From the Association of Nordic Engineers

Submission to the European Commission's Action Plan for Women in Research, Innovation and Start-ups

The Association of Nordic Engineers (ANE) warmly welcomes the European Commission's call for evidence to inform the first EU Action Plan for Women in Research, Innovation and Start-ups, to make Europe the world's most attractive place for women to build scientific, engineering and innovation careers by 2030. This initiative is both timely and necessary. Despite progress, the EU still faces structural imbalances: women remain under-represented in senior academic roles, in patenting, and in innovation-driven entrepreneurship. We share the Commission's view that closing persistent gender gaps is essential not only to fairness but to excellence, competitiveness and sustainable growth across the European Research Area.

The Commission has formulated seven questions, where they seek insights, in particular. While all questions are extremely relevant, ANE has chosen to focus on four of these questions: challenges & barriers, why girls don't choose STEM, impact on competitiveness, and EU action recommendations, as these are areas where our Nordic evidence base is strongest and most actionable for EU-level policymaking.

Our analysis draws on recent publications from ANE member organisations, the engineering trade unions in Sweden, Denmark, Norway, Iceland and Finland, along with research that ANE have conducted:

Our member organisations, who represent 500,000 engineers and STEM professionals in the Nordic countries, are:

- The Swedish Association of Graduate Engineers (Sveriges Ingenjörer)
- The Danish Society of Engineers (IDA)
- The Norwegian Society of Engineers and Technologists (NITO)
- The Association of Chartered Engineers in Iceland (VFÍ)
- Engineers Finland representing the Finnish organisations: the Academic Engineers and Architects in Finland (TEK), the Technical Association in Finland (TFiF), the Union of Professional Engineers in Finland (ILRY) and the Engineers in Finland (DIFF)

Q1: Do women in research, innovation and start-ups encounter specific challenges and barriers? If so, which ones?

Finnish research led by TEK shows that a sense of belonging is a critical factor shaping whether students and early-career professionals remain in the technology field.

Belonging as a structural barrier for women in STEM

A recent TEK study finds that, although both men and women value belonging in tech, women feel less certain that they truly "fit in," report weaker self-efficacy, and experience a lower sense of belonging than men, while gender minorities have the lowest belonging of all. This matters: TEK's research emphasises that a lack of belonging increases the risk of students dropping out, switching degrees, or choosing careers outside the tech sector, even when they have the skills and motivation to succeed.

These belonging-related disparities align with TEK's broader research showing that women face structural and cultural barriers in technology fields, including subtle norms that question their legitimacy or competence. Such barriers reinforce weaker self-confidence and limit the degree to which women feel like "valued and legitimate members" of the field — a key dimension of belonging. When combined with TEK's findings on identity differences and skill-valuation gaps in early-career engineering roles, this evidence indicates that weaker belonging contributes directly to higher attrition risk for women in tech.

Sense of belonging encourages professionals to stay in tech | TEK

Discrimination, pay and harassment

TEK's labour-market analyses identify a persistent unexplained gender pay gap (5.5% after controls) and a lower sense of belonging for women and gender minorities in tech workplaces, alongside higher exposure to harassment, indicating systemic inequities that affect retention.

More than half of the gender pay gap in tech is unexplained | TEK

In Denmark, the cross-union "Kvindernes Sidste Arbejdsdag (LØNGAAAB)" campaign annually highlights the unadjusted gender pay gap based on Statistics Denmark figures (e.g., 12.4% in 2024; 12.9% in 2025), signalling continued inequality that affects women's economic outcomes and career trajectories. Campaign partners include IDA alongside other national unions.

kvindernes-sidste-arbejdsdag-2023-loengaaaaaaab.pdf

Research from TEK shows that women in Finland frequently encounter **stereotypes and a masculine culture** in the technology field, which can call their competence into question and undermine their confidence. These cultural patterns mean that women are more likely than men to experience situations where they feel judged, excluded, or seen as less legitimate in technical roles—forms of treatment that amount to gender-based discrimination in everyday professional life.

Stereotypes and a masculine culture keep women in the minority in technology | TEK

Q2: Why do young girls choose not to pursue a STEM career when they go to university?

Evidence from Sweden

A central barrier to women's participation in engineering begins before university. In this answer, ANE draws on Sweden's most detailed analysis of this issue: **Sveriges Ingenjörer's 2024 report on girls' interest in the upper secondary *Teknikprogrammet (upper secondary gateway to engineering at Higher Education)*.** The report provides rich, municipal-level evidence that helps explain why girls' participation varies so much across the country and, crucially, what can be done to change that.

Geographical access

One of the clearest findings is that girls' likelihood of choosing the *Teknikprogrammet* depends heavily on geographical access. Many Swedish municipalities—122 out of 290—do not offer the programme at all. For many girls, this extra distance becomes a decisive deterrent, lowering their chances of ever entering the engineering pipeline.

Local role models

The report also shows a link between local role models and girls' interest in technical education. Municipalities with a higher share of engineers in the local population also see higher shares of girls selecting the *Teknikprogrammet*. This highlights that girls' choices are shaped not simply by academic interest, but by whether they see people like them in technical professions and whether engineering feels like a realistic, socially supported path in their community.

Gender imbalance and its impact on the pipeline

Another major factor is the pronounced gender imbalance within the programme itself. The *Teknikprogrammet* remains heavily male-dominated, with roughly five out of six students being boys; only about 3% of girls choose it, compared with 14% of boys. Yet, paradoxically, the programme is also one of the most effective springboards for girls who *do* enter it—one in three girls who complete the programme continue into an engineering degree, far higher than from any other upper secondary route. This means that girls' early programme choice is decisive: if they do not choose the *Teknikprogrammet*, their chances of entering engineering later become dramatically lower.

Local engagement makes a difference.

Municipalities that actively collaborate with technical upper secondary schools and local employers tend to see higher female uptake. These partnerships give girls hands-on exposure to technology, clearer insights into career options, and direct contact with role models, all of which help counter stereotypes and make technical pathways feel more meaningful and attainable.

https://www.sverigesingenjorer.se/globalassets/tjejers-teknikintresse-februari-2024-ny-version.pdf

Evidence from Norway

Positive, measurable effects on girls' motivation, Norwegian case story

Jenter og teknologi is a national Norwegian initiative designed to increase the number of girls aged 13–19 who choose technology- and STEM-related education and careers. Driven by NHO, NITO, and the National Centre for STEM Recruitment, the initiative connects the industry's growing need for technological competence with the education sector.

Each year, the project reaches tens of thousands of girls through nationwide school visits, events, role model presentations, and large digital campaigns, highlighting opportunities in technology, green transition, and sustainable innovation. Activities include a national tour meeting ~7,000 girls annually, classroom materials for lower secondary schools, and cooperation with companies and female technologists.

Jenter og teknologi

A majority of surveyed girls (about 59–60%) report that *Jenter og teknologi* influenced one or more of their study choices or planned choices.

Evaluering av Jenter og teknologi | realfagsrekruttering.no

Evidence from Finland

In recent years, the proportion of female students in university education in the field of technology in Finland has developed in a positive direction. From 2018 to 2024, the change has been dramatic, with an increase of around 8 percentage points. In the same period, the share of women among primary applicants in these fields has increased by just under 3 percentage points.

Interventions to increase the amount of female students in the field have been numerous and there is no research that would reveal causalities behind the correlations, but some conclusions can be drawn:

1. **Bold rebranding of degree programmes:** The choice of field of study and study track is motivated as much by impressions as by rationality. What value proposition does the name and content of the degree programme offer? Do they successfully reflect the key role of the field in addressing major societal challenges and saving the world? In this study, we highlight several inspiring cases of successful rebranding.
2. **Enjoying the world's best student culture:** The student culture in the field of technology has transformed in recent years. Students have taken a giant leap towards a more inclusive student culture. This is something that should be communicated to young people considering the field, and the best possible partners for communicating this are the students themselves. It is worth making more systematic use of students' skills and developing an even better study and student culture in cooperation between students and the university.
3. **Cooperation and pooling resources:** All key players in the field of technology try to do their part in balancing the gender ratio in the field. In addition to this common ambition, there is a relatively unified view on the measures required. This starting point provides an excellent basis for extensive marketing and branding campaigns, as long as the partners can join forces and channel small streams of resources into one great current.

Read more on the publication Towards equal representation in tech

Q3: How does the underrepresentation of women negatively affect outcomes and competitiveness in research, innovation and start-ups?

At the EU level, women account for only 9% of patent applications, signaling under-utilisation of talent and ideas in innovation ecosystems.

The leaders of the Danish Technical University (DTU) state that homogeneous research groups produce weaker research. They argue that a lack of diversity leads to blind spots, fewer innovative solutions, and poorer chances of winning major grants. Diverse teams, by contrast, contribute different perspectives and approaches, resulting in stronger, higher-quality research overall.

DTU departments hiring more female researchers: "We set a broad field - and choose the best"

DTU is conducting a two-part research project called *Diversity in Technology*. One part examines gender and ethnic diversity within the technology field, with a particular focus on engineering education. The second part uses multi-site ethnographic fieldwork to explore how organisations that are committed to improving diversity actually carry out this work.

Drawing on the results from both projects, DTU have developed a toolbox which provides practical advice that can enable better diversity practices and perhaps help increase diversity in the workplace.

The suggestions include information on what works and what to avoid, and emphasise shifting from blaming individuals to redesigning systems, structures, and accountability so that diversity and inclusion are created intentionally, context-specifically, and through transparent, shared responsibility.

DTU Diversity in technology; DTU Diversity in technology toolbox

Gender inequality in STEM exacerbates shortages.

ANE's own report, **Reclaiming Europe's Edge: Competitiveness through STEM Talent,** comprehensively analyses the current state of STEM talent mobility within Europe. The report emphasises that shortages in STEM talent "not only hinder research and innovation" but also impede advancement in AI, sustainable energy technologies, and medical/biotech fields and as such is a significant threat to Europe's ability to remain competitive in the global economy.

Because women remain underrepresented in STEM across Europe, failing to engage this half of the population significantly limits the talent pool.

ane-report-20241127-lowres.pdf

Q6: What specific actions should the EU and/or Member States take to promote equality, diversity and inclusion in research, innovation and start-ups?

A) Actions the European Commission can implement directly

- Strengthen gender equality requirements in EU R&I funding: Make gender responsive recruitment, evaluation and leadership pathways mandatory in future EU R&I programmes; require antiharassment systems (reporting, response, training) as part of grant eligibility.
- Introduce EU-wide standards for monitoring gender equality in R&I: Create an EU Gender Equality Dashboard for R&I and strengthen ex-ante and ex-post GEP assessments linked to funding access.
- Mainstream gender equality across EU economic, digital and green strategies: Embed STEM gender-equality objectives beyond education policy (e.g., AI, biotech, digitalisation, green transition).

B) Actions the EU should recommend, encourage, or support in Member States

- Improve geographical access to STEM pathways: Encourage local or regional access to technology programmes in primary and secondary education where distance is a barrier (evidence from Sweden).
- Strengthen local role-model and mentorship ecosystems: Recommend national frameworks that support visibility of female engineers through school visits and community role-model programmes; support national recruitment campaigns for girls into technology.
- Expand school–industry collaborations: Invite scaling of Teknikcollege-style partnerships that include workplace visits, engineering tasters, and structured industry–school projects.
- Promote gender-inclusive teaching practices and learning environments: Encourage adoption of pedagogical measures informed by Nordic findings on masculine culture, harassment and belonging.
- Strengthen national-level data collection and monitoring: Recommend detailed gender-disaggregated education and labour-market data and national dashboards tracking enrolment, retention and progression by gender.