



# EC consultation on Action plan for women in research, innovation and start-ups

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# 1. SCOPE OF CONTRIBUTION

Gender inequality remains a structural challenge across Europe's research and innovation (R&I) ecosystem. Women continue to be significantly underrepresented in many science and technology domains and in leadership positions within start-ups and high-growth companies. This imbalance is particularly pronounced in frontier fields such as Quantum Information Science and Technology (QIST), which are strategically important for Europe's technological sovereignty and global competitiveness.

According to the European Commission's latest [She Figures report \(2024\)](#), women remain a minority in key STEM disciplines. In most EU Member States, women account for less than 40% of doctoral graduates in information and communication technologies and engineering. In the private R&I sector, women represent only 22% of researchers, highlighting a persistent and substantial gender gap in industry-based innovation environments. These disparities are especially consequential in emerging deep-tech sectors, where early-stage participation shapes long-term leadership and market influence.

The underrepresentation of women in QIST is not solely a matter of equity; it represents a structural constraint on Europe's innovation capacity. Quantum technologies are highly interdisciplinary, capital-intensive, and ecosystem-dependent. Excluding or failing to attract and retain diverse talent limits problem-solving capacity, reduces the breadth of research agendas, and constrains entrepreneurial dynamism.

By examining QIST as a frontier deep-tech domain, this contribution illustrates both the systemic barriers facing women in advanced technological sectors and the significant economic and strategic benefits that could result from achieving greater gender balance in Europe's next-generation innovation ecosystems.

Quantum technologies constitute a strategically significant and rapidly evolving domain with transformative potential across computing, communications, sensing, cybersecurity, and advanced materials. The development of a competitive and resilient quantum ecosystem is therefore central to Europe's technological sovereignty and long-term economic growth.

Ensuring women's full participation in this ecosystem is not only an issue of equity, but also a structural requirement to meet the sector's growing talent needs. The quantum R&I and start-up landscape remains heavily male-dominated, reflecting and amplifying the broader STEM gender gap. Recent analyses indicate that women represent approximately [10% of personnel](#) in quantum technology start-ups. In quantum-specific technical roles, women account for roughly [16% of the workforce](#). Particularly concerning is evidence suggesting that fewer than 2% of applicants for [certain quantum technology positions are women](#). These figures illustrate a pronounced imbalance in who is entering, shaping, and commercialising quantum innovation.

This underrepresentation has direct implications for the vitality and inclusiveness of the quantum innovation ecosystem. First, it exacerbates talent shortages in a highly specialised and fast-growing field. Quantum technology development requires interdisciplinary expertise and diverse cognitive approaches and reliance on a narrow demographic base limits access to a substantial portion of Europe's skilled human capital

Second, insufficient gender diversity can constrain creativity, risk assessment, and problem-solving capacity within research teams and start-ups. A substantial body of evidence demonstrates that gender-diverse teams are more likely to generate innovative outcomes and achieve stronger financial performance compared to homogeneous teams. In a capital-intensive and high-risk domain such as quantum technologies, limiting diversity may therefore weaken Europe's competitive positioning.

Importantly, the quantum sector remains at a formative stage. This provides a unique opportunity to embed inclusive governance structures, recruitment practices, mentoring systems, and workplace cultures from the outset. Proactively addressing gender imbalances now can help prevent the entrenchment of structural biases that characterise more mature technology sectors.

In sum, advancing gender balance in QIST is not only a matter of fairness; it is directly linked to strengthening Europe's capacity for excellence, innovation performance, and global competitiveness in a strategically critical deep-tech field.

## 2. Impact of Women's Underrepresentation on Competitiveness in QIST

Women remain significantly underrepresented across STEM disciplines, including in Quantum Innovation Science and Technology (QIST), as consistently documented in the European Commission's "She Figures" reports. This structural imbalance is particularly consequential in frontier domains such as quantum technologies, where scientific breakthroughs, intellectual property generation, and high-growth start-up formation are central to Europe's strategic positioning. The persistent exclusion of a substantial share of the available talent pool represents not only a social inequity but a measurable constraint on research excellence and industrial competitiveness.

A robust body of empirical research demonstrates that gender diversity enhances scientific quality and innovation performance. Nielsen et al. (2017, PNAS) show that gender-diverse research teams produce higher-quality science. Subsequent work by Nielsen, Bloch, and Schiebinger (2018, Nature Human Behaviour) further indicates that diversity, when effectively integrated, improves research questions e.g. by broadening problem framing and increases the likelihood of breakthrough discoveries. In highly complex and interdisciplinary fields such as QIST, which integrates physics, engineering, materials science, computer science, and cryptography, cognitive diversity is particularly critical for advancing frontier knowledge.

Beyond scientific output, diversity also correlates with stronger innovation and commercial performance. Evidence from the private sector indicates that mixed-gender teams are more likely to develop market-relevant innovations and achieve superior financial returns.

Research highlighted by Hewlett, Marshall, and Sherbin (2013, Harvard Business Review) finds that diverse teams are significantly more likely to capture new markets. Complementary analyses indicate that the inclusion of women inventors in previously all-male teams can increase the economic value and citation impact of patented inventions. In capital-intensive and high-risk sectors such as quantum technologies, where early intellectual property and scaling decisions shape long-term competitive advantage, these performance differentials are strategically significant.

Conversely, homogeneous teams are more susceptible to groupthink, narrower problem-definition, and unchallenged assumptions. In QIST, where technical uncertainty is high and application pathways are still emerging, such cognitive blind spots can limit the scope of research agendas, slow translational pathways, and reduce responsiveness to societal and market needs. Underrepresentation of women therefore not only diminishes inclusiveness but may materially weaken Europe's innovation capacity in a domain that is central to digital sovereignty and economic resilience.

Increasing female participation in quantum research, invention, and entrepreneurship would therefore strengthen scientific robustness, expand the innovation frontier, and enhance the economic value of quantum technologies. Addressing gender imbalances in QIST is thus directly aligned with Europe's objectives of excellence, competitiveness, and strategic autonomy in deep-tech innovation.

### 3. Analysis and Discussion of Stakeholder Feedback

Structural barriers affecting women's participation in STEM disciplines extend directly into the investment and financing landscape of Quantum Innovation Science and Technology (QIST). Implicit bias remains one of the most significant obstacles shaping funding decisions, investor perceptions, and entrepreneurial trajectories. As documented in the academic literature (e.g., Pritlove et al., 2019; Gvozdanović & Maes, 2018), implicit biases operate subconsciously and influence assessments of competence and leadership potential. In investment contexts, these biases can translate into differential questioning patterns during pitch sessions, more stringent proof requirements for women founders, and skewed evaluations of technical credibility, particularly in highly complex and male-dominated fields such as quantum technologies.

The lack of visible role models and representation in both the technical and financial spheres further compounds this challenge. Research shows that role models significantly influence career aspirations and perceived belonging (Quimby & De Santis, 2006). In QIST, where few women occupy senior scientific, executive, or investor roles, aspiring women founders may face reduced access to informal networks, mentorship, and high-value introductions to venture capital. Investment ecosystems often rely heavily on trust-based networks and pattern recognition. When investment committees and venture capital partnerships are themselves homogeneous, this can reinforce a cycle in which funding flows predominantly to founders who fit established archetypes of the "deep-tech entrepreneur."

Language and framing also play a non-trivial role. Studies demonstrate that gendered wording in recruitment and professional communication affects women's willingness to apply for positions (Gaucher, Friesen & Kay, 2011). Similar dynamics occur in investor communications and due diligence processes. Masculine-coded expectations around assertiveness, dominance, or hyper-competitiveness can shape investor-founder interactions and influence funding outcomes.

Subtle cues, such as how risk is framed, how technical authority is challenged, or how growth ambition is interpreted, can systematically disadvantage women founders in capital-intensive sectors like QIST, where credibility and perceived technical mastery are central to funding decisions.

Sexual harassment and gender-based hostility in the workplace (e.g., Page & Pina, 2015), particularly in hierarchical academic and start-up environments, further constrain access to finance by driving attrition before women reach senior or entrepreneurial stages. Harassment can disproportionately affect early-career women and is closely linked to power asymmetries. In QIST, where pathways from academia to spin-offs are common, hostile or exclusionary environments can disrupt career progression at precisely the stages where patenting, company formation, and investor engagement typically occur. This reduces the pipeline of women-led quantum ventures entering the funding ecosystem.

Collectively, these structural barriers, implicit bias, network exclusion, stereotypical expectations, and unsafe work environments, shape who is perceived as "investment-ready" and who gains access to early-stage and scale-up capital. In a field such as QIST, characterised by high technical complexity and significant capital requirements, even small disparities at the point of evaluation can have outsized long-term consequences. Addressing these structural constraints through bias-aware due diligence practices, diversification of investment committees, transparent evaluation criteria, inclusive networking platforms, and robust safeguards against harassment would materially improve women's access to finance. Strengthening inclusiveness in the quantum investment ecosystem is therefore not only a matter of fairness but a strategic lever to expand the pool of fundable ventures and enhance Europe's competitiveness in deep-tech innovation.

## 4. Recommended Actions for Improved Inclusivity

Addressing gender imbalances in Quantum Innovation Science and Technology (QIST) requires coordinated measures across the full talent and innovation pipeline, from early education to leadership and access to capital. Given the strategic importance and formative stage of the quantum ecosystem, the EU has a unique opportunity to embed structural inclusiveness before disparities become entrenched.

### 4.1 Strengthen the Talent Pipeline from School to Leadership

- **Promote** early STEM engagement among girls, including EU-supported outreach programmes, visible female role models in quantum science and entrepreneurship, and mentoring initiatives linking schools, universities, and industry.
- **Incentivise** universities and research organisations to improve recruitment and retention of women in quantum-related disciplines through performance-based funding top-ups.
- **Establish** EU-backed mentoring, sponsorship, and entrepreneurship programmes advancing women into leadership and start-up creation
- **Promote** family-friendly STEM careers across Member States, including benchmarking and dissemination of good practices on flexible work, accessible childcare, fair parental leave (with incentives for equal uptake by men), and tenure-clock extensions in academia. Address structural precarity caused by fixed-term contracts in early research careers.
- **Strengthen** enforcement of equal pay principles in publicly funded R&I institutions.

### 4.2 Reform Recruitment, Evaluation and Workplace Culture

- **Require** inclusive and bias-aware recruitment practices in EU-funded projects, including gender-neutral job advertisements, diverse selection panels, transparent evaluation criteria, and explicit references to family-friendly policies.
- **Fund** training on unconscious bias for research leaders, investors, and evaluation panels.
- **Enforce** a zero-tolerance approach to harassment and gender-based violence by conditioning EU funding on robust Codes of Conduct, confidential reporting mechanisms, monitoring, and sanctions.

### 4.3 Improve Access to Investment and Decision-Making Power

- **Promote** diversity in investment committees and venture capital partnerships benefiting from EU-backed instruments and encourage bias-aware due diligence processes.
- **Establish** or expand EU-backed capital flows and co-investment mechanisms targeting women-led deep-tech and quantum start-ups, particularly at pre-seed and seed stages.
- **Introduce** diversity incentives within EU funding frameworks (e.g. Horizon Europe), rewarding project consortia and spin-offs with demonstrably diverse leadership and robust Gender Equality Plans (GEPs).

#### 4.4 Strengthen Structural Accountability

- **Implement** binding or “comply-or-explain” gender balance targets for leadership and decision-making roles in publicly funded research institutions, quantum hubs, and start-ups receiving EU support.
- **Require** annual gender-disaggregated reporting on participation, leadership, IP generation, and access to finance, linking continued funding eligibility to measurable progress.
- **Monitor** and evaluate the effective implementation of Gender Equality Plans and publish aggregated progress data at EU level.
- **A coordinated** EU response should frame gender equality in QIST not as a peripheral social objective, but as a competitiveness imperative. By combining early pipeline interventions, structural incentives, inclusive investment reform, and enforceable accountability mechanisms, Europe can strengthen excellence, innovation performance, and long-term leadership in strategically critical deep-tech sectors.
- **Publish EU-level** progress data and enforce measurable improvements as conditions for continued funding.

## 5. Alignment with the Sustainable Development Goals (SDG 5 – Gender Equality)

Advancing gender equality in Europe’s quantum research, innovation, and start-up ecosystems directly contributes to the achievement of Sustainable Development Goal 5 (Gender Equality - <https://globalgoals.org/goals/5-gender-equality/>). The proposed actions support:

- **SDG Target 5.1:** eliminating discrimination against women by addressing structural biases in recruitment, evaluation, and investment processes.
- **SDG Target 5.5:** ensuring women’s full and effective participation and equal leadership opportunities across quantum start-ups, research institutions, and investment committees.
- **SDG Target 5.9:** adopting and strengthening gender-responsive policies through monitoring, reporting, diversity-linked funding criteria, and enforceable accountability mechanisms.

Embedding SDG 5 principles into the quantum innovation ecosystem strengthens inclusiveness, enhances innovation capacity, and supports Europe’s long-term technological competitiveness.

## 6. Conclusion

Gender equality in QIST is not only a social objective; it is a strategic necessity for Europe's scientific excellence, economic competitiveness, and technological sovereignty. By combining early pipeline interventions, structural incentives, inclusive investment reform, and enforceable accountability mechanisms, Europe can strengthen excellence, innovation performance, and long-term leadership in strategically critical deep-tech sectors. (The EU can build a world-leading, diverse, and resilient quantum innovation ecosystem capable of shaping the next decade of deep-tech leadership.)

## About QuIC and Contributors

**The European Quantum Industry Consortium (QuIC)** is a non-profit pan-European association founded in 2021 that represents the quantum technology industry. QuIC's mission is to **boost Europe's competitiveness in quantum technologies** by uniting stakeholders across the ecosystem – including startups and SMEs, large tech companies, investors, academic institutions, and RTOs. Acting as “the voice” of the European quantum industry, QuIC collaborates closely with EU institutions and national initiatives to shape strategic directions, address common challenges (such as standardization, IP, and workforce development), and accelerate the commercialization of quantum research. QuIC is part of the EU's Quantum Flagship program, ensuring industry input feeds into Europe's quantum R&D efforts.

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Contributors are listed in alphabetical order. An asterisk (\*) indicates a lead role during the creation of the QuIC response to the Call for Evidence on the Action plan for women in research, innovation and start-ups

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