Building a Future Tech Sector That Works for Everyone

Response from the National Engineering Policy Centre (NEPC)

April 2026

Question 12

> *To what extent, if at all, are emerging technologies changing the skills required in your organisation or sector?*

To a great extent ✓

To some extent

Hardly at all

Not at all

Don't know

Question 13

> *Please describe the specific changes you are seeing in the skills required in your organisation or sector as a result of emerging technologies.*

The demand for advanced digital, data and AI skills is growing rapidly and is no longer confined to specialist engineering and tech roles. The NEPC's Engineers 2030 project, an eighteen-month programme of research, roundtables and stakeholder engagement published in 2025, identifies digital technologies including AI, software development and cybersecurity as among the fastest-growing areas of demand across the engineering workforce. The Engineers 2030 Vision and Principles establish being "data and digitally fluent" as one of six core requirements for all engineers by 2030 across every engineering discipline.

The IET's 2025 UK Engineering and Technology Skills survey reports that 58 per cent of engineering employers currently use AI in some form, though only 18 per cent do so regularly (IET, UK Engineering and Technology Skills, 2025, p.36). It is important to note that 'using AI' encompasses a wide spectrum of activity: from routine use of AI-powered tools for tasks such as report writing or scheduling, which requires relatively little specialist skill, through to the design, development and assurance of AI systems themselves, which demands deep technical expertise in areas such as machine learning, data architecture and safety engineering. The former is becoming near ubiquitous while the latter remains a highly specialist capability that a much smaller proportion of the workforce possesses. The skills challenge lies predominantly at this more technical end, where 61 per cent of employers expect AI to improve productivity but the workforce is not yet equipped to deliver on that expectation (ibid.).

New hybrid skills profiles are also emerging that cut across traditional engineering disciplinary boundaries. These profiles reflect increasing demands for engineers who can combine deep technical expertise with skills in safety assurance, ethics, systems thinking and responsible innovation. These skills are increasingly understood as core engineering competencies, not

peripheral additions. It is worth emphasising that the competencies required to develop AI systems – involving algorithm design, data engineering and model training – differ substantially from those required to deploy them responsibly in real-world settings, which demand skills in risk assessment, regulatory navigation and human-factors engineering. Both sets of skills are in growing demand, but they call for distinct training and career development pathways.

The NEPC's Calibrating Future Curricula report (NEPC, 2024) found that skills such as communication, policy literacy and interdisciplinary working – increasingly essential in technology roles – are often not explicitly embedded in engineering higher education programmes. The IET's 2025 Skills Survey also found that 76 per cent of engineering employers struggle to recruit personnel with the required skills, with digital capability gaps specifically cited by 30 per cent for automation skills and 17 per cent for data and software engineering roles (IET, 2025, p.7). These findings suggest that engineering curricula are not calibrating quickly enough to current and future emerging technology needs. At the same time, curriculum reform in this area must be managed carefully. The pace of change in AI and related technologies is volatile, and there is a real risk that educational provision designed around today's headline technologies may not reflect the landscape graduates encounter. Curricula should therefore prioritise durable competencies – for example, data literacy, computational thinking, systems reasoning and ethical judgement – over narrow tool-specific training that may prove short-lived.

The skills gap also has a significant diversity dimension. EngineeringUK's May 2025 workforce data shows that women make up just 16.9 per cent of the engineering and technology workforce, compared to 56 per cent across other occupations, with progress over fifteen years described by EngineeringUK as insufficient relative to the sector's growth rate (EngineeringUK, The Engineering and Technology Workforce, May 2025, p.2). The picture in AI specifically is no better: the DSIT-commissioned AI Labour Market Survey 2025 reports that women's share of AI roles has fallen from 24 per cent in 2020 to 20 per cent in 2025 (DSIT, AI Labour Market Survey, 2025, p.38). It should be noted that 'AI roles' as defined in that survey span a wide spectrum, from highly technical AI Experts and AI Specialists through to AI Implementers who apply AI tools within existing business processes. The underrepresentation of women is documented across all three categories, but the barriers and interventions required at each level are likely to differ.

The AI Skills for the UK Workforce report further identifies that marginalised groups, including women in male-dominated sectors, older workers and those with limited digital access, face compounding barriers to developing AI skills, and that regional disparities in training availability mean that geography compounds disadvantage (Ameen, AI Skills for the UK Workforce, Skills England, October 2025). Without deliberate action, the skills transition driven by emerging technologies risks narrowing rather than broadening participation in the tech workforce.

The UK's skills infrastructure is not yet able to support the training and upskilling of the necessary workforce to take advantage of emerging technology opportunities. The government has signalled clear ambition, including a Skills England target to upskill 10 million people in AI and a new AI and automation practitioner apprenticeship. But as the NEPC's Engineers 2030 final report identifies, there are structural barriers that require systemic reform, including: apprenticeship standards that have not kept pace with emerging technology requirements; a

fragmented and underfunded further education system; and financial pressures on universities that threaten the resource-intensive provision that technical roles in AI, quantum and other fields demand.

Question 14

> *To what extent, if at all, are emerging technologies leading to new or significantly changed roles in your organisation or sector?*

To a great extent

To some extent ✓

Hardly at all

Not at all

Don't know

Question 15

> *Please describe any new or significantly changed roles emerging in your organisation or sector due to emerging technologies.*

Emerging technologies are changing the skills required within existing roles, generating new role types and reshaping the scope and character of established ones.

The scale of change in AI-related roles is substantial and accelerating. The government's own analysis in AI Skills for Life and Work (DSIT, January 2026) projects that jobs directly involving AI activities could rise from 158,000 in 2024 to 3.9 million by 2035, with Science, Research, Engineering and Technology Professionals among the occupational groups seeing the highest AI-related growth. PwC's UK AI Jobs Barometer reinforces this, finding that skills sought by employers for AI-exposed roles are changing 66 per cent faster than other jobs (PwC, The Fearless Future: 2025 Global AI Jobs Barometer – UK Analysis, 2025).

Entirely new roles are emerging in engineering, AI and safety. These include AI safety engineers, AI assurance specialists and responsible AI leads – roles that combine deep technical knowledge of how AI systems are built with expertise in risk assessment, ethical frameworks and regulatory compliance. These roles did not exist in their current form a decade ago, and there is as yet no established pipeline producing people qualified to fill them at scale.

The NEPC's work on the safety and ethics of autonomous systems, spanning transport, healthcare and cross-sectoral governance, identifies similar patterns. As autonomous systems move from research environments into real-world deployment, new roles are required to manage the human-machine interface, assure system safety in complex environments and navigate an evolving regulatory landscape. These roles require a combination of sector-specific knowledge and cross-cutting technical and ethical literacy that does not yet sit within existing qualification frameworks.

Quantum technologies may also create demands for a newly skilled engineering workforce. The UK Quantum Skills Taskforce Report, published by DSIT, finds that demand for quantum specialists is high and anticipated to continue growing for at least the next ten years. This will be driven by quantum technology and applications still under development and the continued emphasis on research and development. The Taskforce also notes that the global supply of candidates with deep quantum expertise is limited, with intense international competition for talent. Critically, the Taskforce explicitly states that there is no comprehensive data on the diversity characteristics of the UK quantum workforce, a significant gap that risks replicating historical patterns of exclusion if not addressed deliberately as the sector grows. As quantum technologies mature, new hybrid roles are also emerging, combining quantum and classical computing expertise, such as quantum software engineers and quantum-classical systems integrators, for which no established educational pathway yet exists.

Existing technical roles are changing in response to emerging technologies. Across engineering disciplines, roles that were previously defined by sector expertise alone are being reshaped by data and digital capabilities. The Engineers 2030 Vision and Principles identify being "data and digitally fluent" as a core requirement for all engineers by 2030, reflecting the extent to which AI-assisted design, digital twins, real-time data analysis and automated monitoring are transforming practice across virtually every engineering sector. In many cases these changes are happening faster than job descriptions, professional standards or accreditation frameworks can keep pace with. Cambridge Industrial Innovation Policy's 2025 analysis of the UK science and engineering workforce found that 76 per cent of engineering employers reported difficulties recruiting personnel with the required skills. This figure reflects not just overall shortfall but the growing mismatch between the skills the system produces and those emerging roles demand.

New roles are also emerging around AI governance, public engagement and policy translation. The Royal Academy of Engineering's (the Academy) People's AI Stewardship Summits, held across five UK cities, highlight growing recognition that developing and deploying emerging technologies responsibly requires people who can bridge technical expertise and public dialogue. That is, explaining complex systems to non-specialist audiences, engaging communities in discussions and decisions about which technologies are chosen and how they are used, and translating between engineering practice and policy. These roles are increasingly valued by employers and government yet remain poorly defined within existing career frameworks and are rarely the focus of formal skills development provision.

A central concern is that many of the new roles emerging in these sectors are being filled in ways that risk replicating existing workforce inequalities. EngineeringUK's most recent workforce data (May 2025) shows that women make up only 16.9 per cent of the engineering and technology workforce (compared to 56 per cent across other occupations) and that progress over the past 15 years has been slow relative to the sector's growth (EngineeringUK, The Engineering and Technology Workforce, May 2025, p.2). Minority ethnic groups make up approximately 14 per cent of the engineering and technology workforce, below their 18 per cent share of other occupations, and disabled people are similarly underrepresented at 14 per cent against 19 per cent elsewhere (ibid., p.3). Where new roles require rare combinations of skills, hiring tends to draw on narrow networks and proxies for capability. This may include specific degree backgrounds or prior experience in a small number of organisations. This will

systematically disadvantage women and people from underrepresented groups. Without deliberate action to define new roles clearly, develop accessible pathways into them and ensure inclusive hiring and progression practices, the rapid growth of the emerging technology workforce risks compounding rather than correcting these patterns.

Question 16

> *To what extent, if at all, are emerging technologies reshaping traditional career pathways in your organisation or sector?*

To a great extent

To some extent ✓

Hardly at all

Not at all

Don't know

Question 17

> *Please describe the changes you are observing in career pathways in your organisation or sector.*

Traditional career pathways in engineering and technology, characterised by linear progression from education through early-career roles to senior specialism, are being disrupted by the pace of technological change. Three shifts stand out from the available evidence.

First, the boundaries between engineering disciplines are blurring. The NEPC's Engineers 2030 project identifies a growing expectation that engineers will move between domains over the course of a career, applying transferable skills in data, digital tools and systems thinking across sectors rather than remaining within a single specialism. This creates opportunity but also uncertainty, particularly for those whose initial training was narrowly defined and who lack access to continuous professional development.

Second, new entry points are emerging alongside traditional degree-level routes. The expansion of apprenticeships, degree apprenticeships and bootcamp-style training in AI and data science is creating alternative pathways into the sector. The DSIT-commissioned AI Labour Market Survey 2025 reports that apprenticeships now account for 19 per cent of AI hires, up from 3 per cent in 2020. However, the same report notes the reliance on informal training while the NEPC's Engineers 2030 report highlights a fragmented and underfunded further education system, and the IET's 2025 Skills Survey also found that SMEs are significantly less likely than large employers to have digital skills strategies in place.

Third, mid-career transitions are becoming more common as established professionals seek to retrain in AI, data science or other emerging technology fields. This trend presents both an opportunity to diversify the workforce and a risk that retraining provision will replicate existing patterns of exclusion if it is not designed with accessibility and inclusion in mind.

The implications for women and underrepresented groups are significant. Career pathways that rely on continuous full-time engagement, geographical proximity to innovation hubs and access to informal professional networks systematically disadvantage those with caring responsibilities, those from lower socioeconomic backgrounds and those outside London and the South East. Unless new career pathways are deliberately designed to accommodate diverse working patterns, flexible progression routes and geographically distributed provision, they will reproduce rather than disrupt existing inequalities. And if engineering and technology careers are structurally less attractive to women, there are severe limits on what can be gained from efforts to recruit more women at the education stage.

Question 18

> *In your experience, to what extent are changes to skills, roles or career pathways due to emerging technologies affecting who applies for, or succeeds in, tech roles within your organisation or sector?*

To a great extent

To some extent

Hardly at all

Not at all

Don't know

I have not seen changes to the skills, roles, or career pathways in my organisation or sector due to emerging technologies

Question 19

> *Please describe the changes you are noticing in who applies for, or succeeds in, different tech roles? What do you think may be driving these changes?*

Across the Academy's Enterprise Hub portfolio of around 600 awardees, gender data is available for 476 individuals. Of these, 64 per cent of founders identify as male and 29 per cent as female, with a small proportion identifying as non-binary or preferring not to say. (These figures describe the current composition of the portfolio, rather than an aspirational benchmark. The Academy actively encourages applications from women and other underrepresented groups.) The Academy's State of UK Deep Tech 2023 report also found that 77 per cent of deep tech sector founders come from all-male teams and just 8 per cent from all-female teams (Royal Academy of Engineering, State of UK Deep Tech, 2023, p.12). The same report noted that key employee representation tells a more encouraging story, with 40 per cent of businesses having mixed-gender teams at senior levels, suggesting that women are participating in deep tech leadership but face specific and compounding barriers on the path to founding.

This underrepresentation points to structural barriers that arise well before individuals reach the point of founding companies or applying to Academy programmes. Underrepresentation of women in engineering begins early and continues through key transition points in education and

employment. While participation has improved in recent years, the overall pool of women with the technical background needed to found deep tech companies remains structurally constrained long before they reach the Enterprise Hub.

The Academy's internal data indicates that women are well represented among initial applicants but experience higher attrition across successive assessment stages. While final award outcomes are more balanced than early-stage progression might suggest, the cumulative effect remains significant. This is a pattern the Academy takes seriously and is actively seeking to understand and address to ensure that processes identify potential equitably and do not inadvertently disadvantage particular groups. Encouragingly, women who do succeed in the Academy's process and become part of the Enterprise Hub community are observed to thrive in leadership roles; the challenge lies upstream, in who applies and who progresses.

The drivers behind these patterns are structural, cultural and financial. One of the most persistent barriers reported within the community is investor behaviour. Women entrepreneurs and business leaders are frequently offered mentoring, introductions or in-kind support in place of capital investment. While often well-intentioned, this form of substitution can be self-defeating, reflecting an underlying assumption that women-led ventures require more nurturing before they are investable. These dynamics are not exclusive to the tech sector but are observed across many professional and funding environments. In this context, however, they not only disadvantage individual entrepreneurs and leaders but also signal more broadly that the bar for women seeking funding is higher, deterring applications before they are even made.

Caring responsibilities compound this further. While caring is not exclusively a women's issue, it remains disproportionately borne by women and is commonly observed in the Hub community. The specific demands of founding a deep tech company – financial risk, irregular hours and the intensity of early-stage scaling – sit in direct tension with those responsibilities. This is likely to suppress the number of women who consider founding at all, meaning the underrepresentation we see at the application stage may significantly understate the scale of the problem.

The absence of sufficient role models at founder level in deep tech creates a further self-reinforcing dynamic. Representation shapes aspiration: when women looking to found companies see very few who have done so in deep tech, the pathway feels less attainable. Meaningful change will require not only recognising and amplifying the women who are succeeding, but addressing the systemic conditions – in funding access, in workplace flexibility, in how risk and potential are assessed – that determine who is able to reach the founding stage in the first place.

Question 20

> *To what extent, if at all, have each of the following helped women and people from under-represented groups to enter, stay in, and progress in the tech sector?*

Training or upskilling opportunities: To some extent.

Team or organisational culture: To a great extent.

Access to leadership roles or decision-making spaces: To a great extent.

Funding or resources: To a great extent.

Policies or regulations (inside or outside organisations): To some extent.

Question 21

> *At which stages in education or work do you think support is most important for helping women and people from under-represented groups enter, stay in, and progress within the tech sector?*

At school (e.g. subject choices, early exposure to tech) ✓

Further education or training (college, apprenticeships, bootcamps) ✓

Entering the tech sector for the first time ✓

Early-career development ✓

Moving into management for the first time

Progressing into senior leadership roles

Returning to work after time out (parental leave, caring responsibilities, illness)

Experiencing major life or health transitions (e.g. menopause, disability-related changes)

Later-stage careers

Don't know / None of these

Question 22

> *Why do these stages matter, and what contributes to barriers at these points?*

All of the stages identified above matter, but evidence suggests emphasis on education through to early and mid-career levels could have greatest impact. By the time women reach the workforce, many of the most consequential filtering decisions have already been made, or made for them, in school. Later interventions should look to issues affecting women remaining within the tech sector.

School Education

The data on subject choices demonstrates the early exclusion of girls from the tech sector. EngineeringUK's Gender and Pathways into Engineering and Technology analysis documents the progressive attrition of girls from the subjects that serve as gateways into engineering and technology careers (EngineeringUK, A Call to Action: Gender and Pathways into Engineering and Technology, March 2026). Girls make up roughly half of all GCSE physics students (48.2 per cent in 2025), but this drops to just 24.1 per cent at A Level. In computing, the picture is even more pronounced: girls represent only 22.6 per cent of computing GCSE entries and just 18.6 per cent at A Level. If we take physics and computing as markers for pathways into the tech sector, given their role as feeder subjects for engineering and technology degrees, the scale of

attrition between GCSE and post-16 study represents the single largest point of loss in the entire pipeline.

These subject choices are shaped by a combination of curriculum design, teaching quality, career perceptions and societal influence (Royal Society and EngineeringUK, Science Education Tracker, 2023). The EngineeringUK analysis draws on the ASPIRES longitudinal research to show that gender has a very large effect on career aspirations evident from at least the age of ten, at which only 11 per cent of girls aspired to engineering careers compared to 44 per cent of boys. Only 12 per cent of girls say being an engineer fits well with who they are, compared with 38 per cent of boys, and just 16 per cent think engineering is suitable for them, compared with 44 per cent of boys.

These perceptions are not innate. The ASPIRES longitudinal research programme, which has tracked young people's science and career aspirations over more than a decade, identifies family socialisation (Archer et al., ASPIRES3 Main Report, UCL, 2023, p.20), gendered peer culture (ibid., p.37) and the narrow framing of science careers in schools (ibid., p.15) as key factors shaping who sees STEM as 'for people like me'. The EngineeringUK Gender Pathways report similarly highlights curriculum content, the limited visibility of female role models and gendered stereotyping – from parents, teachers, peers and media – as reinforcing the perception that engineering is not for girls (EngineeringUK, Gender and Pathways, March 2026, pp.4–5).

Crucially, these perceptions are not solely the product of misunderstanding or lack of information. Girls and young women who do encounter engineering, whether through work placements, university study or informal exposure, may observe first-hand the cultural and workplace conditions documented elsewhere in this submission: male-dominated environments, experiences of sexism, and working patterns that appear incompatible with the lives they want to lead. Their decision not to pursue engineering is a rational response to what they see, not a failure of aspiration. This means that efforts to recruit more women into the pipeline will have limited impact unless the conditions within the profession change in parallel.

The curriculum itself also plays a role. Analysis by STEMettes, cited in the EngineeringUK Gender Pathways report, found that the statutory curriculum for science, maths, engineering and computer science at key stages 3 to 5 names 20 male and just one female or non-binary individual. Hands-on practical work, the factor most likely to encourage students to learn science and selected by 54 per cent of girls at Key Stage 3, has declined significantly, with the proportion of students in years 10 to 11 doing practical work at least fortnightly dropping from 44 per cent in 2016 to 26 per cent in 2023. The Science Education Tracker found that girls are also more sensitive to teaching quality than boys: 40 per cent of girls at Key Stage 3 said a good teacher encouraged them to learn science, compared to 33 per cent of boys, while 23 per cent of girls said they had been put off by their teachers compared to 16 per cent of boys (Royal Society and EngineeringUK, Science Education Tracker, 2023, p.58). Yet acute STEM teacher shortages persist, with physics recruitment targets significantly below target and only five per cent of primary teachers having a STEM background.

The November 2025 Curriculum and Assessment Review Final Report contains recommendations that would assist in removing gender disparity in STEM subject uptake. This

includes stronger representation of diversity in programmes of study, an entitlement to triple sciences for all pupils, and attention to systemic barriers in the computing curriculum. The Gender Pathways into Engineering and Technology partnership broadly welcomes these findings and is urging the government to work with the partnership to ensure the revised curriculum and assessment system and teaching practices are designed to appeal to all students, particularly girls, across physics, computing and design and technology. We are ready to assist the government in developing guidance for teachers and publishers on inclusive teaching practices and materials.

Further and Higher Education

The narrowing of the pool of girls selecting STEM and related subjects at school feeds directly into further and higher education, where women undertaking engineering, technology and computing qualifications remain underrepresented. While there has been progress in increasing the number of women undertaking such qualifications, the pace of change is insufficient to shift the composition of the workforce at scale.

In higher education, engineering, technology and computing are male-dominated subject areas in the UK, compared to the general first-degree and postgraduate student body which is 55 per cent women. Female first-degree enrolment in engineering and technology programmes has been increasing but stands at 20 per cent of students in 2024/25, and postgraduate enrolment stands at 27 per cent of students in the same year. In computer sciences, women made up 21 per cent of first-degree enrolments in 2024/25 and nearly 30 per cent of postgraduate students (HESA, Who's Studying in HE?, January 2026).

In further education, the picture is starker still. Girls accounted for between 9 and 12 per cent of engineering and technology T Level entries, and between 8 and 13 per cent of digital T Level entries, in the 2024/25 academic year, compared to the even gender split across T Level subjects as a whole (Department for Education, T Level and T Level Foundation Year Entrant Data 2025 to 2026, March 2026). For apprenticeships, just 20 per cent of engineering and technology apprenticeship starts in 2024/25 were by women, driven largely by a rise in women undertaking digital apprenticeships to 40 per cent of apprentices, compared to 11 per cent in construction and engineering and manufacturing technology apprenticeships (EngineeringUK, Apprenticeship Pathways into Engineering – 2024/25 Annual England Data Update, November 2025).

Addressing the barriers to entry into these educational pathways must start with tackling subject choice at school, as set out above. However, it would be a mistake to treat the underrepresentation of women in further and higher education engineering and technology programmes purely as a perception problem. As the evidence presented throughout this submission demonstrates, and as discussed in more detail in the sections below on workplace culture, pay, progression and caring responsibilities, the conditions women encounter in engineering and technology can be genuinely unattractive: male-dominated learning environments, experiences of harassment and discrimination, inflexible working patterns and limited progression. Women and girls who observe these conditions and choose not to pursue engineering are not suffering from a misperception; they are making a reasonable judgement. Addressing cultural and learning environments in engineering and technology so that they are

substantively inclusive of women must therefore be a government priority alongside curriculum reform.

There are policy levers that could meaningfully boost the number of women studying tech qualifications in further and higher education. The Lifelong Learning Entitlement represents one such opportunity. By enabling modular, flexible study funded across a lifetime, the LLE could make engineering and technology qualifications more accessible to women who are balancing study with caring responsibilities, returning to education after time out, or retraining mid-career. Foundation apprenticeships offer a further route, but only if they are accompanied by targeted outreach, inclusive recruitment practices and support for employers to create welcoming environments for women.

While the education stage determines the number of women entering engineering and tech careers, subsequent stages determine whether those who enter are retained, progressed and promoted. Our evidence identifies several critical junctures where women are disproportionately lost, which are discussed further in this submission.

Career and Workforce

The evidence provided here identifies several critical junctures where women are disproportionately lost following their educational pathway.

Evidence from the Academy suggests that support matters most at the points where women are most likely either to be filtered out of a pathway or to stall in their progression. This includes entry into the profession, the first five years of a career, progression into management and senior leadership, and return after time out. The challenge is not only whether women enter the sector but whether they are enabled to stay, progress and be promoted.

The Academy's 2020 gender pay gap research found that underrepresentation of women in more senior and higher-paid roles is a major driver of inequality. In the sample studied, 91 per cent of those in the top career grade were men and 92 per cent of those in the upper pay quartile were men. The same research recommends going beyond recruitment to focus on the retention and progression of women into more senior roles. The analysis found the median gender pay gap in technology was relatively higher than in other sectors of engineering, at 14.9 per cent (versus 11.4 per cent for all engineering) (Royal Academy of Engineering, Gender Pay Gap Research, 2020).

An EDI literature review covering 2013 to 2023 shows that women face barriers before and at entry. In 2020/21, only 18.5 per cent of students enrolled on engineering and technology undergraduate programmes were women, and only 15 per cent of engineering and technology graduates between 2015 and 2018 were women. The review also found that men tended to develop a clearer engineering career identity from a young age, while women had greater difficulty establishing themselves in the profession during university. This points to the importance of support during further education and early transition into work (Royal Academy of Engineering, Equality, Diversity and Inclusivity and Engineering 2013–2023: A Review).

Early career is especially important because this is where loss is most acute. The literature review reports that nearly half of women engineering graduates who secure engineering roles

leave within five years. The review also finds that graduate women are typically offered lower starting salaries than men, and that this initial gap can widen over time (ibid.).

Return after time out is a critical juncture. The literature review describes the birth of a child as a "critical turning point": women in engineering are nearly twice as likely as men to switch fields, reduce their hours or leave engineering altogether. This is directly linked to unequal caring burdens and a lack of family-friendly working arrangements. The Inclusive Cultures in Engineering 2023 report reinforces this: 66 per cent of respondents with caring responsibilities agreed that it is harder to progress their career, and participants reported being forced into career breaks because employers did not offer flexible working options, as well as assumptions that new parents would not return or would no longer want to progress. Engineering roles are among the least likely to be advertised as flexible (Timewise, Flexible Jobs Index, 2017), and WISE reported in 2023 that over two-thirds of new parents who left their jobs felt their departure was preventable, with more than half identifying flexible working as a potential solution, while nearly half of those who returned to work credited flexible arrangements as a critical factor (WISE, Research on Working Parents, 2023). This disproportionately impacts women (Royal Academy of Engineering, EDI Literature Review, 2023).

Progression into management and senior leadership matters because our evidence points to a real barrier at this level. The Inclusive Cultures in Engineering 2023 report found a perception that organisations are more willing to diversify entry-level roles than to promote underrepresented groups beyond middle management into senior leadership. The literature review similarly describes a pattern in which structural and systemic workplace barriers contribute to a persistent lack of women in leadership roles (Royal Academy of Engineering, Inclusive Cultures in Engineering, 2023).

Culture is a major part of the barrier at each of these stages. The Inclusive Cultures in Engineering 2023 report found that men were substantially more likely than women to say engineering is inclusive (76 per cent compared to 59 per cent). It also found that women reported bullying, harassment and discrimination including sexual comments, silencing and being given less meaningful work than men. Women were also significantly more likely than white heterosexual men to report bullying and harassment. These issues are compounded for women with intersecting characteristics, with perceptions of the inclusivity of engineering varying significantly depending on the individual's protected characteristics (ibid.).

Question 23

> *Which initiatives and interventions have helped women and underrepresented groups develop and progress?*

The Academy's evidence points most strongly to interventions that support women after entry, rather than recruitment alone. The Inclusive Cultures in Engineering 2023 report recommends sponsorship, mentoring and reciprocal mentoring schemes for underrepresented staff to support career progression beyond entry- and mid-level positions. It also recommends developing line managers' cultural competence and mandating inclusion training, which is significant because the same report found that line managers are pivotal to inclusion:

supportive managers who set clear expectations, provide flexibility and champion people's work are experienced as more inclusive, while poor line management can reinforce discrimination and microaggressions (Royal Academy of Engineering, Inclusive Cultures in Engineering, 2023).

The Academy's gender pay gap research is specific about what helps women progress: transparent pay structures and grades, published salary ranges, reviewed promotion criteria and flexible working options for senior roles. This is especially important because we found that pay gaps are smaller in organisations with clearly defined grades and pay ranges attached to them (Royal Academy of Engineering, Gender Pay Gap Research, 2020).

The Academy's literature review gives concrete examples of initiatives associated with improved progression for women. These include women-focused leadership and development programmes, mentoring programmes, career development workshops and returner support. The review notes examples such as women's mentoring and leadership programmes, career development for early- to mid-career women, leadership programmes for senior and high-potential women, and returner schemes for experienced professionals coming back after a career break. It also highlights family-friendly initiatives such as parental buddying, support for pregnancy, fertility and baby loss, and maternity standards (Royal Academy of Engineering, EDI Literature Review, 2023).

For initial entry, the Academy's Inclusive Recruitment toolkit sets out interventions considered good practice: analysing diversity data at application, shortlist and appointment stages; reviewing job design and entry requirements; using inclusive language; encouraging reasonable adjustments; reducing bias in selection by removing personal and educational identifiers; drawing interviewers from diverse backgrounds; and keeping an objective audit trail of decisions (Royal Academy of Engineering, Inclusive Recruitment Toolkit).

Question 24

> *Which initiatives and interventions have helped underrepresented groups influence decisions or shape emerging technology areas?*

The Academy's evidence here is more limited and less women-specific, but it points to some clear interventions. The strongest message from Academy research is that influence increases when underrepresented groups are brought closer to leadership, governance and design decisions. The literature review highlights examples such as Junior Leadership Teams and Shadow Leadership Teams, which are intended to integrate diverse perspectives into decision-making while also supporting development and internal network growth. It also highlights collaboration with staff network groups to deliver career development and skills workshops (Royal Academy of Engineering, EDI Literature Review, 2023).

The Inclusive Cultures in Engineering 2023 report recommends publishing diversity data for leadership teams and addressing progression beyond middle management, which matters because without women in senior roles, women are less able to shape priorities and decisions in the design and deployment of emerging technologies (Royal Academy of Engineering, Inclusive Cultures in Engineering, 2023).

The Academy's EDI Engine report provides a further relevant point: diverse teams with lived experience are better positioned to design solutions for underrepresented groups, and embedding EDI into governance and strategy helps move influence upstream. It recommends cross-functional EDI task forces, executive-level EDI committees and embedding EDI into governance and strategic decision-making (Royal Academy of Engineering, The EDI Engine, 2023). This is not women-specific evidence, but it is directly relevant to whether women and other underrepresented groups can shape emerging technologies rather than simply work within them.

Question 25

> *Which initiatives now feel less effective, and what changes or alternatives would you suggest?*

The Academy's evidence suggests that pipeline-only approaches now look insufficient. The Inclusive Cultures in Engineering 2023 report identifies a perception that organisations have focused on diversifying entry-level talent but have not adequately addressed the barriers women and other underrepresented groups face in progressing beyond middle management into senior leadership (Royal Academy of Engineering, Inclusive Cultures in Engineering, 2023).

An Academy literature review also suggests that generic awareness activity on its own is too weak. It notes that awareness days and weeks can be a useful starting point, but also reports that some organisations have done little more than make generic statements. The evidence suggests that the real issue is addressing systemic barriers rather than signalling concern about them (Royal Academy of Engineering, EDI Literature Review, 2023).

A further warning from Academy research concerns treating EDI as tokenistic or voluntary side-work. The Inclusive Cultures in Engineering 2023 report found that diversity and inclusion activity was sometimes seen as a tick-box exercise rather than embedded practice. It also found that the burden of driving improvements often sat disproportionately with underrepresented staff, with EDI groups sometimes self-organised and lacking formal protected time, budget or resource (Royal Academy of Engineering, Inclusive Cultures in Engineering, 2023).

On the basis of this evidence (see also Royal Academy of Engineering, Gender Pay Gap Research, 2020), the alternatives we would recommend are: moving from pipeline-only approaches to progression-focused ones; replacing generic statements with transparent action on pay, progression and promotion; properly resourcing staff networks and EDI groups; strengthening line-manager accountability; and building in flexible and family-friendly design, especially around return after career breaks and progression into senior roles.

Question 26

> *Is there anything else that you would like to share to inform the work of the Women in Tech Taskforce?*

A key message from the evidence presented here is that women's underrepresentation is not principally a recruitment issue. The research points repeatedly to progression, culture, pay,

leadership and return-to-work as the points where women are lost from the sector. The Women in Tech Taskforce should therefore avoid treating early pipeline activity as sufficient on its own.

A second message is that culture matters as much as process. Women are less likely than men to experience engineering as inclusive, and Academy research records bullying, harassment, silencing, less meaningful work assignments, microaggressions and assumptions about mothers' commitment as live issues in the profession. This makes culture change, management capability, anti-harassment action and workplace flexibility central to any credible strategy, not peripheral (Royal Academy of Engineering, Inclusive Cultures in Engineering, 2023).

Third, the evidence base is not equally strong for every issue. The evidence is strongest on gender, progression, pay, culture, caring responsibilities and flexible working. It is thinner on menopause specifically, and the literature review notes that disability-related research is limited compared with other characteristics (Royal Academy of Engineering, EDI Literature Review, 2023). It is important to acknowledge this and to urge the Taskforce to invest in strengthening the evidence base where gaps exist.

Finally, the Academy is committed to progressive leadership in engineering and EDI, and so we deploy the positive action provisions under the Equality Act 2010 to advance the participation of women. However, in our view there is currently inadequate guidance on what constitutes lawful positive action under the Equality Act – particularly for organisations in their role as service providers, rather than as employers. The guidance that exists for service providers is dated and general, leaving organisations disinclined to take legal risks and/or spending significant resource to ensure measures are legally compliant.

There would be benefits to making further guidance available, aimed at areas like engineering where participation by women and other groups is particularly low. This would need to give more clear and explicit examples of the types of intervention that are lawful and proportionate, for what might be considered 'grey' or risky areas where money (grants, internships) is involved but that fall outside employment. Guidance coupled with a campaign for boldness among key stakeholders could result in an increase in the pace of change.

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