3%), followed by the French region of Languedoc-Roussillon (48.0%).
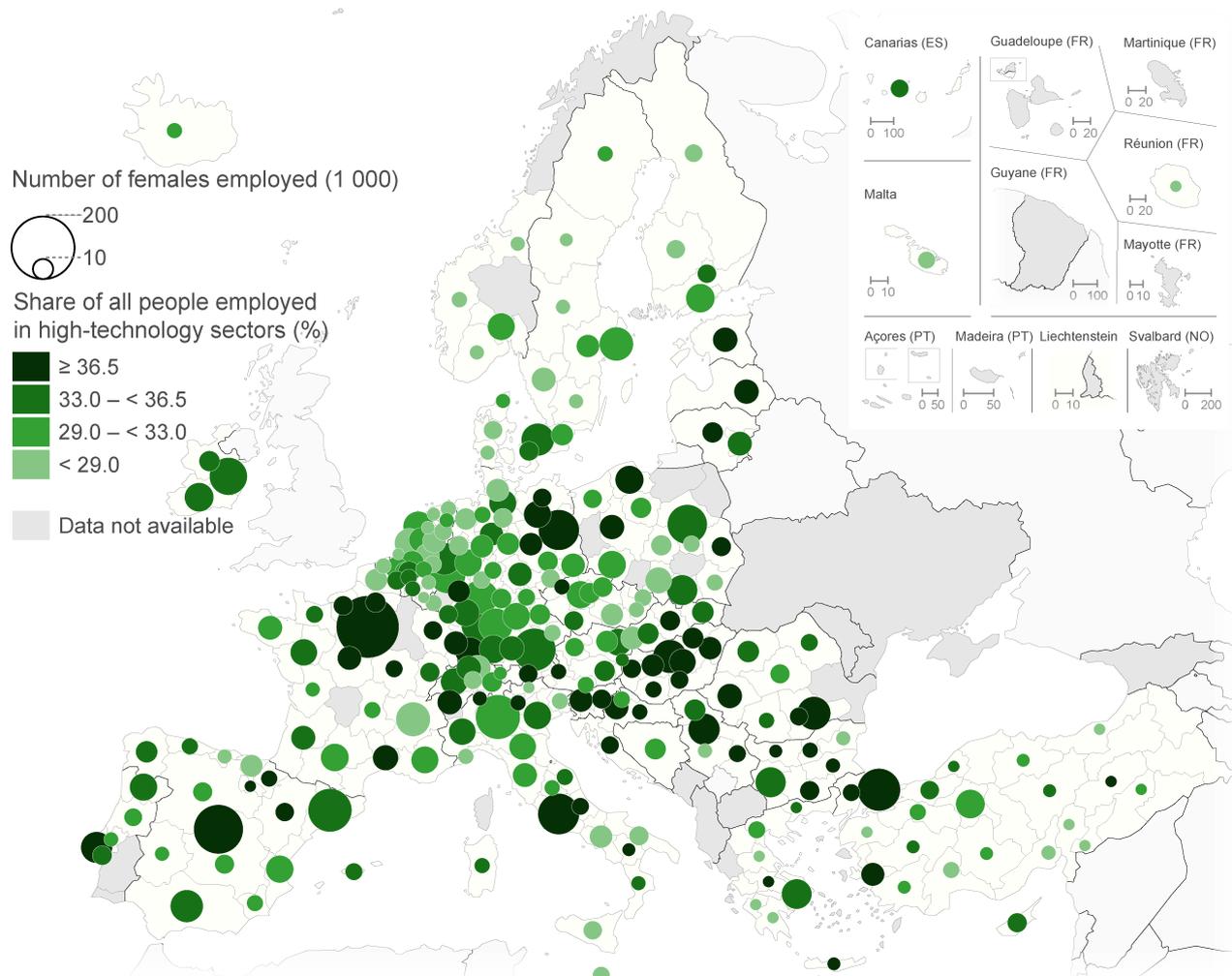
Female representation was considerably lower across a broad range of regions. In 2024, there were 54 NUTS level 2 regions where females made up less than 29.0% of the workforce in high-technology sectors (as shown by the lightest shade of green in **Map 4**). The lowest shares were concentrated in:

- 9 out of 12 regions in the Netherlands

- 7 regions in Germany

- 7 regions in Italy

- 4 out of 8 regions in Sweden

- 4 out of the 9 Greek regions for which data are available

- Luxembourg

- Malta.

Female employment in high-technology sectors

(by NUTS 2 regions, 2024)

Number of females employed (1 000)

200

10

Share of all people employed
in high-technology sectors (%)

≥ 36.5

33.0 – < 36.5

29.0 – < 33.0

< 29.0

Data not available

Canarias (ES)

Guadeloupe (FR)

Martinique (FR)

0 20

Malta

Guyane (FR)

Réunion (FR)

0 20

0 10

Mayotte (FR)

0 10

Açores (PT)

Madeira (PT)

Liechtenstein

Svalbard (NO)

0 50

0 50

0 10

0 200

0 100

0 100

Note: EU = 3.6 million females employed in high-technology sectors,
equivalent to 33.4% of all people employed in high-technology sectors.
Severozapaden (BG31) and Poitou-Charentes (FRI3): 2023. Includes data with
low reliability (too many regions to document).
Source: Eurostat (online data code: htec_emp_reg2)

Administrative boundaries: © EuroGeographics © OpenStreetMap
Cartography: Eurostat – IMAGE, 07/2025

Map 4: Female employment in high-technology sectors Source: Eurostat (htec_emp_reg2)

Source data for figures and maps

Regional research and development statistics

Data sources

Regional data on human resources in science and technology (HRST) and data on high-technology sectors are derived from the European Union's labour force survey (EU-LFS) , whose legal basis, starting with survey year 2021, is an integrated European social statistics (IESS) regulation – *Regulation (EU) No 2019/1700 of the European Parliament and of the Council of 10 October 2019 establishing a common framework for European statistics relating to persons and households, based on data at individual level collected from samples* .

The methodology for statistics on HRST is laid down in the *Canberra manual* (OECD, 1995), which lists all HRST concepts and provides definitions of human resources devoted to science and technology in terms of qualification (levels and fields of study) and occupation.

Data on HRST concern stocks of human resources. An HRST stock is defined as the 'number of people at a particular point in time who fulfils the conditions of the definition of HRST'. The Canberra manual states that HRST comprise those individuals who:

- have successfully completed a tertiary level of education (ISCED levels 5 to 8) in a science and technology field and/or

- are employed in an science and technology occupation (regardless of their educational background).

This results in 3 different HRST categories:

- HRST by education – people with a tertiary level of education in science and technology

- HRST by occupation – people employed in science and technology occupations

- core HRST – people who meet both of the above criteria, in other words, they have a tertiary level of education in a science and technology field and they are employed in a science and technology occupation.

Data for employment in high-technology sectors are defined in relation to people aged 15 to 74 years who during the reference week performed work, even for just 1 hour a week, for pay, profit or family gain or were not at work but had a job or business from which they were temporarily absent because of, for example, illness, holidays, industrial dispute or education and training.

Based on NACE divisions, the term 'high-technology sectors' refers to an aggregate composed of 8 different activities.

High-technology manufacturing

- NACE Divisions 21 – the manufacture of basic pharmaceutical products and pharmaceutical preparations

- NACE Divisions 26 – the manufacture of computer, electronic and optical products

High-tech knowledge-intensive services

- NACE Division 59 – motion picture, video and television programme production, sound recording and music publish activities

- NACE Division 60 – programming and broadcasting activities

- NACE Division 61 – telecommunications

- NACE Division 62 – computer programming, consultancy and related activities

- NACE Division 63 – information service activities

- NACE Division 72 – scientific research and development

Context

Innovation

The dual challenges of climate change and the post-pandemic recovery are expected to drive profound socioeconomic transformations. The European Commission's Directorate-General for Research and Innovation has outlined a transformative vision for the future. Industry 5.0 aims to build resilience within the EU's existing economic

structures while fostering sustainable, regenerative and circular production models. Recognising that technological progress often exhibits strong agglomeration effects and that emerging value chains tend to cluster in more innovative regions, Industry 5.0 promotes initiatives to rebalance regional performance, particularly through investments in 'de-industrialised' and 'left-behind' regions.

Europe is often said to have an innovation deficit. A European Commission communication, *Path to the Digital Decade* (COM(2021) 574 final) reiterates that, despite strong research and invention capacities, Europe continues to lag behind in the diffusion and commercialisation of innovation. This persistent gap may be linked, at least in part, to risk aversion among EU businesses and financial systems, which can hinder the ability to identify and scale disruptive research and breakthrough technologies.

A recent report by the Directorate-General for Research and Innovation, *Combining regional strengths to narrow the EU innovation divide* , highlights the concentration of innovation-critical factors – such as talent and funding – within established hubs. It argues that synergies with complementary policy areas, including skills development and economic redistribution, are essential to maximising the impact of research and innovation strategies across EU regions.

Skills

A highly skilled workforce is a cornerstone of research and innovation, driving scientific progress, technological development and long-term competitiveness. Strengthening skills across the EU is considered essential to supporting the science and technology sectors and to enable the economy to adapt to the green and digital transitions. The European Year of Skills aimed to tackle skills gaps across the EU and reinforce the EU's skills strategy, with a particular focus on preparing the workforce for the demands of a rapidly evolving knowledge-based economy.

At the closing event of the Year of Skills in April 2024, several key messages were emphasised:

- people and their skills must be placed at the heart of the green and digital transitions

- transversal skills – such as critical thinking, communication and problem-solving – are vital human assets in an increasingly automated and technology-driven world

- inclusive skills development empowers individuals to upskill and/or reskill and to pursue careers in science and technology

- sustained and adequate funding for training remains a major challenge across the EU

- tackling skills shortages is critical to strengthening research, innovation and industrial competitiveness.

Gender equality

The EU has intensified its efforts to promote gender equality in science, technology and innovation through targeted policy initiatives. The Gender Equality Strategy 2020–25 (COM(2020) 152 final) aims to eliminate disparities and foster inclusive workplaces by enhancing women's participation – particularly in science, technology, engineering and mathematics (STEM) fields. Complementing this, the She Figures annual report provides essential data to inform policy and monitor progress on gender equality in research and innovation. In addition, the Marie Skłodowska-Curie Actions promote gender balance in research teams and seek to reduce bias in recruitment and evaluation, thereby supporting the advancement of women's careers in research.

Horizon Europe

Since their launch in 1984, the EU's framework programmes for research have played a leading role in multidisciplinary research and innovation. In December 2020, a political agreement was reached on Horizon Europe , the EU's 9th framework programme for research and innovation, which runs until 2027. With a total budget of € 93.5 billion – mostly drawn from the EU's multiannual financial framework for 2021–27 – Horizon Europe represents the largest EU research and innovation programme to date.

The programme's 2nd strategic plan (2025–27) outlines 3 key strategic orientations:

- the green transition

- the digital transition

- a more resilient, competitive, inclusive and democratic Europe.

Within Horizon Europe, 5 missions have been identified to enhance the effectiveness of funding by pursuing clearly defined targets:

- adaptation to climate change

- cancer

- restoring our oceans and waters

- climate-neutral and smart cities

- a soil deal for Europe.

European research area (ERA)

The European research area (ERA) , launched in 2000, aims to create a single, borderless market for research, innovation and technology across the EU. It supports better alignment of national policies, the free circulation of researchers, and stronger cross-border cooperation and competition.

In September 2020, the European Commission published a communication on *A new ERA for Research and Innovation* (COM(2020) 628 final). It acknowledged stagnating EU performance in research and innovation, especially in the light of emerging competition, notably from Asia. Drawing on lessons from the COVID-19 crisis, the communication proposed revitalising the ERA to support the EU's prosperity, autonomy and global competitiveness through a stronger focus on green and digital transitions, resilience and preparedness to face future crises and innovation leadership.

The *European Research Area Policy Agenda 2022–24* set 4 priorities:

- creating a fully functional internal market for knowledge

- addressing the challenges posed by the twin green and digital transition, and increasing public engagement

- boosting access to research and innovation excellence across the EU

- coordinating investments and reforms more effectively.

In May 2025, the Council adopted a proposal for the European Research Area Policy Agenda 2025–27 , building on earlier initiatives and reinforcing efforts to create a more cohesive and effective ERA. The agenda outlines several structural policy initiatives, including enabling open science and data reuse, advancing inclusive and intersectional gender equality, improving research careers and strengthening links with higher education, and fostering greater trust in science through public engagement and communication.

To address these priorities, the following ERA actions have been proposed for the period 2025 to 2027:

- equity in open science

- advancing the European Science for Policy (S4P) ecosystem

- facilitating and accelerating the responsible use of artificial intelligence (AI) in science

- enhancing research security across the EU.

This article forms part of Eurostat's annual flagship publication, the *Eurostat regional yearbook* .

You can explore the maps interactively using Eurostat's *Statistical Atlas* .

Explore further

Other articles

- Government budget allocations for R&D (GBARD)

- Human resources in science and technology

- R&D expenditure
- R&D personnel
- Sustainable development goal 9 (SDG 9) – Industry, innovation and infrastructure

Database

- Regional statistics by NUTS classification (reg) , see

Regional science and technology statistics (reg_sct)

    R&D expenditure and personnel (reg_rd)
    Employment in high technology sectors (reg_htec)
    Human resources in science and technology (HRST) (reg_hrst)

- Science and technology (scitech) , see

Research and development (R&D) (rd)

High-tech industry and knowledge-intensive services (htec)

    Employment in high-tech industry and knowledge-intensive services (HTEC) (htec_sti)

Human resources in science & technology (hrst)

    Stocks of HRST at national and regional levels (hrst_st)

Thematic section

- Regions and cities
- Science, technology and innovation

Publications

News articles

- 7.7 million female scientists and engineers in the EU
- Women make up 52% of science & technology employment
- EU reached 2 million researchers in 2021

Paper and PDF publications

- Eurostat regional yearbook – 2025 edition

Online publications

- Regions in Europe – 2025 interactive edition
- Rural Europe – online publication
- Urban Europe – online publication

Visualisation

- Eurostat statistical atlas (Chapter 9)
- Regional statistics illustrated
- Regions in Europe – 2025 interactive edition

Methodology

Manuals and further methodological information

- EU labour force survey – methodology

- ILO – International Standard Classification of Occupations 2008 (ISCO-08)

- Methodological manual on territorial typologies

- NACE Rev. 2 – Statistical classification of economic activities

- OECD – Canberra manual

- OECD – The Measurement of Scientific, Technological and Innovation Activities

- Regions in the European Union Nomenclature of territorial units for statistics (NUTS) – 2024 edition

- UNESCO – International Standard Classification of Education (ISCED 2011)

Metadata

- High-tech industry and knowledge-intensive services (ESMS metadata file – htec_esms)

- Human resources in science & technology (ESMS metadata file – hrst_esms)

Legislation

Since the beginning of 2021, the collection of R&D statistics is based on

- Regulation (EU) 2019/2152 of 27 November 2019 on European business statistics

- Commission Implementing Regulation (EU) 2020/1197 of 30 July 2020 laying down technical specifications and arrangements pursuant to Regulation (EU) 2019/2152 of the European Parliament and of the Council on European business statistics repealing 10 legal acts in the field of business statistics

The collection of data for the EU's labour force survey is based on

- Regulation (EU) No 2019/1700 of the European Parliament and of the Council of 10 October 2019 establishing a common framework for European statistics relating to persons and households, based on data at individual level collected from samples

External links

- European Commission – Research and innovation

- European Commission – Regional policy – Research and innovation

- European research area (ERA)

  – European Research Area Policy Agenda 2025–2027

- Horizon Europe

  – Horizon Europe Strategic Plan 2025–2027

Selected datasets

- Regional statistics (t_reg) , see

Regional science and technology statistics (t_reg_sct)

       Human resources in science and technology (HRST) by NUTS 2 regions (tgs00038)

       Employment in high-tech sectors by NUTS 2 regions (tgs00039)

       Intramural R&D expenditure (GERD) by NUTS 2 regions (tgs00042)

       Researchers, all sectors by NUTS 2 regions (tgs00043)

- Science and technology (t_scitech) , see

Research and development (R&D) (t_rd)

High-tech industry and knowledge-intensive services (t_htec)

Human resources in science & technology (t_hrst)