Briefing

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Women in STEM in the EU

How to close the gender gap

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Summary

The EU has made closing the gender gap in science, technology, engineering and mathematics (STEM) a priority in its education, research and employment policies. This answers to legal requirements to pursue gender equality through any EU action, as well as to practical imperatives to address a shortage of specialists that limits the EU's ability to compete in the global technological race. Moreover, existing data show that many young women today have strong maths and science skills but are still largely absent from careers in engineering and information and communications technology (ICT).

Research shows that the under-representation of women in STEM has many causes, including: unwelcoming work environments in STEM jobs, family caring responsibilities, and social norms that discourage girls from pursuing these fields. Tackling these issues requires a combined approach including: challenging rigid gender stereotypes, using gender-sensitive teaching methods in schools, encouraging girls to choose STEM careers, and removing barriers to employment.

The EU pursues gender equality as a cross-cutting priority in various policies that cover STEM, and has adopted specific initiatives to promote women in STEM. In education, it uses a range of measures to support women at all levels, from schools to universities. In research, EU funding now depends on programmes promoting gender equality. In employment, EU laws help remove obstacles that might put women off STEM careers.

The EU also funds projects that support women's innovation, entrepreneurship, networking and mentoring. The European Parliament strongly backs these efforts, and has called for wider action by the EU and its Member States.

In this briefing

Data and trends on women's participation in STEM fields in the EU

The EU has been suffering from a chronic shortage of science, technology, engineering and mathematics (STEM) professionals. This shortage has been significant in the field of digital technologies, and could become more severe with the deployment of artificial intelligence (AI). In the EU, estimates put the ratio of demanded to available AI specialists at three to one – a significant gap but still narrower than in the United States or China. The shortage of specialists goes beyond the digital realm, affecting other cutting edge technologies. Consultancy company McKinsey assessed in a report published in August 2025 that the shortage of talents constrains 13 frontier technologies, including AI and robotics, advanced connectivity, bioengineering, space, cloud and edge computing, immersive reality, and mobility.

Despite a variety of measures at EU and national level, women continue to be under-represented in STEM in the EU. The gender discrepancy sets in early in school, becomes obvious at the level of vocational and university studies, and continues and deepens in professional careers.

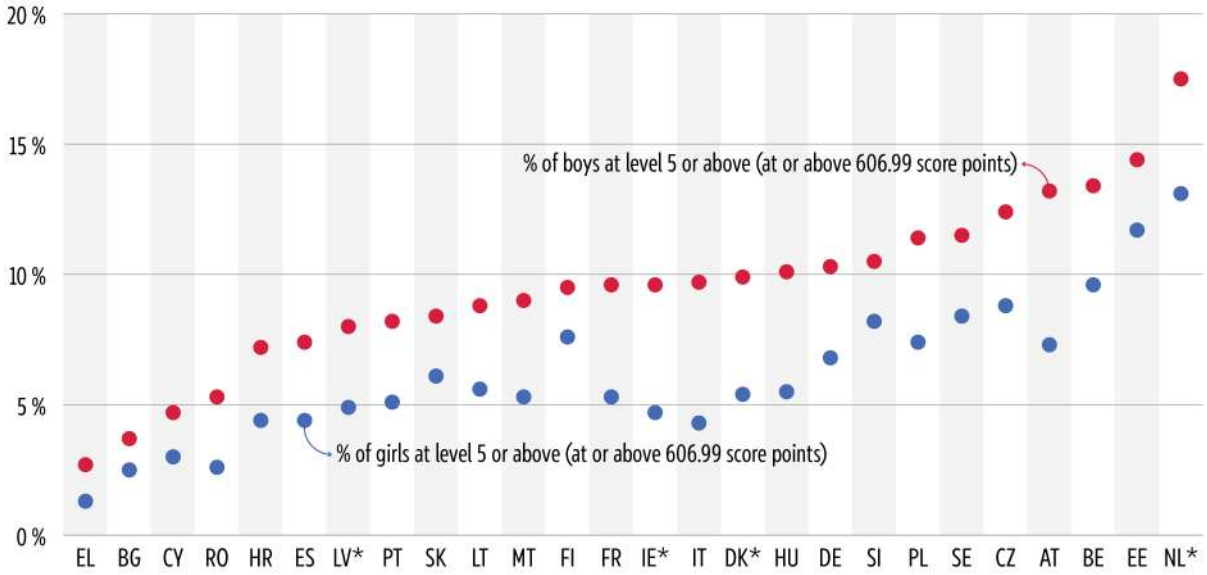
Gender imbalance in STEM in school education

The results of the Programme for International Student Assessment (PISA) measuring the school performance of 15-year-old students in Organisation for Economic Co-operation and Development (OECD) and partner countries show a persistent gender gap in school performance. In the 2022 assessment, on average, boys outperformed girls in mathematics, while girls had a significant advantage over boys in reading, a situation that had not changed since the previous evaluation in 2018. Nevertheless, in 17 of the 81 countries participating in the PISA 2022 evaluation, girls outperformed boys in mathematics in average scores. [1]

The gender gap is most consistent among top performers. According to the report on the results of the evaluation, published by OECD, [2] 'there is no country in PISA 2022 where the share of top performers in mathematics is larger among girls than boys', whereas this is the pool from where future STEM university students most likely originate. [3] In the EU too, more boys than girls achieve the highest level of maths proficiency in each Member State. In some countries – such as Greece, Romania, Ireland, Italy, Denmark and Hungary (see Figure 1) – twice as many boys as girls show top proficiency.

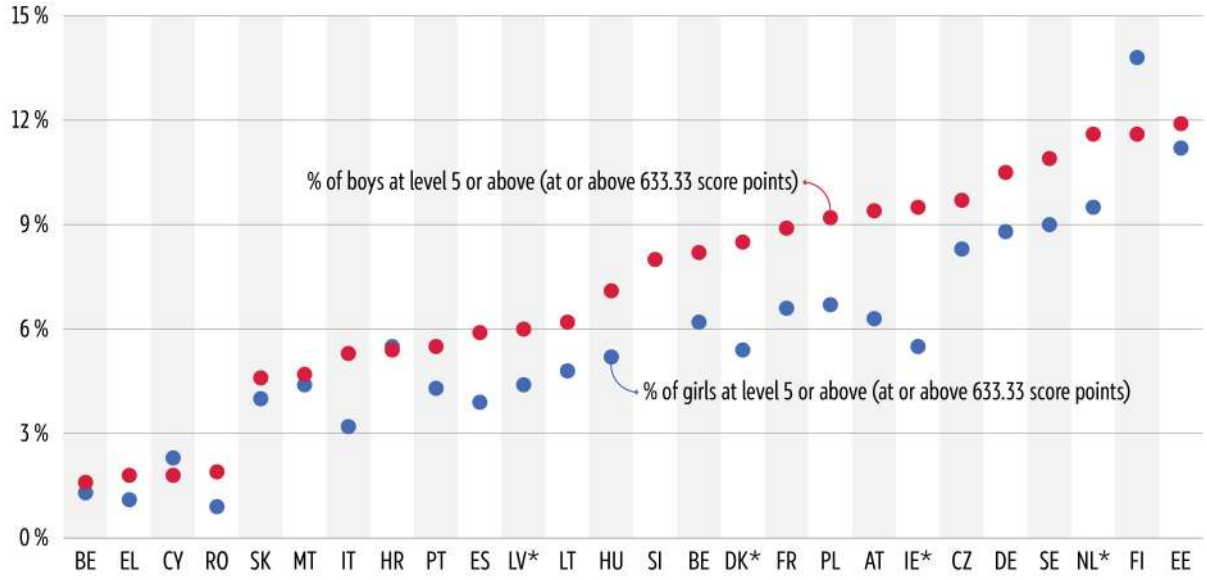
Nevertheless, a strong maths education system does not guarantee a smaller gender gap. The Netherlands, Belgium and Austria lead in overall maths performance but still have large gender gaps, while Greece and Bulgaria lag behind in performance, despite showing smaller gender disparities (see Figure 1). In the case of science (see Figure 2), the situation is partly similar, although in a few EU countries (Cyprus, Croatia and Finland), girls are better represented in this top category than boys.

Figure 1 - Student top performers in maths in PISA tests 2022, by gender



Data source: A. Schleicher, PISA 2022 results (Volume I) – Chapter 4, OECD, 2022 (* data not reliable).

Figure 2 - Student top performers in science in PISA tests 2022, by gender



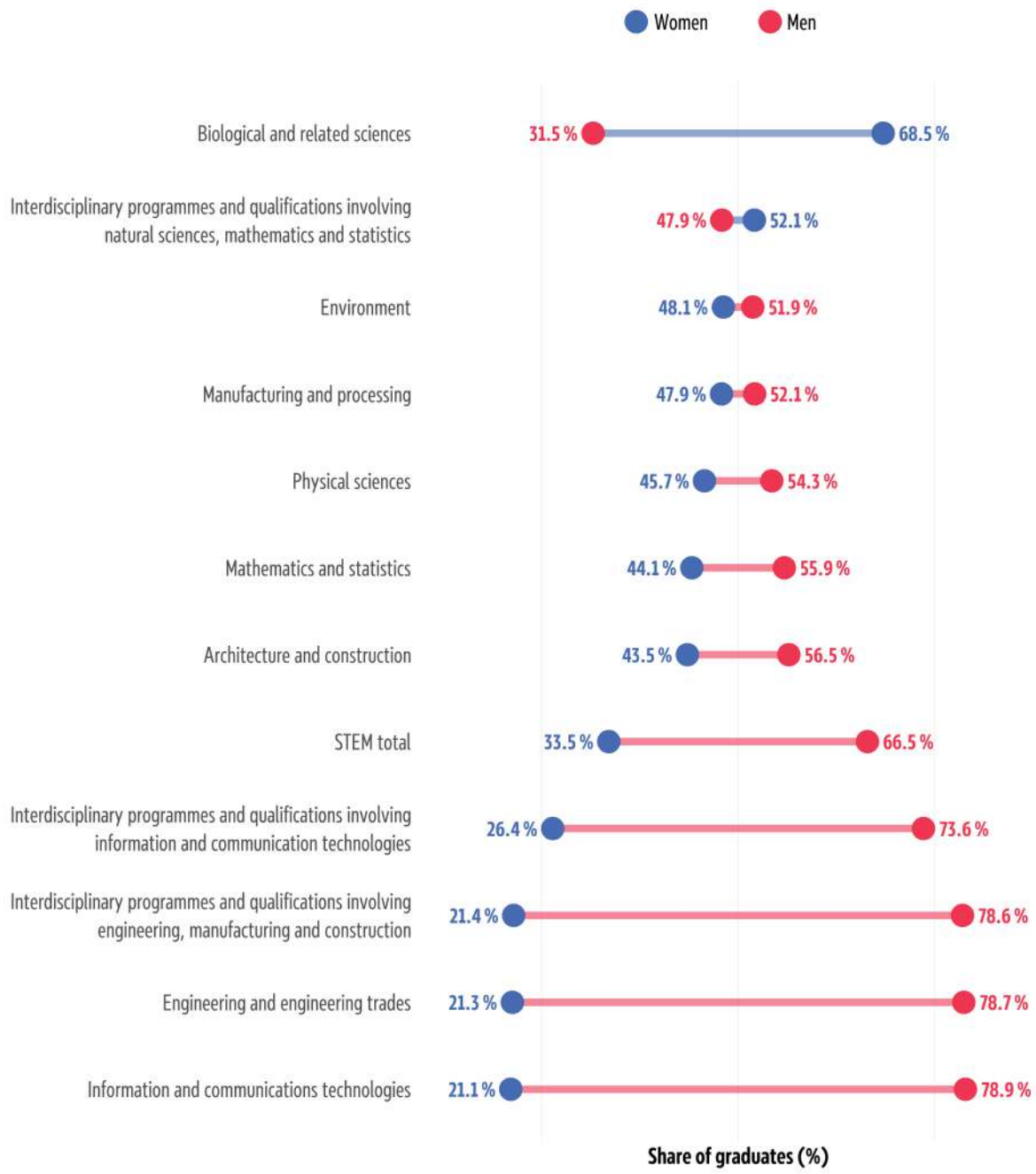
Data source: A. Schleicher, PISA 2022 results (Volume I) – Chapter 4, OECD, 2022 (* data not reliable).

Gender imbalance in STEM tertiary education

According to Eurostat data (see Figure 3), in 2023, only one third of university graduates in STEM in the EU were women. This gender imbalance is not uniform among disciplines and EU countries. On the contrary, there are significant discrepancies both ways.

At sectoral level (see Figure 3), women are least represented among ICT and engineering university graduates, at slightly over 21 %. On the other hand, they are well-represented in the field of biology (68 %), environmental science (48 %), physical sciences (46 %), mathematics and statistics (44 %), as well as in architecture and construction (43.5 %).

Figure 3 - Share of women tertiary education graduates in specific STEM fields – EU average, 2023

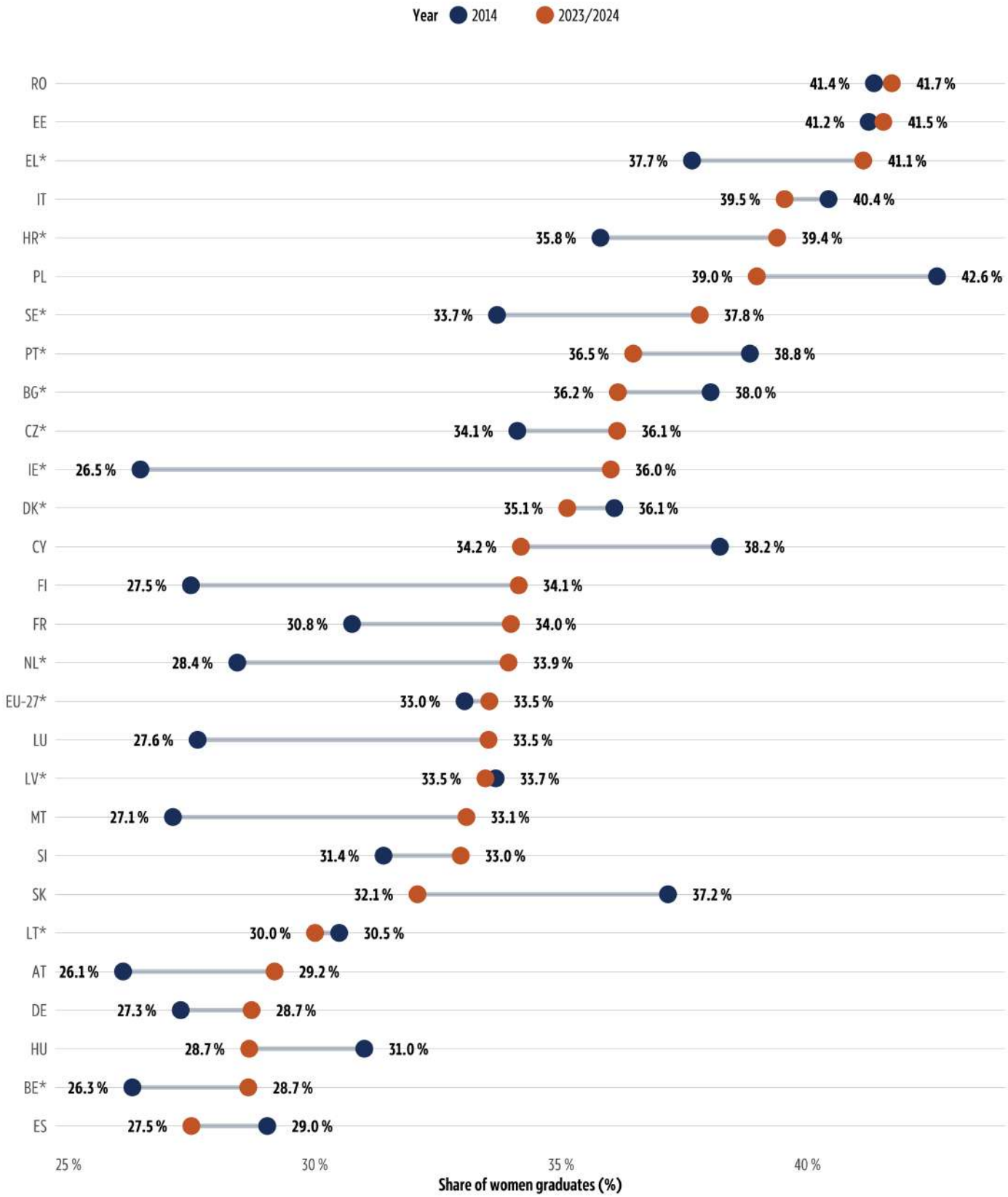


Data source: Eurostat, Graduates by education level, programme orientation, sex and field of education, February 2026.

At country level (see Figure 4), there are considerable variations among and within countries over time.

By specific sectors and country, discrepancies are also significant. For example, the share of women who graduated in ICT in 2023 ranged from 38 % in Greece and 36 % in Estonia to 15 % in Belgium and 13 % in Spain. In engineering, the share ranged between a high of 33 % in Romania and 29 % in Sweden to 14 % in Germany, the EU's manufacturing power, and 11 % in Slovakia.

Figure 4 – Share of women graduates in STEM by EU country and over time



Data source: Eurostat, Graduates by education level, programme orientation, sex and field of education, February 2026.

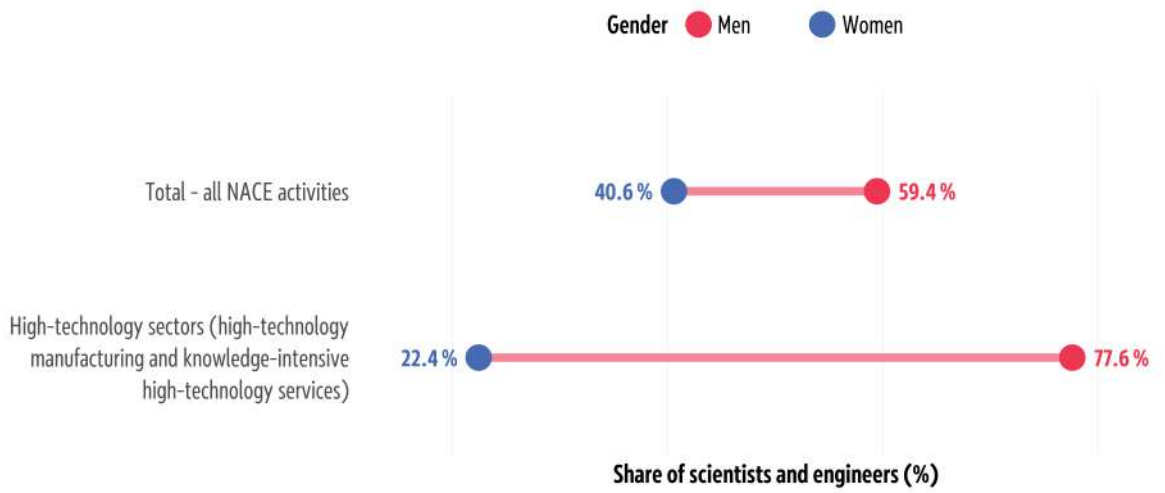
Gender imbalance in vocational training

In vocational upper secondary education, according to Eurostat data, the share of female graduates was 44 % in STEM fields in 2023, while in medium-level vocational training, it stood much lower, at around 15 %.

Gender imbalance in STEM employment

In employment, women are severely under-represented as scientists and engineers in high-technology sectors, at 22 %, compared with 41 % in the economy overall (see Figure 5).

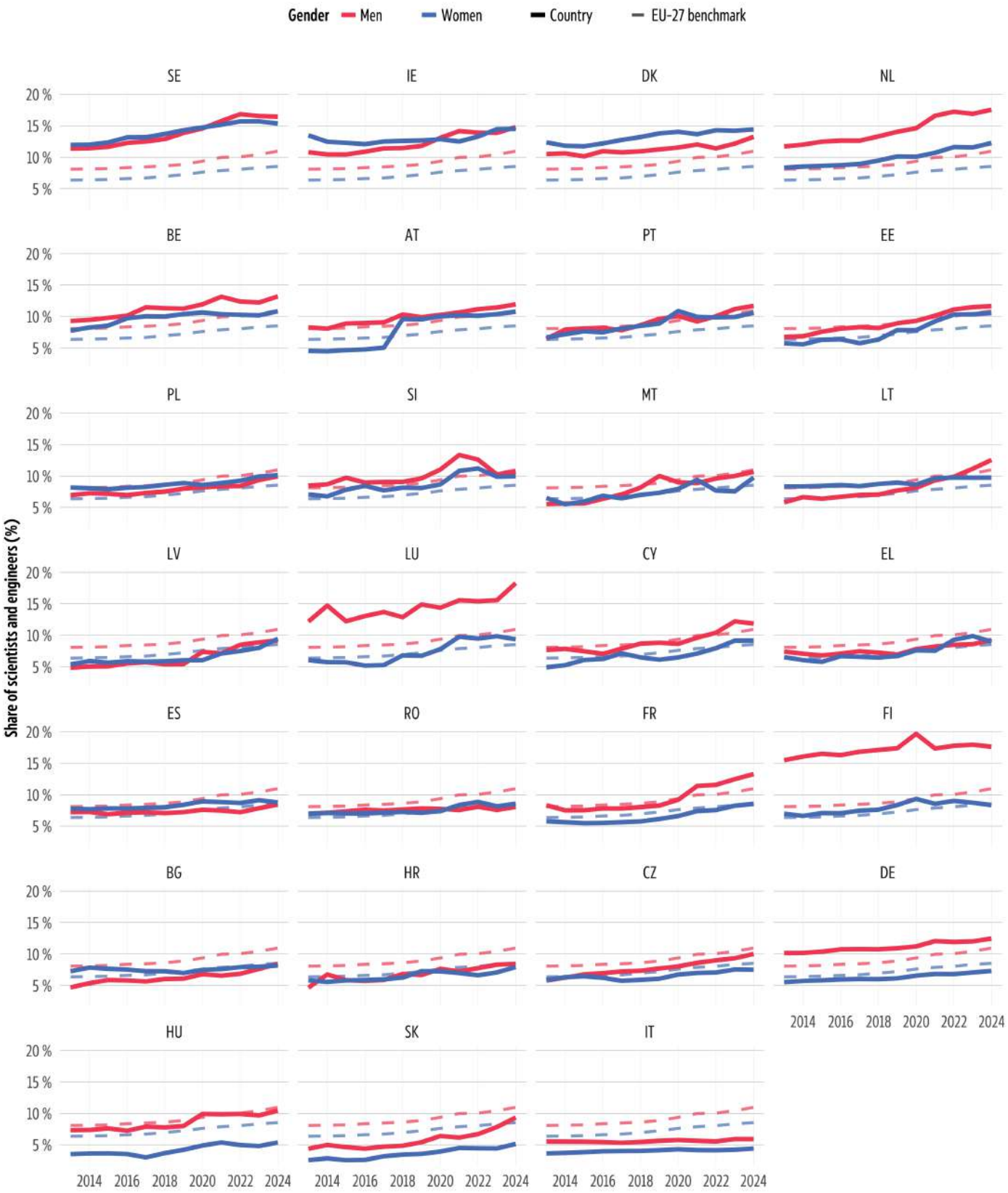
Figure 5 - Share of scientists and engineers by gender in high-technology sectors versus the general economy, 2024



Data source: Eurostat, Employed persons in science and technology (HRST) by category, NACE Rev. 2 activity and sex (2008-2026)

In some EU countries the share of scientists and engineers in the total female, respectively male workforce is similar, while in others the gap is rather large, such as in the Netherlands, Luxembourg, Finland, Germany and Hungary (see Figure 6), indicating that proportionally much less working women than men choose STEM as a field of activity.

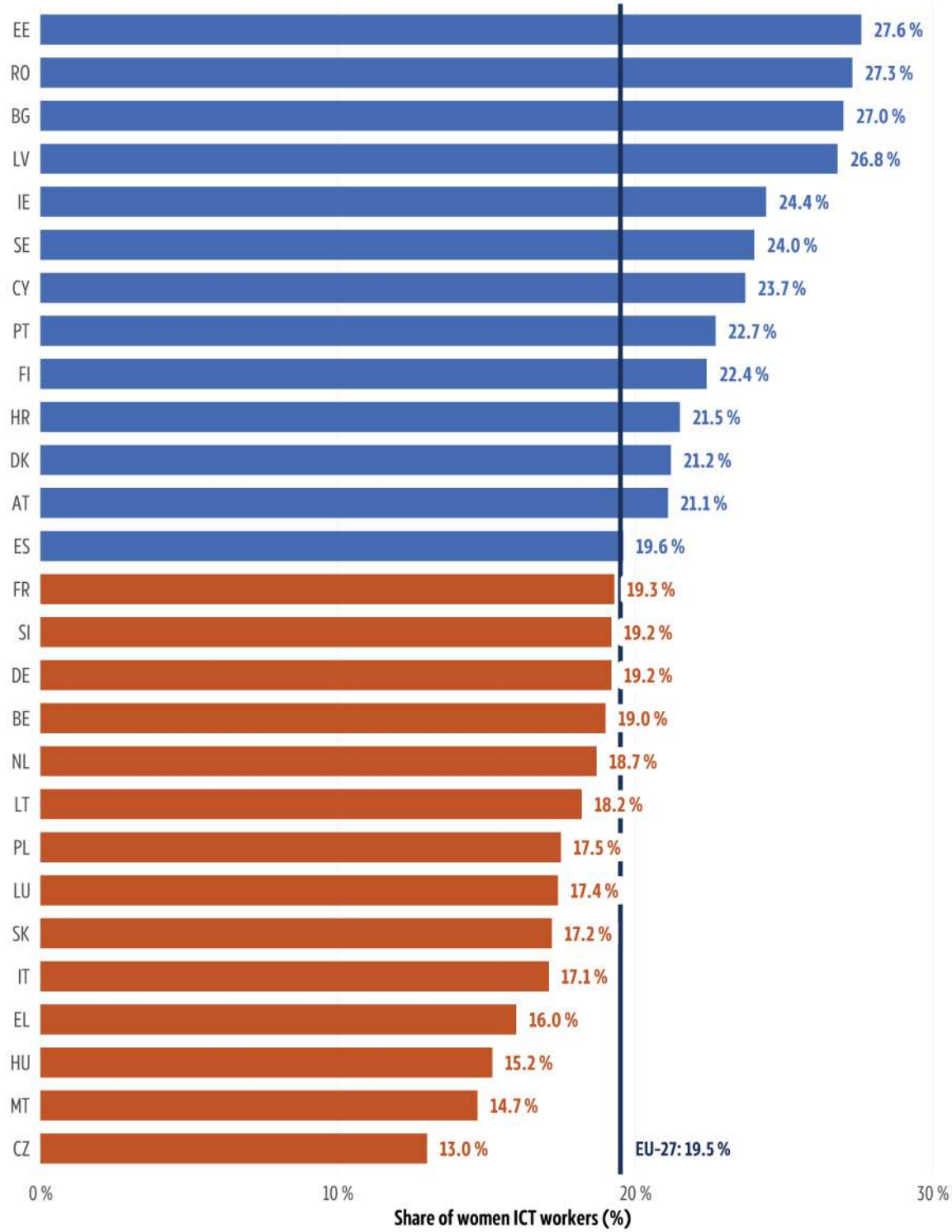
Figure 6 - Share of scientists and engineers by gender among all workers in individual Member States, 2014-2024



Data source: Eurostat, Employed persons in science and technology (HRST) by category, NACE Rev. 2 activity and sex (2008-2026), February 2026.

In ICT, although the gender gap varies widely among EU countries, women remain under-represented overall, reaching at best around 27 % in Estonia, Romania, Bulgaria and Latvia (see Figure 7).

Figure 7 - Share of women among ICT workers, 2024



Data source: Eurostat, Employed information and communications technology (ICT) specialists by sex, February 2026.

In the area of research, according to a 2024 European Commission report on women in research and innovation, women researchers remain under-represented in both the fields of natural sciences (32 % in the higher-education sector and 36 % in the government sector) and in engineering and technology (25 % in higher education and 24 % in government). In terms of patent applications, women comprise only 9 % of applicants, and most patent applications are submitted by men-only teams.

How to close the gender gap in STEM

To close the gap, it is important to understand its causes and the benefits of increased presence of women in STEM for individuals and for society.

Multiple factors behind the gender gap

The possible causes of the gender gap in STEM remain a topic of ongoing scientific investigation, [4] with multiple factors interacting. Measurable differences appear at the level of both skills and interests. The age when cognitive differences set in is also subject of scientific inquiry. [5] Possible causes explored by various studies include:

- **sociocultural factors**: family expectations, cultural norms and teachers' attitudes still encourage girls and boys, more or less subtly, to choose traditional career paths; lack of role models and media messages that perpetuate gender stereotypes about girls' skills and talents also discourage girls from pursuing STEM careers;
- **individual factors**: even when they are on a par with boys in school performance, girls tend to make different choices and avoid STEM. According to a policy paper from the OECD on the topic, girls tend to make choices that minimise their risk of failure and avoid competitive settings. This is related to girls' low self-efficiency in maths: unlike boys, girls tend to underestimate their mathematical abilities; as a consequence, their confidence and enjoyment of maths and scientific subjects are lower;
- **gender insensitive education**: educational curricula, teaching materials, teaching styles, etc. are not tailored to the needs of girls and give an advantage to boys in maths and sciences;
- **women-unfriendly working environments**: gender bias, long hours and commitments that are not compatible with family life, as well as gender-based harassment against women, are all factors that discourage women from pursuing STEM careers;
- **gender-specific life constraints**, particularly those relating to **family and maternity**: many women drop out of STEM fields and do not return;

An issue particularly debated among scientists refers to the relative importance of biological versus sociocultural factors in explaining measurable differences in cognitive abilities and interests, such as spatial abilities (boys find it easier to rotate objects in their mind) and interests in things versus people (girls are more interested in people, while boys give more attention to things). Experts argue that, even if biological differences are real, cognitive gaps are not inevitable, and a proper identification of causal mechanisms at work based on robust scientific investigation is the only solid guarantee that measures to eliminate such gaps are effective. [6]

Moreover, recognising the decisive role of sociocultural factors is important, as well, in order to avoid an overemphasis on individual choices and responsibilities. A 2020 study commissioned by the European Parliament's Committee on Women's Rights and Gender Equality (FEMM) argued that people's choices are influenced by broader sociocultural norms. Unless these norms change to promote gender equality in STEM, individual efforts alone will not lead to lasting progress.

The level of gender equality in a society is itself a factor that can strengthen or alter rational individual choices. One explanation for the under-representation of women in STEM highlights the aspect of intraindividual relative academic strengths, and the way this plays out in broader sociocultural

contexts. According to this theory, girls – who have a relative strength in reading — tend to avoid STEM fields, even if their proficiency level in maths and science is high. In contrast, boys' weaker performance in reading compared with maths may reinforce their focus on science and maths, improving their skills in these areas over time. [7]

This hypothesis helps explain why more gender-equal countries often have larger gender gaps in STEM education and careers – a phenomenon known as the 'gender-equality paradox'. [8] According to this idea, better living standards (such as economic prosperity, gender equality and education) can widen differences in personality and cognitive abilities between men and women. In wealthier, more gender-equal societies, students are more likely to choose careers based on personal interests, whereas in less prosperous countries, financial considerations often push more girls into STEM. However, other researchers challenge this view. [9]

EU policy documents emphasise sociocultural factors as the main driver, and commit to tackling them. The Commission, in the STEM education strategic action plan (2025), stresses that 'the root causes are linked to persisting gender-related societal expectations and stereotypes, which influence girls' career aspirations and choices early on, affecting attitude, motivation and performance in STEM subjects'. The European Parliament, in a 2021 resolution, stressed various sociocultural barriers, such as gender stereotypes, male-dominated workplaces, discrimination and prejudice, conscious and unconscious bias, sexual harassment, a negative working environment, and a lack of female role models and mentors.

Benefits of greater representation of women in STEM fields

There are numerous benefits of increased female representation in STEM, including: [10]

- **social equity**: a higher participation of women in STEM reduces the overall gender gap, and ensures that women have more access to sectors that shape society, such as AI;
- **more innovation**: gender equality brings new perspectives in new technologies, making them more inclusive and relevant for society;
- **economic benefits**: attracting more women to STEM helps to solve the skills shortage, and to increase the EU's gross domestic product (GDP) and its global competitiveness. According to an article by McKinsey from 2023, 'if Europe could double the share of women in the tech workforce to about 45 percent, or an estimated 3.9 million additional women by 2027 … it could benefit from a GDP increase of as much as €260 billion to €600 billion'. A European Institute for Gender Equality (EIGE) report from 2017 notes that more gender equality in STEM would increase the employment rate between 2.1 % and 3.5 % by 2050;
- **social benefits**: greater representation of women in STEM professions enhances their economic and financial independence;
- **making the EU more attractive for STEM talent**: gender equality matters for women migrants. One reason why they migrate is to escape inegalitarian settings at home. By improving gender equality, the EU has a better chance of both retaining its trained talent and attracting new international talent.

Strategies to close the gender gap

The 2024 report by the network of experts working on the social dimension of education and training (NESET) for the European Commission emphasises the following examples of successful practices:

- increasing girls' self-efficacy, as this enhances performance and retention in STEM subjects;
- having supportive families and a family-school partnership;
- using gender-sensitive teaching and gender-sensitive curricula;
- taking innovative pedagogical approaches focusing on problem-solving and making connections to real-life problems;
- adopting non-formal learning (e.g. in camps, afternoon clubs, summer school)
- breaking down barriers among STEM disciplines;
- improving the recruitment and retention of girls and women in STEM disciplines.

The study for the FEMM committee mentioned above proposed several strategies to close the gender gap in STEM in education and employment.

- Interventions need to be delivered within real-world contexts, for instance in internships, and not in rigid institutionalised arrangements such as diversity workshops.
- Different interventions should target specific STEM fields: in biology and chemistry, where women are well- represented, focus should be on retention; in engineering, where the proportion of women is low, women need to be attracted at early stages.
- Enabling environments in education and the workplace need to be created by removing the barriers skewing female interests, preferences and choices (gender stereotypes and gender discrimination) while fully respecting women's individual choices.
- The role of schools should come under close scrutiny: in primary school, the focus should be not on abilities but on work and effort; in secondary school, the influence of sociocultural factors on students yet immature enough to make independent subject choices needs to be minimised.

A 2025 report by the Centre for European Policies Studies (CEPS) recommends a geographically differentiated policy to attract more women to AI professions. According to the report, 'despite advances in gender equality in Scandinavian countries, Sweden and Denmark rank low in the proportion of women in tier 2 [advanced AI engineers and researchers developing cutting-edge models], at 17 % and 15 % respectively. Likewise, Germany and Poland lag behind many other countries with regard to women as tier 2 talent, despite the large proportion of tier 2 talent relative to the rest of Europe'.

The above-mentioned McKinsey article from 2023 emphasised the need to address girls' drop-offs from STEM fields in secondary school and university. Girls enjoy less teacher, parental and peer support than boys do for pursuing STEM careers, and receive subtle messages that they are less good for it. According to the article, in university, it is important to address the drop-off rates by establishing programmes to support women. In employment, to solve the talent gap, companies should offer a good working environment for women, improve the retention of women at mid-career, and redeploy women to roles of responsibility.

EU policy

Numerous EU initiatives, strategies and policies focusing on education or employment integrate a cross-cutting gender equality objective, while EU legislation is instrumental to fighting sex-based discrimination and harassment. The EU gender equality strategy 2020-2025, which was based on a comprehensive approach integrating legislation and soft measures, took aim at gender concentration in professions.

More women in STEM education

Improving gender equality has been a long term-priority of EU education policy. In the Union of Skills communication published in March 2025, the Commission outlined the ambition to address gender disparities in STEM fields, including in engineering and computer science, where women are under-represented. The objective is that, by 2030, women make up at least 40 % of tertiary-level students enrolled in STEM, and at least 33 % of ICT doctoral candidates.

In the related STEM education strategic plan: skills for competitiveness and innovation, the Commission notes that the persistent gender gap in STEM is one of the factors that 'weaken the EU's ability to compete in the global race for technology and maintain its strategic autonomy in key industrial sectors'. The plan proposes to address the gap by promoting 'more accessible, inclusive and gender-unbiased STEM education', raising awareness and interest among girls of STEM subjects, and adopting gender-sensitive teaching strategies and materials. It also calls on the Member States to address gender stereotypes; facilitate access to STEM education by targeting crucial age cohorts; and promote more institutionally supported mentorship programmes with role models. Actions proposed under the plan include:

- a new EU funded initiative, 'Girls go STEM', led by the European Institute of Innovation and Technology Community, which applies an approach based on 'Circular Learning Spaces' – interactive platforms to help women acquire essential digital and entrepreneurial skills;
- identifying most successful practices for girls and women in STEM;
- exchange of good practice and mutual learning on attracting and supporting girls and women in STEM apprenticeships through the European Alliance for Apprenticeships.

The draft new regulation on the Erasmus+ programme commits to granting particular attention to gender equality, particularly to the participation of girls and women in STEM, including through the science, technology, engineering, arts and mathematics (STEAM) approach.

The EU digital education action plan 2021-2027 proposes 14 actions, of which one is focused specifically on gender equality. Its objective is to empower young women to develop digital and entrepreneurial skills.

Tackling the gender gap has been a priority for the EU in vocational training, as well. In a 2020 recommendation on vocational training and education, the Council recommended that Member States adopt targeted measures to promote gender balance in traditionally 'male' or 'female' professions, and address gender-related and other stereotypes. The Commission is currently preparing a new strategy on vocational training and education with, among other things, the aim to address gender imbalances by tackling gender stereotypes. The Herning Declaration on attractive and inclusive vocational education and training (VET) for increased competitiveness and quality jobs 2026-2030,

endorsed on 12 September 2025 by ministers responsible for VET, European social partners and the European Commission, states that national action should address gender inequalities and stereotypes in VET, promoting equal access to professions for all.

More women in STEM research

EU research policy pursues ambitious gender-equality objectives. The European research area (ERA) has aimed at gender equality at all levels since 2012. The ERA policy agenda 2025-2027 establishes several objectives relating to gender equality with an intersectional dimension, including the implementation of a code of conduct on gender-based violence in research.

The EU supports the implementation of gender equality plans under its Horizon Europe framework programme for research with over €79 million. Entities eligible under the programme need to have a gender equality plan in place, in which they outline commitments and actions to promote gender equality through a 'process of structural change', and to increase gender balance throughout the programme with a target of 50 % women on boards, expert groups and evaluation committees. The SheFigures report published yearly by the Commission since 2003 to track gender equality in research and innovation showed in its 2024 edition that the proportion of research organisations that apply gender equality measures varies vastly among Member States, from 85 % in Germany to 14 % in Bulgaria.

An evaluation of gender equality plans in research found that gender action plans had a positive impact on work–life balance, labour and working conditions for women, hiring, career progression, women's representation in senior and leadership positions, and rates of sexual harassment, discrimination and gender stereotyping.

Despite these measures, according to a Commission report from 2025 on fostering gender equality, women remain less represented in programme parts where STEM subjects are the main focus. For example, in the Digital, Industry and Space cluster, women represented as little as 27 % of researchers, less than in other programme parts.

More women in STEM employment

The EU has comprehensive legislation in place to remove the numerous barriers that make a STEM career unattractive to women. It has adopted rules to combat sex-based discrimination in employment, including sexist harassment at the workplace, to ensure that women are paid similar salaries to men for similar work, to facilitate reconciliation of family and professional life through maternity and parental leave and flexible working arrangements, and to ensure gender balance in the management of publicly listed companies.

In addition to legislation, the EU has outlined ambitious objectives on gender equality. The Digital Decade policy programme 2030 from 2022 aims to promote women's access to this field through a mix of measures designed to increase the number of ICT graduates and ICT professionals in the EU overall. To achieve this goal, the Women in Digital Scoreboard evaluates how well girls and women are included in digital jobs, careers and entrepreneurship.

In 2019, EU Member States and Norway committed to boosting women's participation in digital and technology sectors through the Ministerial Declaration of Commitment on Women in Digital, with a strong focus on improving women's representation in certain high-skilled activities.

The EU has also implemented initiatives such as:

- the Women TechEU scheme, which provided support to women (co-)founders of deep tech start-ups, consisting of funding, coaching and mentoring. Over the 2024-2025 period, the scheme made available €12 million in grants for 160 women-led deep tech companies;
- EmpoWOMEN, to empower female-led deep tech start-ups, which has supported an acceleration programme, free-equity funding, prizes and vouchers for services for 25 selected women-led companies operating in the deep tech sector;
- the EU Prize for Women Innovators, to reward innovations led by women entrepreneurs in health, biotechnology and ICT domains.

European Parliament position

In various resolutions, Parliament has repeatedly called on the EU and its Member States to overcome the gender gap in the digital and technological sectors. In a November 2025 resolution on recommendations for the new EU gender equality strategy post-2025, Parliament emphasises the importance of women's presence in STEM education and professions to avoid gender bias in new digital developments, for example. Parliament advocates an integrated strategy to strengthen women's and girls' education from an early age, including initiatives to motivate women to enter into STEM fields. It calls on the Commission to ensure women's equal access to vocational training courses, internships and awareness-raising courses on STEM, as well as to promote gender equality in companies working on AI and ICT matters, including through financing women-led projects in the digital sector and promoting a minimum number of women researchers participating in AI- and ICT-related EU-funded research projects.

In a 2021 resolution on promoting gender equality in STEM, Parliament stressed that the main goal of public policies in the field should be 'to remove all barriers that restrict women's and girls' interests, preferences and choices'. It called on the Commission, the Member States, and education institutions and companies to implement a comprehensive set of measures, such as:

- promoting women's participation in STEM studies and careers through national or regional gender-equality action plans or strategies;
- raising awareness of gender bias and stereotypes across all STEM-relevant sectors, fighting stereotypes and promoting female role models by increasing the number of women in leadership positions and incentivising companies that support female role models;
- introducing gender-sensitive educational content, teacher training and curricula in STEM studies in schools and universities;
- setting up mentoring schemes and facilitating the networking of women in the field;
- providing specific support for women from disadvantaged backgrounds;
- creating a women-friendly environment by ensuring healthy and safe working and studying conditions, establishing zero tolerance for sexual harassment, introducing mandatory pay transparency policies, and ensuring work–life balance;
- fighting discrimination in the labour market;
- supporting women entrepreneurs in STEM and their access to finance;

- making AI free of gender biases, and using it to overcome stereotypes.

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Endnotes

1 According to A. Schleicher, PISA 2022 Insights and Interpretations, OECD, 2023.

2 ibid.

3 According to the OECD report, 'the under-representation of girls among top performers in science and mathematics [in secondary schools] can partly explain the persistent gender gap in careers in [STEM] fields'.

4 This experts' report for the European Commission, Addressing the gender gap in STEM education across educational levels (2024), reviews relevant scientific research in the field (academic studies from 2014-2023) and concludes that further scientific work is still needed: 'The findings of the report reveal that studies carried out over the past decade have predominantly explored individual-level factors such as attitudes and motivation, but lack definitive conclusions as to the drivers of the gender gap in STEM.'

5 According to P. Martinot, B. Colnet, T. Breda, J. Sultan, L. Touitou et al., 'Rapid emergence of a maths gender gap in first grade', *Nature*, No. 643, 2025, pp. 1020-1029, the gap in mathematical performance emerges after only four months of school and becomes significant after 12 months.

6 See G. Stoet, D. C. Geary. Sex differences in adolescents' occupational aspirations: Variations across time and place, PLoS One, 2022 Jan 26;17(1).

7 G. Stoet and D. C. Geary, 'The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education', *Psychological Science*, Vol. 29(4), 2018, pp. 581-593; M. Balducci, M.-P. Larose, G. Stoet and D. Geary, 'The STEM Conundrum: Sex Differences in Intraindividual Academic Strengths and the Gender Equality Paradox Across Academic Achievement Levels', *Intelligence & Cognitive Abilities*, Vol. 1(2), pp. 18-34.

8 G. Stoet and D. C. Geary, 'The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education', *Psychological Science*, Vol. 29(4), 2018, pp. 581-593.

9 T. Breda, E. Jouini, C. Napp and G. Thebault, Gender stereotypes can explain the gender-equality paradox, 2020, argue that gender stereotypes – rather than greater equality – drive these differences. V.-J. Ilmarinen and J.-E. Lönnqvist, Deconstructing the gender-equality paradox, 2024, question the paradox on metholodogical grounds.

10 See, for instance, the European Commission's Women in Digital webpage.

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