CONNECTING WOMEN IN DIGITAL

CLOSING THE GENDER GAP

An Intersectional Roadmap from Early STEM Education to Digital Leadership

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1. Executive Summary

Despite two decades of EU digital and gender-equality policy, women remain under-represented throughout the digital talent pipeline, from early STEM education and higher education to digital employment and leadership. This brief synthesizes findings from four stages of expert consultation under the WIDCON initiative to present an evidence-based policy agenda.

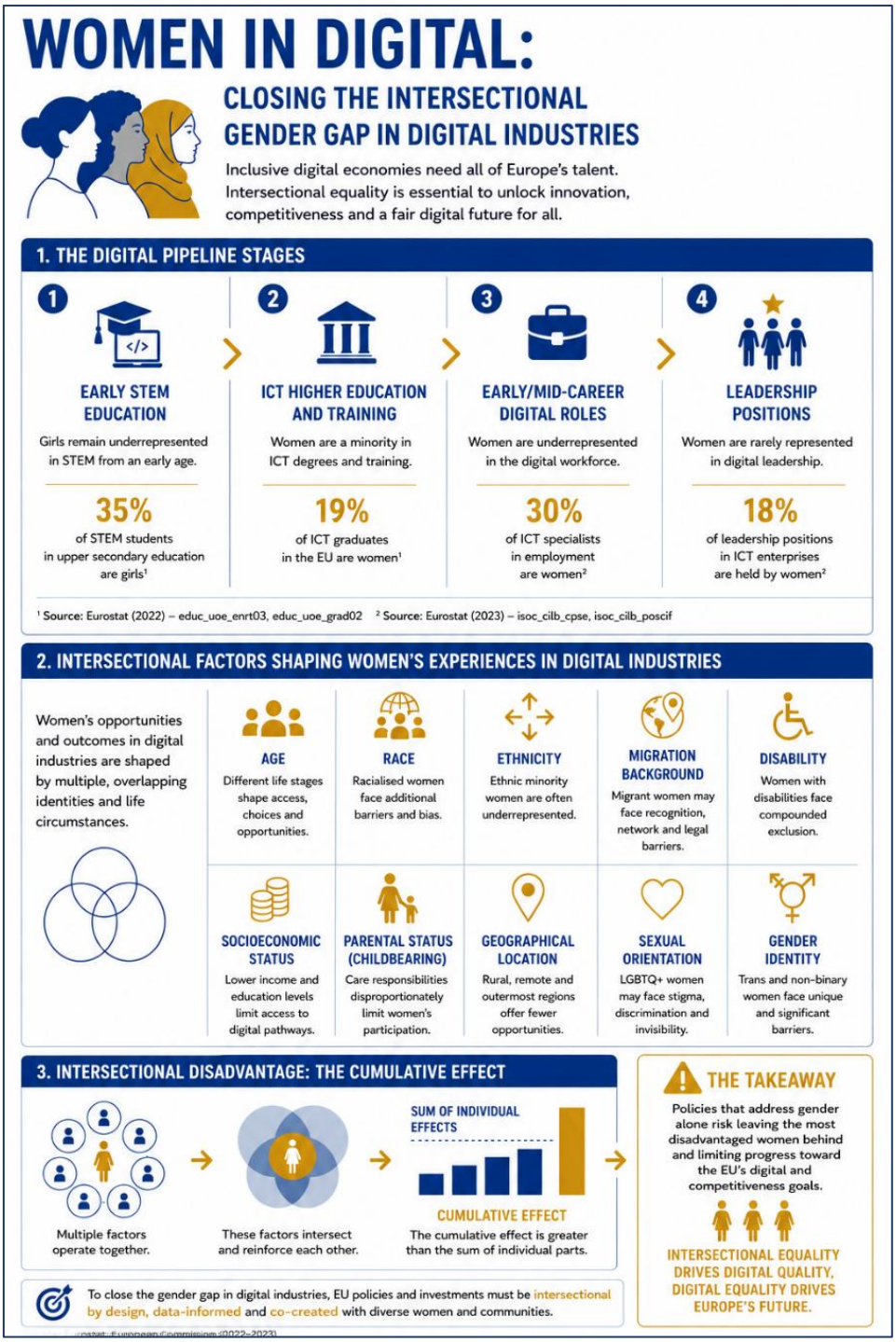
The consultations show that disadvantage is cumulative and intersectional. Girls and women are facing overlapping barriers related to socioeconomic status, ethnicity, race, age, migration background, disability, geography, gender identity, or caregiving responsibilities, with obstacles accumulating at every stage. Addressing gender without accounting for other forms of disadvantage risks leaving the most marginalized women behind and limiting progress toward the EU's digital and competitiveness goals.

The brief presents recommendations for EU and national policymakers across five priorities: embedding intersectionality in EU policy design; expanding equitable access to digital infrastructure, education, and training; improving workplace practices and caregiving support; strengthening accountability for leadership representation; and improving disaggregated data collection and cross-border coordination. Together, these measures would help build a more coherent and inclusive digital talent ecosystem across the EU.

The recommendations presented in this policy brief are particularly relevant to the European Commission's Directorate-General for Education, Youth, Sport and Culture (DG EAC), Directorate-General for Communications Networks, Content and Technology (DG CNECT),

and Directorate-General for Justice and Consumers (DG JUST), with the Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL) as an additional relevant stakeholder. Recommendations on embedding intersectionality into policy design and strengthening accountability for women's leadership representation (Sections 5.1 and 5.4) could inform DG JUST's Gender Equality Strategy 2026–2030. Measures to ensure equitable access to STEM and ICT education and training (Section 5.2) are relevant to DG EAC's STEM Education Strategic Plan (2025) and Digital Education Action Plan 2021–2027. Recommendations concerning women's participation in digital careers, leadership representation and monitoring (Sections 5.2, 5.4 and 5.5) could contribute to DG CNECT's Digital Decade Policy Programme 2030 and Women in Digital initiative. Finally, recommendations addressing workplace practices, caregiving responsibilities, skills development and career re-entry (Sections 5.2 and 5.3) are relevant to DG EMPL's Union of Skills (2025) and EU work-life balance policies.

Figure 1. Digital Talent Pipeline Stages, Intersectional Factors and Intersectional Disadvantage



2. Introduction and Purpose

Digital transformation is central to the European Union's economic competitiveness, strategic autonomy, and social cohesion. Yet women remain under-represented in the digital workforce. This brief consolidates findings from four rounds of WIDCON expert consultations covering the female digital talent pipeline. Experts from at least twelve Member States contributed evidence, examples of good practice, and policy proposals. The brief aims to: (1) identify the barriers limiting women's participation and progression in digital fields; (2) highlight effective practices that could be scaled across the EU; and (3) present policy recommendations aligned with existing EU competences and instruments.

2.1. An Intersectional Lens as the Organising Principle

A consistent finding across all consultations is that barriers to women's participation in digital fields rarely stem from gender alone. Instead, they emerge through the interaction of gender with factors such as socioeconomic status, ethnicity, disability, migration background, geography, age, sexual orientation, gender identity, and caregiving responsibilities. A girl growing up in a low-income, rural, migrant household, for example, may face simultaneous barriers of limited role-model exposure, restricted access to devices and connectivity, teacher bias, and language difficulty, barriers whose cumulative effect is substantially greater than the sum of their individual parts.

Accordingly, this brief adopts intersectionality as its organising principle. It argues that policies, funding programmes, data collection, and accountability mechanisms should address overlapping forms of disadvantage rather than treating women as a single, homogeneous group.

3. Key Barriers Across the Digital Talent Pipeline

The barriers identified through expert consultation are presented below according to the four stages of the pipeline. While each stage has distinct characteristics, common threads, stereotyping, resource inequality, network exclusion, and the invisibility of intersectional disadvantage in monitoring systems, recur throughout.

Table 1. Digital Talent Pipeline Stages and Barriers

Pipeline Stage	Principal Barrier	Description
1. Early STEM Education	Limited exposure & absent role models	Girls, especially from minority/migrant/rural backgrounds, rarely see STEM professionals around them, reinforcing "not for people like me" perceptions
	Unequal access to technology	Lower-income families lack devices/connectivity; boys more often get recreational computer access, building early technical familiarity girls miss out on
	Early tracking & teacher bias	Early study-path decisions are made before girls are exposed to STEM; teachers inconsistently trained to counter stereotypes, sometimes actively discouraging girls
	Ethnicity, migration & language barriers	Roma girls face early school withdrawal; diaspora families often have limited STEM networks; language gaps disadvantage recent migrant children

	Disability invisibility	Girls with disabilities (visible or not) are rarely championed in STEM; stigma intensifies when combined with migration or low income
	Geographical inequality	Rural schools have weaker STEM infrastructure and industry links versus tech-cluster regions, creating spatial inequality in pipelines
	School climate & gender identity	LGBTQ+ or gender-nonconforming girls may face unsafe/exclusionary climates, leading to disengagement from STEM
2. ICT Higher Education & Vocational Training	Financial constraints	Tuition, living costs, and digital tool expenses push low-income women toward shorter, non-technical pathways
	System navigation & migration barriers	Migrant women struggle to understand qualification pathways; language barriers reduce access and confidence
	Representation & social expectation	Women steered toward traditional/local careers; lack of visible role models reinforces ICT as inaccessible
	Accessibility gaps	Training environments and educators often fail to accommodate accessibility needs

	Assumed baseline competence	Institutions assume prior digital exposure, disadvantaging women from non-digital/low-resource backgrounds
	Fragmented policy & rigid pathways	Lack of coordinated support and linear-only academic structures leave mid-career entrants/returners with few flexible options
3. Early- & Mid-Career Employment	Talent under-utilisation & bias	Younger women must "prove worth"; older women assumed outdated, both leave skills unused
	Network exclusion at entry	Early-career women lack access to informal networks and preparation (CVs, interviews, workplace norms)
	Cost of entry	Unpaid internships, costly certifications, and high urban living costs exclude women lacking financial support
	Qualification non-recognition	Migrant women often forced to requalify or restart careers due to unrecognised foreign credentials
	The 'clash of clocks'	Conflict between career and biological timelines; parental leave uptake can still be penalised in practice
	Workplace design & health risks	'Always-available' cultures treat caregiving as exceptional; ergonomic/repetitive-strain risks are under-addressed

	Geographic & SME gaps	Rural women face limited access to employers/networks; SMEs (majority of labour market) lack structured diversity programmes
4. Leadership & Advancement	Parental & family status	Single most significant barrier, career breaks create a structural leadership penalty at the exact moment male peers accelerate
	Age-based bias (both directions)	Young women seen as inexperienced, older women as less adaptable; experience conflated with age
	Elite network exclusion	Informal networks from higher education favour higher socioeconomic backgrounds, disadvantaging migrant/lower-income women
	Migration & qualification barriers	Non-EU qualifications unrecognised; work-permit rules disincentivise employers from promoting migrant women
	Disability, geography & gender identity	Inaccessible leadership infrastructure; rural/peripheral isolation from networks; rising conservatism narrowing LGBTQ+ leadership expression in some regions
	Norm-based penalisation of leadership style	Masculine norms penalise both collaborative/empathetic and assertive female leadership styles, leaving no “safe” style

Example Nr. 1: Disability, Poverty, and Early Tracking. A young girl with a non-visible disability in a low-income household is never actively championed in her STEM classroom because her condition goes unrecognised by teachers, and the rigid early tracking system in her country means that, even if she later wanted to pursue a technical path, the opportunity would already be closed to her.

Example Nr. 2: Migration, Motherhood, and Age Bias. A migrant woman with a foreign engineering degree finds her qualification unrecognised in her new country and must restart her studies from scratch; after taking a career break to raise her children, she re-enters a fast-changing digital job market where employers view her as both under-qualified and too old to catch up, while her male peers who took no such break continue advancing toward leadership roles.

Improving women's representation in the digital sector is essential not only for gender equality but also for Europe's economic competitiveness and digital transformation. The evidence in the table above shows that barriers accumulate throughout the educational and occupational stages. Addressing them via coordinated, intersectional policies would enable the EU to make better use of its digital talent, strengthen innovation, and build a more inclusive and resilient digital workforce.

4. Emerging Best Practices and Promising Initiatives

Across all stages, experts identified recurring categories of effective practice. Selected examples from Member States illustrate how these approaches can be operationalised; many could be scaled or replicated through EU-level instruments.

4.1. Early exposure, mentoring, and visible role models

Gamified and experiential learning approaches, such as national cybersecurity games deployed in primary schools, and structured show-and-tell or mentoring schemes connecting girls with women from their own communities, including Roma engineers, women with disabilities in technology, and migrant women in cybersecurity, were repeatedly identified as transformative in building early self-identification with STEM. Their effectiveness, however, depends heavily on individual teachers or school leaders acting as active champions, in the absence of which such initiatives remain patchy.

4.2. Intersectional and family-centred design

The most effective interventions are explicitly designed for groups facing overlapping disadvantage, for example, coding clubs for girls from low-income migrant families, or robotics workshops that are fully accessible for students with disabilities and provide transport support for rural participants, rather than addressing single factors in isolation. Effective outreach also engages parents and caregivers directly, particularly through accessible, multilingual formats explaining the breadth of digital career options.

4.3. Structured mentoring, sponsorship, and returner programmes

Long-term mentoring relationships that pair early-career women with experienced professionals, and workplace-based return-to-work programmes for those re-entering after a career break, show consistently stronger outcomes than external or one-off training courses. Sponsorship, active advocacy by a senior leader using their own organisational influence, was identified as more powerful than mentoring alone in overcoming elite-network exclusion, and reverse mentoring schemes, in which digitally native junior women mentor senior leaders, were noted as effective in addressing age-based bias in both directions.

4.4. Employer accountability frameworks

The Women in Finance Charter operating in the United Kingdom and Ireland was cited as a compelling model for adaptation to the digital sector: employers set their own gender representation targets for leadership, define a multi-dimensional intervention mix, publish progress annually, and are held accountable for results. Participants noted that the finance sector is itself digitally intensive, making the transfer of this model directly relevant to digital industries.

4.5. Community-based care infrastructure

Community-based childcare models, such as a national initiative in Greece that pays community members, including grandparents and underemployed women, to provide home-based childcare from two months of age, enable mothers to sustain career trajectories through the most vulnerable period of family formation. Experts emphasised that state backing is essential to resolve the legal liability issues that otherwise prevent such community models from scaling.

4.6. Digital tools and skills recognition

AI-powered skills recognition platforms can validate competencies that migrant or returning women have developed informally, making these qualifications legible to employers, while digital leadership development platforms can reduce the geographical barriers to mentoring and coaching that disadvantage women in rural or peripheral regions. Experts cautioned, however, that such tools must themselves be designed with accessibility and gender equity as explicit requirements, since AI-enabled monitoring can otherwise intensify surveillance and availability expectations. The table below summarises representative examples.

Table 2. Best European Practices for Intersectional Digital Inclusion

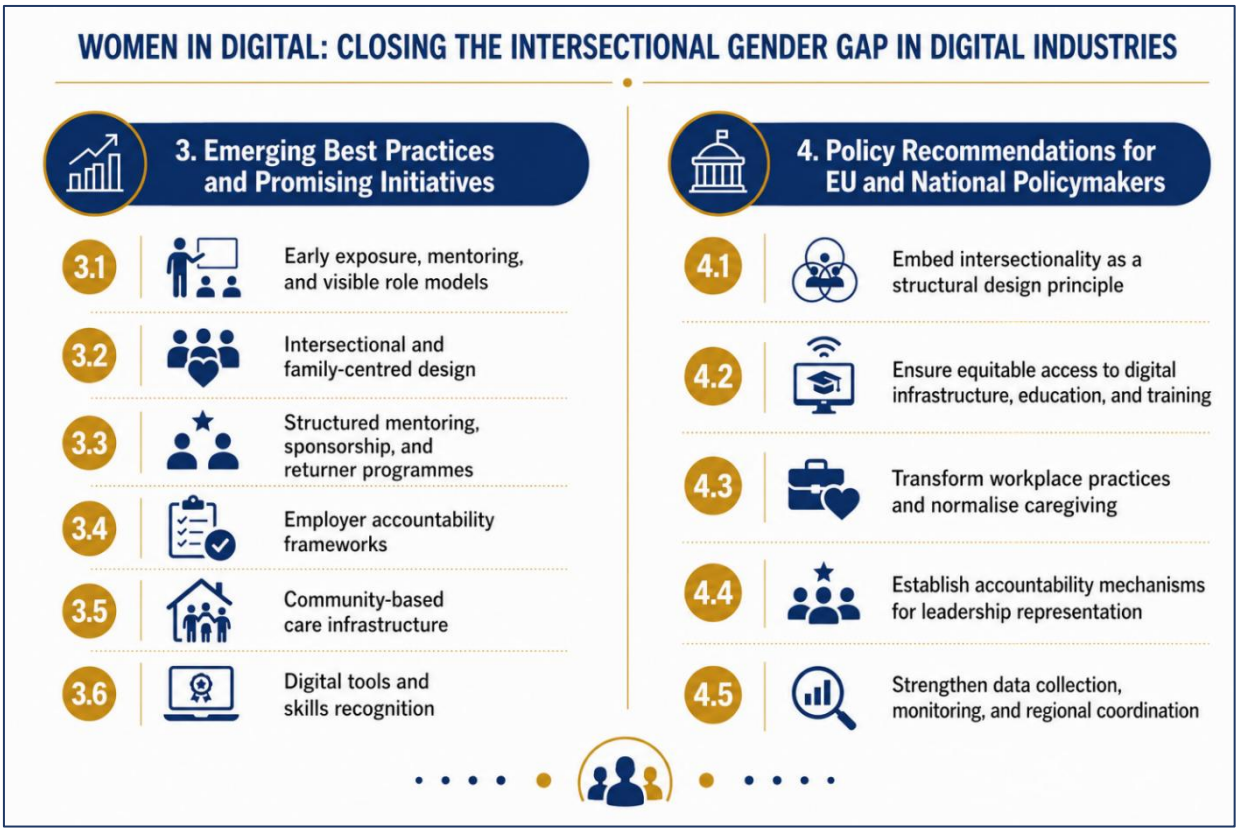
Practice Area	Example Initiatives	Core Mechanism
Early outreach	MINT Project Days (AT); Transformer Project, TU Wien (AT)	Hands-on STEM exposure and stereotype-countering educator training from primary level.
Mentoring & role models	I Wish (IE); LEA Austria; Komm, mach MINT (DE)	Connects girls/women with diverse STEM role models and scholarship directories.
Skills-to-employment bridges	STEM Passport for Inclusion; Teen-Turn; Digital Skillnet Women ReBOOT (IE)	Accredited training linked to mentoring and industry exposure, incl. returners.

Inclusive recruitment	AHEAD WAM Programme; Specialisterne Ireland	Mentored placements and job coaching for graduates with disabilities/neurodivergence
Care infrastructure	Neighbourhood Nannies (EL)	State-backed community childcare enabling continuous career trajectories
Employer accountability	Women in Finance Charter (UK)	Published, measured leadership targets linked to consequences
Migrant & intersectional support	Caritas Gütersloh (DE); EiL4MINT goes Diversity (AT)	Tailored, multilingual, culturally responsive STEM and employment support
National digital-skills coalitions	Digitálna koalícia; Digitálni seniori (SK)	Multi-stakeholder upskilling coalitions reaching disadvantaged groups

5. Policy Recommendations for EU and National Policymakers

While the practices outlined above demonstrate what is achievable when national actors adapt to local needs, their impact remains uneven and fragmented across the EU, typically depending on local leadership, municipal decisions, or individual employer commitment rather than systematic policy backing. A lasting, sector-wide change requires a coordinated policy framework that can embed successful elements as structural norms rather than isolated exceptions. The following recommendations propose how EU and national policymakers can institutionalise these practices and ensure that intersectional gender equity becomes a systemic feature of ICT governance rather than a matter of individual initiative. These recommendations are organised around five priorities that cut across all four stages of the pipeline. Each priority is designed to be actionable through existing or readily adaptable EU instruments. Throughout, it is required that intersectionality, not gender alone, is addressed explicitly in the design, funding, and evaluation of all supported initiatives.

Figure 2. Emerging Best Practices, Initiatives and Policy Recommendations



5.1. Embed intersectionality as a structural design principle

Require Member States and EU-funded programmes to articulate explicitly how intersectional factors, gender, ethnicity and race, disability, migration background, socioeconomic status, geography, and gender identity, will be addressed in the design, funding, and evaluation of digital-skills and leadership programmes at every stage of the pipeline.

Mandate that funding calls under Digital Decade, Erasmus+, and Horizon Europe instruments favour initiatives that intentionally target groups facing overlapping disadvantage over single-factor interventions.

Establish EU guidance clustering related intersectional factors (for example, ethnicity–migration–language; socioeconomic status–geography; disability–health) to support coherent, multi-factor programme design at national and regional level.

5.2. Ensure equitable access to digital infrastructure, education, and training

Introduce EU minimum standards for digital access in schools, ensuring every child has reliable access to a suitable device, connectivity, and basic assistive technologies, with funding formulas prioritising low-income families and under-resourced schools.

Support free or low-cost extracurricular STEM activities targeted at girls and intersectionally disadvantaged groups, including transport and care support where needed, through Cohesion Policy and European Social Fund Plus co-financing.

Expand scholarships, subsidies, and equipment support for women entering ICT higher education and vocational training, with dedicated provision for migrant, low-income, and rural applicants.

Fund structured guidance systems to help migrant and first-generation women navigate qualification pathways, complemented by flexible, modular entry points (micro-credentials, industry-linked bootcamps) for non-linear and returner career paths.

Require accessibility of digital tools, platforms, and teaching methods as a condition of EU co-funding for education and training infrastructure.

5.3. Transform workplace practices and normalise caregiving

Extend paid parental leave with a reserved, non-transferable component for the non-birthing parent across Member States, to normalise shared caregiving and reduce the career penalty currently falling on mothers.

Fund and scale community-based childcare models at EU and national level, including regulatory frameworks that resolve legal liability barriers for community-based carers.

Require organisations above a defined size threshold to base leadership and promotion criteria on demonstrated outcomes rather than hours worked or physical presence, eliminating availability expectations that penalise both parents and childless women.

Harmonise Member States' approaches to the Right to Disconnect, establishing a minimum EU standard that prevents AI-enabled monitoring from intensifying availability expectations, particularly for employees with caring responsibilities.

Develop dedicated support mechanisms, toolkits, financial incentives, and partnerships, to help SMEs, which constitute the majority of the European labour market, implement inclusive hiring, mentoring, and development practices equivalent to those found in larger organisations.

Streamline EU-wide recognition of non-EU qualifications for digital roles and reform work-permit systems to remove bureaucratic disincentives when employers wish to promote or hire migrant women.

5.4. Establish accountability mechanisms for leadership representation

Develop a voluntary but measured Women in Digital Leadership Charter, modelled on the Women in Finance Charter, requiring participating digital-sector employers to set, publish, and report on gender leadership targets, with participation linked to Digital Decade funding eligibility and public procurement criteria.

Require Charter commitments to address intersectionality explicitly, covering ethnicity, migration background, disability, and socioeconomic status, and not gender alone.

Require mixed-gender promotion panels for senior appointments and mandate transparent, documented promotion criteria in organisations above a defined size threshold.

Fund EU-wide mentoring and sponsorship programmes that connect women from under-represented groups with senior digital leaders, extending from secondary education through to executive level, and incorporating reverse-mentoring models to address age-based bias.

5.5. Strengthen data collection, monitoring, and regional coordination

Support EU-wide, disaggregated data collection on gender and intersectional participation, achievement, and leadership composition in digital fields, integrated into the Corporate

Sustainability Reporting Directive and Digital Decade monitoring framework, and conducted in full compliance with data protection and non-discrimination law.

Use disaggregated data systematically to identify gaps, target funding, and monitor progress toward equitable representation of women from diverse backgrounds across all four stages of the pipeline.

Direct Cohesion Policy funds toward digital hub development in rural and peripheral regions, providing locally accessible training, networking, and leadership development equivalent to that available in major urban centres.

Align national and EU-level initiatives through a coordinated policy framework spanning early education, higher education, employment, and leadership, to replace the current landscape of fragmented, isolated projects with a coherent, cross-stage ecosystem.

Position gender and intersectional inclusion in digital industries as a central pillar of European competitiveness, innovation, and resilience policy, rather than as a standalone social-policy objective.

6. The Regional Dimension: Addressing Disparities Across EU Regions

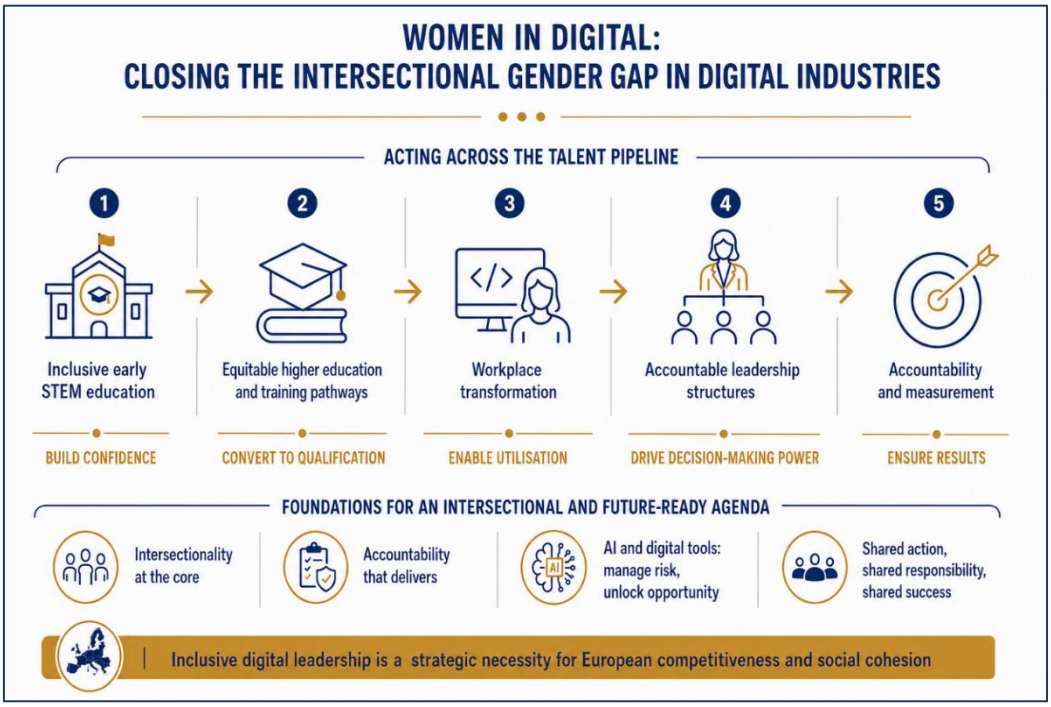
A consistent finding across all four consultation stages is that geography compounds gender disadvantage at every point of the pipeline. Rural schools have weaker STEM infrastructure and fewer trained teachers; women in remote areas face higher travel costs and limited access to training providers and professional networks; and regional technology clusters concentrate industry outreach, mentoring, and leadership development opportunities in a small number of urban centres. Post-socialist Member States were noted to face social conservatism affecting the inclusion of LGBTQ+ women in leadership, while countries with strong traditions of family-owned business dynasties present distinct barriers linked to elite-network exclusion.

These disparities imply that a uniform, one-size-fits-all EU approach risks reinforcing rather than reducing regional inequality. Therefore, it should be ensured that EU instruments for digital transformation explicitly fund digital hub development, remote-access training, and leadership programming in non-urban and peripheral regions, and that monitoring frameworks capture regional as well as national-level disaggregated data, enabling targeted intervention where regional disparities are most acute.

7. Conclusion: Implications for Inclusive Digital Leadership in Europe

The evidence assembled across four stages of expert consultation converges on a single conclusion: improving women's representation in European digital industries requires sustained, coordinated action across the entire talent pipeline, not isolated interventions at any single stage. Inclusive early STEM education is a strategic investment, not merely a matter of fairness; equitable higher education and training pathways convert early confidence into qualification; workplace transformation ensures that qualifications are actually utilised; and accountable leadership structures ensure that utilisation translates into decision-making power.

Figure 3. Pathway to Closing the Intersectional Gender Gap



Intersectionality is not optional in this agenda. Policies that address gender alone will systematically leave the most disadvantaged women, those additionally facing barriers of socioeconomic status, ethnicity, migration background, disability, geography, or gender identity, behind, and will therefore fail to deliver the diverse, competitive digital workforce that Europe's strategic objectives require. Accountability and measurement are equally non-negotiable: voluntary commitments are effective only when they are public, measured, and linked to real consequences, and culture change, while essential, cannot be substituted by policy alone without sustained leadership buy-in.

The transition to AI-intensive, distributed digital workplaces presents both risk and opportunity. Handled without regulatory attention to accessibility and equity, digital tools can encode and intensify existing biases; designed and governed deliberately, they offer a genuine window of opportunity to reset leadership norms that have historically excluded women. Realising this opportunity will require the EU policy makers, national governments, employers, and educational institutions to act in concert, guided by clear targets, shared accountability, and an unambiguous commitment to intersectional equity. Inclusive digital leadership is, ultimately, not only a matter of fairness, it is a strategic necessity for European competitiveness and social cohesion.

8. Expert Contributors

This Educational Framework is the result of the collaborative work of WIDCON Thematic Working Group 4 (TWG 4) – Intersectional Approaches. It builds on the contributions, discussions, practical experience and expert insights shared by TWG 4 members throughout the working process. The experts who contributed to the development of this framework are listed below:

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