



# Closing the STEM gap

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Practical steps for improving gender diversity

# Contents

Exploring the challenges	4
The story revealed by our research	6
Practical steps for making progress	10
Attraction	12
Recruitment	14
Retention	16
Retraining	18
Where powerful opportunities lie	20
What's next? / Contact us	22
Research methodology	23

## Our thought leadership

At PA, we believe that shaping global conversations is core to our purpose. Our subject matter and research experts bring inspiration and insight as, together, we tackle the world's toughest challenges and seize its greatest opportunities.

# Exploring the challenges

It's long been the case that men outnumber women working in science, technology, engineering and mathematics (STEM). In the US, women make up only 28 percent of the workforce.<sup>1</sup> In the UK, the equivalent statistic is 24 percent. In spite of recent marginal improvements and potential uplift on the horizon – such as a forecasted rise to 29 percent in the UK by 2030 – there are clearly challenges to overcome to achieve much greater balance.<sup>2</sup>

At PA, gender diversity is a cause that's close to our hearts. Our award-winning [‘Women in Tech’](#) network promotes diversity through inspirational learning opportunities and events.

For us, diversity is about more than equality and fairness. It's about creating a positive human future by helping society evolve, and inspiring the next generation. And from a practical point of view, it's about having a crucial impact on the global talent gap, which is predicted to reach 85 million people by 2030 left unchecked.<sup>3</sup> In 2022, three in four companies said they were experiencing skills shortages and difficulties with hiring – a 16-year high.<sup>4</sup>



## Unlocking a wealth of untapped potential

From our many years of working with clients and researching [how to innovate successfully](#), we know the full benefits of diverse teams. That includes the positive impact on a company's bottom line. Research has shown there would be an extra £123 billion in profits in the UK alone if companies where women make up less than 33 percent of their executive committee performed as well as those with 33 percent or more.<sup>5</sup>

To build on this, we carried out quantitative and qualitative research into what people are seeing and experiencing, and what they think would make a difference. We didn't just want to understand the state of play, we wanted to combine the results with our experience and expertise to identify solutions.

## Bringing about change

We consulted 300 mid- to senior-level decision makers and/or business leaders in an online survey across the US and UK, supplemented by 16 in-depth interviews with gender experts, decision and policy makers, and other professionals in STEM businesses. We conducted in-depth qualitative interviews with 12 women, two men, and two non-binary people. (See more on the methodology on page 23.) The recommendations from our research apply to four stages of the employee experience:

- **Attraction**
- **Recruitment**
- **Retention**
- **Retraining**

You can read about the recommendations relating to these stages on pages 10-19. Our findings also uncovered four powerful opportunities for STEM companies to redress gender balance (pages 20-21).

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Gender equality [works] hugely in men's favour too – companies make more money when they have women in high positions.

Gender expert



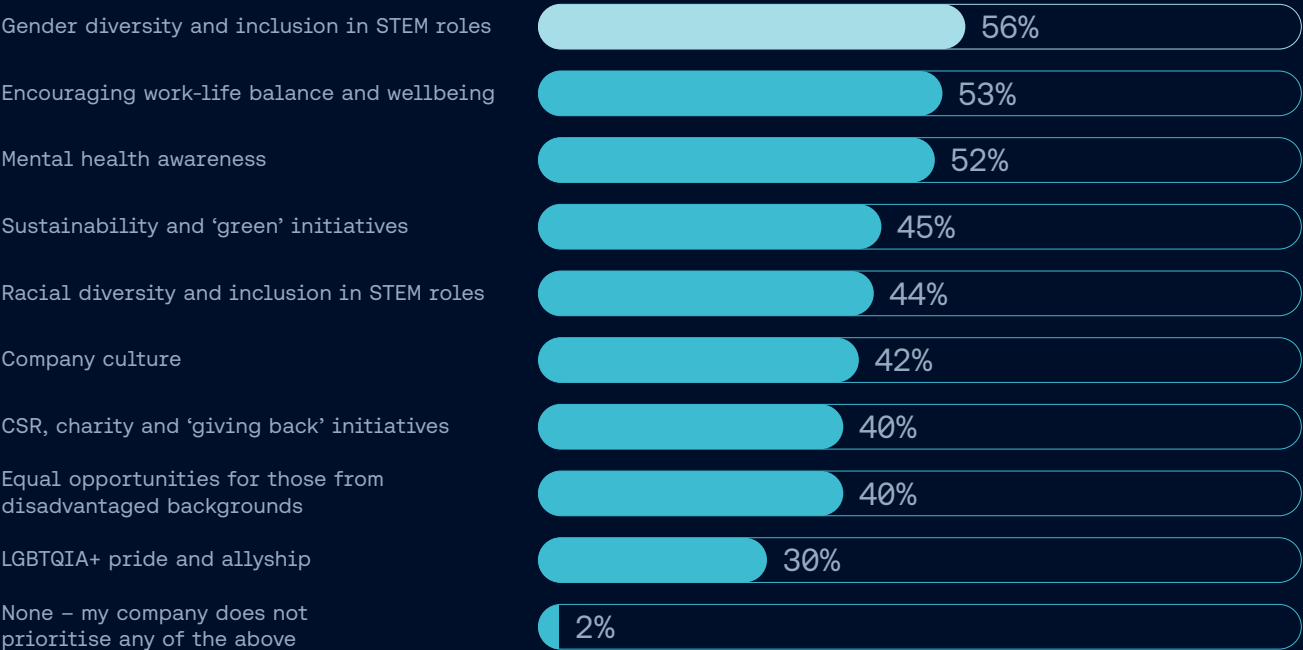
# The story revealed by our research

## Signs of progress

There are positive signs in terms of attitudes to and progress around gender diversity. With most of our respondents in senior roles, it's encouraging that over half (56 percent) say gender diversity is a top priority for their organisation – on a par with work-life balance. And one fifth (17 percent) believe the issue has top priority over all other factors we'd asked about. These included mental health issues, sustainability, and company culture.

The majority of respondents see visible momentum. Seventy-eight percent agreed they'd seen a strong improvement in encouraging and supporting gender diversity and inclusion in STEM roles over the course of their careers. And 80 percent agree that a more diverse workforce is crucial to building a better workplace for the future.

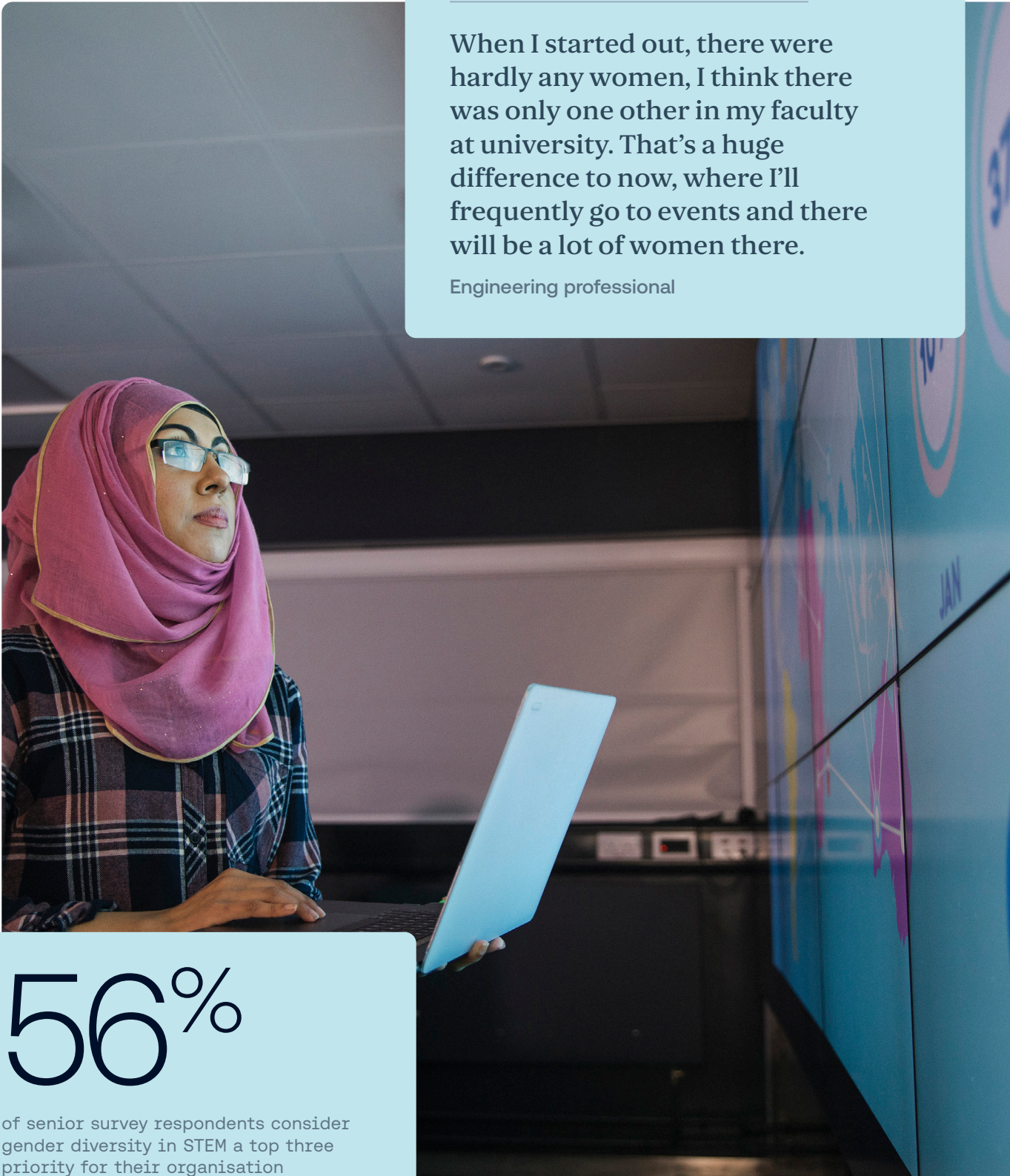
Figure 1: Top priorities for STEM businesses



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When I started out, there were hardly any women, I think there was only one other in my faculty at university. That's a huge difference to now, where I'll frequently go to events and there will be a lot of women there.

Engineering professional



56%

of senior survey respondents consider gender diversity in STEM a top three priority for their organisation



Yet there’s more to do

Our research shows satisfaction with the current scenario varies in perhaps predictable but still-concerning ways. What’s more, there’s no agreement on the main barriers to improving gender balance. There’s a sense that some people think it’s someone else’s problem to solve. And the trans and non-binary community feel they’re an afterthought in some companies.

Women and more junior staff tend to be less satisfied

Satisfaction with workplace gender diversity policies is significantly lower for women than it is for men, and varies between levels of seniority: **86 percent** of male respondents say they’re satisfied or very satisfied, compared to **74 percent** of women. From what we heard in our qualitative interviews, trans and non-binary STEM professionals are even less satisfied.

When we analysed our results by seniority, **91 percent** of C-suite respondents say they’re satisfied or very satisfied, compared to **57 percent** of middle management. These discrepancies point to a complacency that will need to be addressed to ensure things keep moving in the right direction.

There’s a multitude of barriers

While **70 percent** of those surveyed agree there are still considerable structural barriers hindering progress for gender diversity and inclusion in STEM, there’s little agreement on what’s most significant. From our analysis, three main thematic groups emerged:

- **Organisational** – including issues such as pay, flexible working opportunities, and pregnancy support
- **Societal** – issues such as racial bias intersecting with gender bias, discrimination, and few women studying STEM subjects
- **Interpersonal** – including lack of male allyship, networks, and leadership support.

70%

of respondents still believe there are considerable structural barriers hindering progress

13%

Women are 13% less satisfied than men

“

No one is holding anyone back [in my industry].

Male technology professional

People believe the biggest challenges are beyond their control

Each seniority group was more likely to identify a barrier they couldn't or wouldn't usually get involved in influencing or removing, as the most significant in attracting women to STEM roles. C-suite leaders are 20 percent more likely to select the lack of employee-led networks and communities as the main hindering factor. Middle managers are 16 percent more likely to see lack of C-suite mentorship and sponsorship as the main barrier. And young STEM leaders are 39 percent more likely to blame the lack of HR policies, such as support during pregnancy or motherhood, as the key factor hindering progress.

We believe that ultimate responsibility lies with business leaders – they need to make gender diversity a priority and clearly highlight how everyone can play a role in closing the gap.

Policies supporting the trans non-binary community are reactive

Policies and initiatives for trans and non-binary people often don’t exist. Change is driven out of necessity rather than organisations progressively pushing for it. One trans interviewee told us that when they wanted to physically and socially transition at work, a transitioning policy didn’t exist. That meant they had to pave the way at work, as well as navigate transitioning from a personal perspective. Another interviewee reported issues with people referring to them by a name they no longer use (their deadname) and incorrect pronouns. Training and education could ensure a person’s preferred name and correct pronouns are recorded at the recruitment stage and used consistently within a company.

Essentially, cis-women-focused efforts are often prioritised over LGBTQIA+ specific efforts. This gives the impression that the LGBTQIA+ community is an afterthought. This sentiment was echoed by all our qualitative interviewees – regardless of level and how individuals identify.

Over the following pages, we outline the practical and most effective steps people believe can make a difference – and highlight some significant opportunities for creating change.

“

While it’s important to involve LGBTQIA+ colleagues in decisions, policy making, and initiatives, the burden shouldn’t fall just to them, and we shouldn’t typecast. Companies need to be more proactive: they shouldn’t wait until someone needs the policy, initiative or approach before getting started on it.

Science professional

# Practical steps for making progress

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In our view, companies need to carefully consider and address problems across the end-to-end employee experience. That encompasses attraction, recruitment, retention, and retraining.

We asked people which actions they thought would be most effective at each stage – and which would be easiest to implement. Combining our experience and these results provides a practical guide for employers to make it easier for women, trans, and non-binary people to work and succeed in STEM.





# Attraction

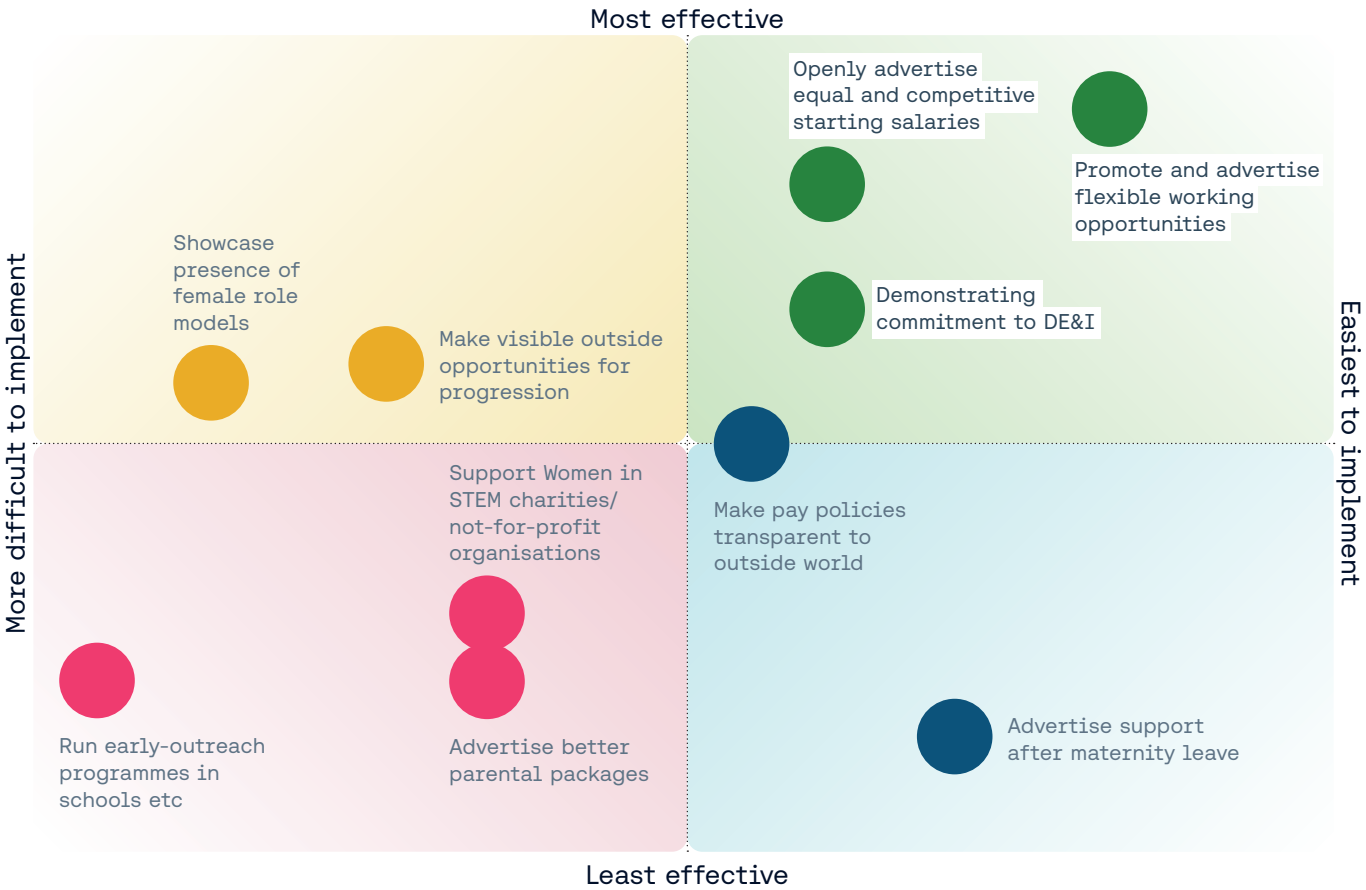
What emerged from our research is that the most effective actions in terms of attracting a more gender diverse workforce related to companies walking the walk, not just talking the talk. It's more effective to change policies and ensure equal and competitive salaries, than merely endorsing the cause publicly to build a positive reputation. It's a question of 'show, don't tell' – women, trans, and non-binary people are interested in the reality of what's on offer.

“

The landscape of opportunity has opened up... but it's still not as attractive to women as to men.

Gender expert

Figure 2: Most effective and impactful gender diversity options: Attract



## The top three actions in terms of effectiveness and feasibility

### 1. Promote and advertise flexible working opportunities

Considered most effective by **35 percent** of respondents and as easy to deliver by **59 percent**

Having a visible and clear flexible working policy signals that a company's culture is supportive and inclusive.

Flexible working shouldn't only be interpreted as the ability to work from home. Flexibility can support gender balance through job sharing, compressed hours, term-time working, or self-rostering (where employees choose their work schedule), for example. The key to successful flexible working is personalisation. Showcasing and role-modelling people's existing arrangements is useful, as well as advertising the company's willingness to tailor roles.

### 2. Openly advertise equal and competitive salaries

Considered most effective by **33 percent** of respondents and as easy to deliver by **56 percent**

Companies must own their responsibility to eradicate the gender pay gap and should encourage rather than shy away from conversations about pay. It's generally understood among our interviewees that women and gender-diverse people are less likely to initiate those conversations.

It's clear from our research that candidates expect (and appreciate) honest, upfront information on salaries – and will benchmark these within the sector and against others. Being clear and highlighting future avenues for salary reviews reassures applicants an organisation strives to be equitable.

### 3. Demonstrate tangible commitment to diversity, equity, and inclusion (DE&I)

Considered most effective by **27 percent** of respondents and as easy to deliver by **56 percent**

Companies should be open about their existing situation and spell out how they plan to change. It needs to be authentic. Respondents say they are likely to check an employers' diversity credentials and approach before making an application, and can tell the difference between genuine intent and token gestures.

True authenticity calls for organisations to be honest about their numbers – perhaps using a dashboard like [HSBC](#). A transparent strategy also demonstrates openness to change. We worked with [The Ocean Race](#) to challenge male dominance in sailing, developing a practical strategy and tools to ensure a fifty-fifty female/male split across the fleet by 2030. We've also seen companies harness the power of social media, such as LinkedIn, to boost their DE&I messages: to reach diverse candidates, and to create open spaces where candidates can ask questions and create a conversation.

“

We just don't talk about pay to our colleagues... transparency is not there on pay. Men should be going to their female colleagues and saying, 'I'm on this salary, he's on this salary, you should probably be on this same salary.'

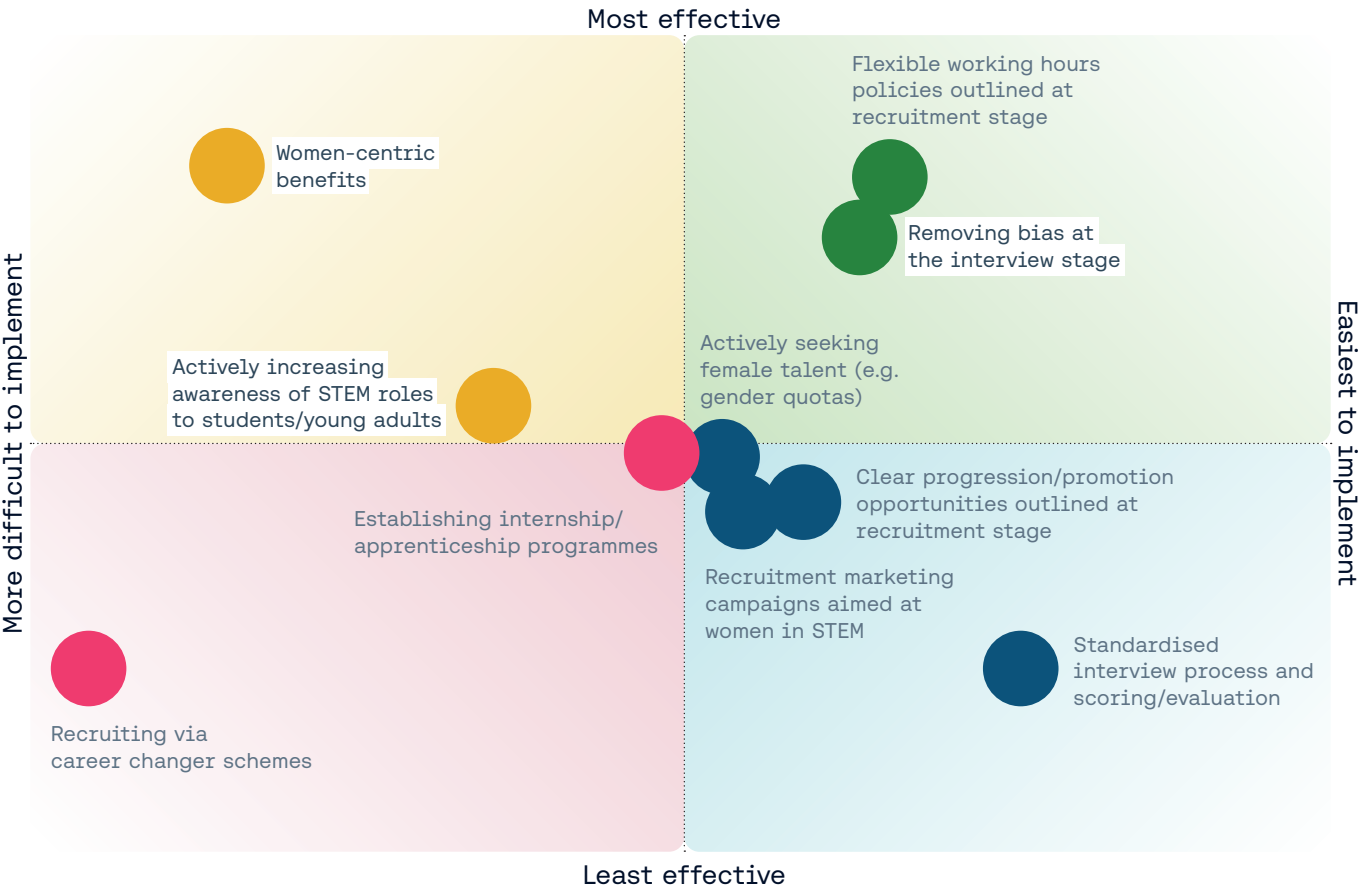
Technology professional

# Recruitment

Our respondents suggest that how companies recruit has a strong impact on whether women, trans, and non-binary people drop out of the process. Creating the right interview experience and highlighting relevant benefits is crucial. They also feel companies should invest in creating their own pipeline through outreach activities.

“  
Job descriptions written by men attract men... we write for our own audience.  
Technology professional

Figure 3: Most effective and impactful gender diversity options: Recruit



## The top three actions in terms of effectiveness and feasibility

### 1. Remove bias at interview stage

Considered most effective by 30 percent of respondents and as easy to deliver by 56 percent

Where possible candidates should be able to ‘see themselves’ in the organisation, so interviewer panels should be representative and diverse. That means an important step on this journey is to make sure you have a genuinely diverse leadership team. We worked with the [UK Space Agency](#) to do just that. We proposed strategies for ensuring genuine diversity across the leadership team (rather than the appointment of one or two high-profile female or ethnic minority leaders, for example).

### 2. Offer women-centric benefits and speak about them during the recruitment process

Considered most effective by 30 percent of respondents and as easy to deliver by 49 percent

Creating and making women-centric benefits visible can encourage more women or diverse candidates to accept roles. Companies should invest in truly understanding the issues affecting women, trans, and non-binary people, and then offer progressive policies which go beyond the basics. These could include provisions around menopause: for example, allowing leave, paying for HRT, or making workplace adjustments (like fans or breathable uniforms). And companies could break the taboo around periods and provide wellbeing leave, mark endometriosis month, and set up initiatives with relevant partners (such as affinity networks). Having explicit benefits relating to time off for gender transitioning would also help.

### 3. Actively increase awareness of STEM roles among students and adults

Considered most effective by 28 percent of respondents and as easy to deliver by 51 percent

Partnerships with schools and institutions are key for generating interest in the sector, untapping new talent, and recruiting for graduate or junior roles. The secret to successful outreach programmes lies in the variety of who volunteers – ensuring that allies attend too – and also in the variety of offerings. These could range from panel-style conversations, to code-alongs and hackathons where people can actively participate. Be ready to adapt to different needs and make sure there’s a mix of people from the company in attendance.

“  
A good initiative I’ve seen elsewhere is where your job would be safe for up to five years after maternity leave.  
Technology decision and policy maker

“  
We often hear organisations say, ‘We don’t have women with the [right] qualifications’. That’s because the pipeline needs improvement. This requires addressing as early as primary school even.  
Gender expert

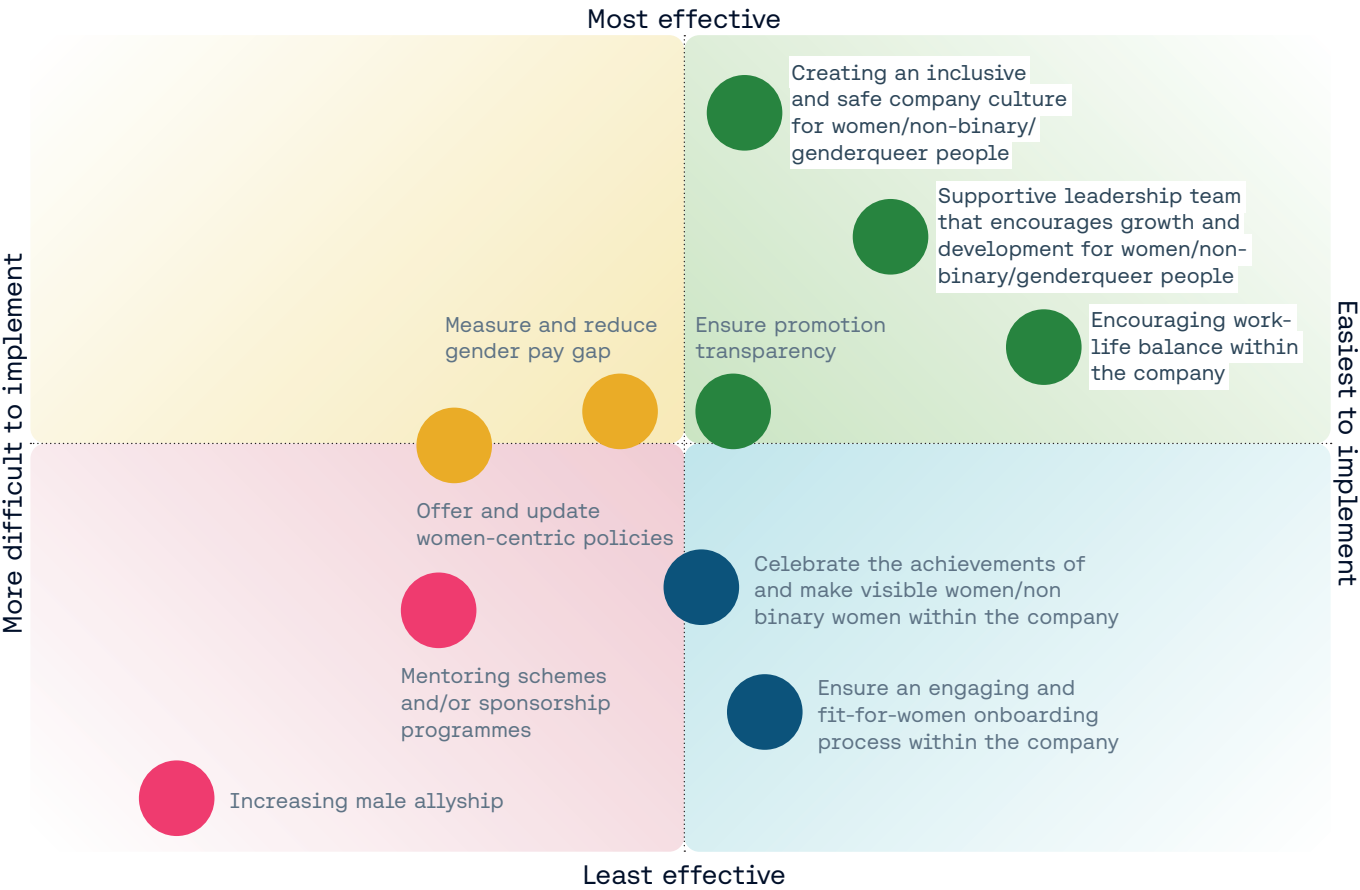


# Retention

With a high turnover rate of women in STEM, including more than half leaving the industry before they're 35, it's imperative for companies to focus on creating an inclusive and balanced culture, supported by executive leadership.<sup>6</sup>

Our research shows common barriers preventing women, trans, and non-binary people in STEM from succeeding in their jobs include the absence of a number of factors: sponsorship; tailored benefits; inclusive environments; and allyship.

Figure 4: Most effective and impactful gender diversity options: Retain



## The top three actions in terms of effectiveness and feasibility

### 1. Build an inclusive and safe culture through networks

Considered most effective by **38 percent** of respondents and as easy to deliver by **55 percent**

Networks are a key component to creating an inclusive company culture. Creating a space where similar people can get together, meet, and support one another encourages camaraderie and creates a sense of belonging. From our experience, there are three core components to running a successful network: there needs to be a purpose-led strategy; dedicated capacity (it can't be 'side of the desk'); and it must be metrics-driven.

### 2. Create a supportive and committed leadership team that encourages growth and development

Considered most effective by **34 percent** of respondents and as easy to deliver by **56 percent**

Senior leadership buy-in is critical for getting new policies and initiatives off the ground, especially those that encourage growth and development. We believe diversity should be a regular feature on executive committee agendas.

And leaders should be aware of how policies might need to change. Working with non-profit [Speak Out Revolution](#), we designed and developed a user-friendly dashboard that individuals and businesses alike can use. Using a rolling online survey, Speak Out Revolution gather insight from people who've spoken out about harassment and bullying at work to tackle the fundamental challenge of creating truly inclusive workplaces. Organisations can draw on the data to ensure their diversity and inclusion strategies are based on lived experiences.

For change to stick, it's crucial for leaders to help demonstrate what healthy allyship looks and lead by example. This can mean giving opportunities to women, recommending them to others and amplifying their voices in meetings. Leaders should be open and listen to what meaningful inclusion looks like from gender diverse communities themselves. And men should be allowed space to fail and learn in becoming allies.

### 3. Encourage a healthy work-life balance

Considered most effective by **30 percent** of respondents and as easy to deliver by **57 percent**

Creating a culture where work-life balance and flexible working are embraced signals that a company trusts employees and respects their lives outside of work. Employees value STEM organisations that recognise the need for flexible working arrangements outside of caring responsibilities, with trans interviewees stating the importance of being able to take time to attend gender-affirming appointments. Celebrating the achievements of those who work flexibly, with reduced hours or job sharing, demonstrates how those arrangements can lead to successful outcomes. What's more, leaders can role model by making it public they're leaving to watch a school play or to do some exercise, for example.

“

Professional networks are key – offering the opportunity for people to feel safe and learn from them. This is closely intertwined with culture.

Engineering professional

“

[There's] always a feeling that you have to pretend that you don't have kids – if flexible working is offered then that is indicative of the culture [of a company].

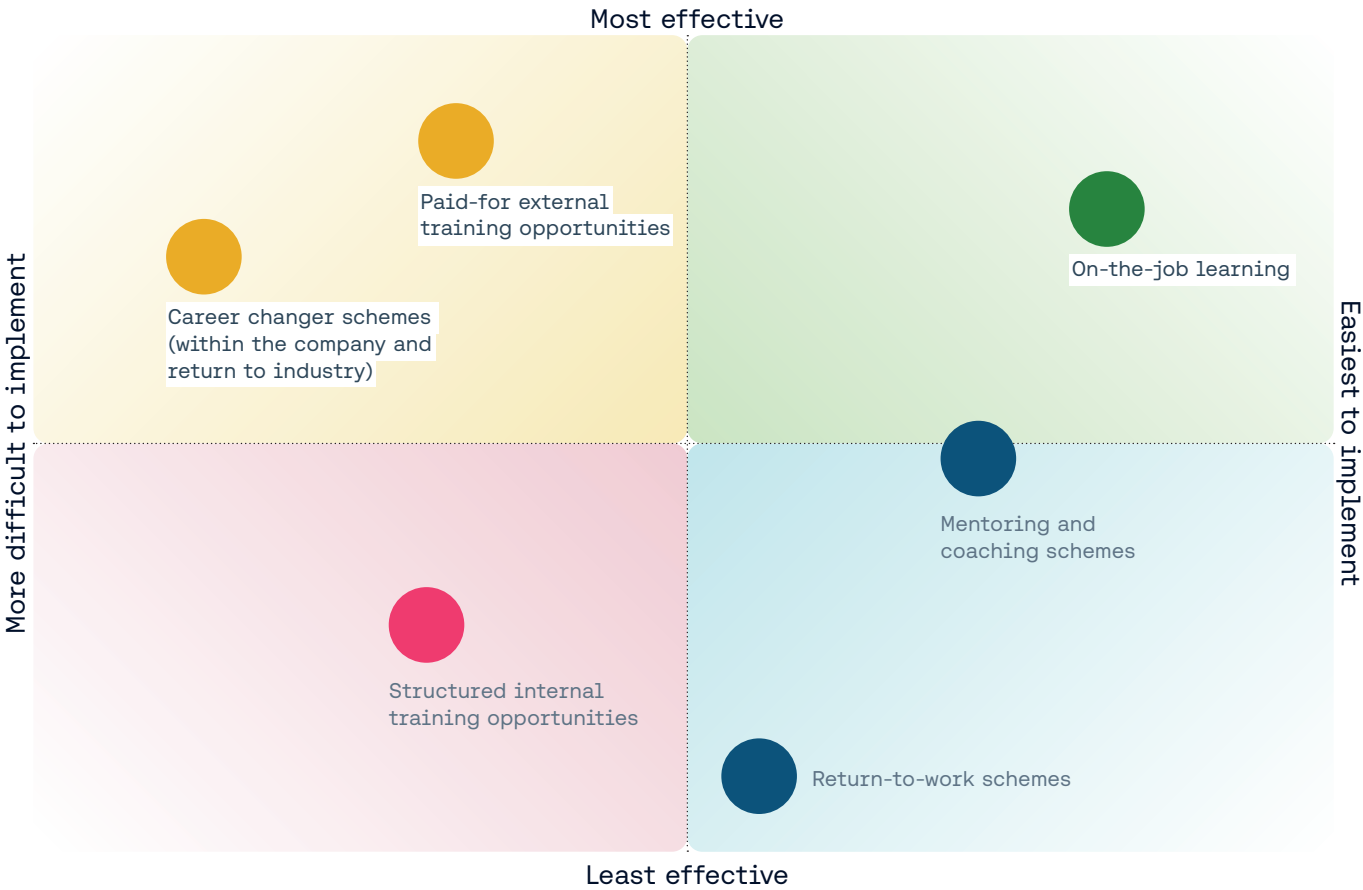
Engineering professional

# Retraining

Retraining is often overlooked as a strategy to close the gender gap in STEM but, focused on the right roles and with enough flexibility, it could be extremely powerful. It's important to have distinct and measurable frameworks: career development pathways with clear objectives, metrics, and modes of engagement.

We're big champions of training. As well as being involved with external courses, we've expanded our in-house [Women in Tech](#) curriculum to ensure it's accessible to the broadest possible group, including non-binary people. Our Web Development course provides training in high-level infrastructure, user research, user experience, design, HTML, CSS, and FE frameworks. Our Python course covers coding fundamentals, data structures, logic, functions, and working with files. And our newest Data Science course covers visualisation basics, and several machine learning models. The feedback has been excellent, with 100 percent of attendees saying they'd recommend our courses.

Figure 5: Most effective and impactful gender diversity options: Retrain



## The top three actions in terms of effectiveness and feasibility

### 1. Increase the provision of on-the-job learning

Considered most effective by **35 percent** of respondents and as easy to deliver by **58 percent**

On-the-job learning is a convenient, efficient way of learning that doesn't require additional resources from the employee. Our qualitative interviewees emphasised the need for safe, structured learning spaces in the workplace. In particular, mid-level employees felt that hyper-critical or pressurised environments mid-project were a barrier to learning. They felt that organisations lacking a framework for retraining (i.e. without objectives and metrics) were likely to fail their employees and lose talent. Organisations should also encourage those who may lack confidence to apply for training opportunities, coaching, and support. People won't always put themselves forward.

### 2. Uplift knowledge and skills with training

Considered most effective by **32 percent** of respondents and as easy to deliver by **49 percent**

Respondents (especially those in more senior positions) point out that a gap remains in retraining almost all staff, especially in senior positions. Training men could have a positive impact here. The more organisations invest in training leadership to be inclusive and sustainable, the more women are likely to succeed.

While this can be expensive, there are ways of getting more value from external courses – ensuring people who get the opportunity share their learning with colleagues, for example. Companies could invest in platforms which allow them to leverage existing courses. If there is an expectation an individual would need to contribute financially, companies can consider options such as 50:50 splits, or salary sacrifice schemes.

### 3. Be more open to cross-skilling and career change

Considered most effective by **34 percent** of respondents and as easy to deliver by **47 percent**

Our respondents suggest companies can be short-sighted when it comes to recognising how skills from one sector or job might be easily transferred to another within STEM. For example, the skills an accountant has might be transferable to the role of a data analyst. We think companies (and individuals) would benefit from psychometric testing and ongoing conversations around skillsets and how they might be relevant in various roles. This ongoing talent mapping would be good for individuals and organisations alike.

Our interviewees also suggested companies could do more in supporting people returning to work or transferring from other industries – from linking them to relevant online training to providing mentors.

“

Our [women's] inner critic is so strong – we'll talk ourselves down or out of opportunities. We don't always realise our skills are transferable.

Finance professional



# Where powerful opportunities lie

As well as these detailed findings, there are some broad learnings from our qualitative research. These centre on areas our interviewees feel companies often miss in attempting to improve diversity, equity, and inclusion (DE&I).

## 1. Look beyond flexible working

While offering flexible working often comes out as an effective solution across all four stages of the end-to-end employee experience, it isn't the single answer to increasing gender diversity. It's also nuanced and not exclusively for women or parents. Through the steps we've described within attraction, recruitment, retention, and retraining, we've identified the impact that more personalised flexible options can have. We think STEM businesses should offer flexible working to bring those benefits, but not rely solely on those policies to enable gender diversity. Our practical recommendations demonstrate there are many other levers.

## 2. Make retraining a viable option

Women, trans, and non-binary people often fall through the cracks when it comes to training and retraining for a number of reasons: they're outnumbered in STEM; less likely to have relatable role models compared to male peers; less likely to put themselves forward for opportunities; more likely to work part-time; and often not supported appropriately post-parental leave. We believe businesses should provide specific support in-role, beyond the attracting and recruitment stages. That includes offering training opportunities that can fit within part-time working patterns, and making on-the-job learning and shadowing formal features of career development frameworks.

“

We're a bit behind in our gender diversity journey – gender diversity is amalgamated, there's not much focus on gender identities beyond the binary. While we have Trans-inclusion training and gender transitioning policies do exist, I acknowledge that more work needs to be done here at a policy level. We're hoping to improve the data we collect to help inform the business case for future change.

Technology decision and policy maker

## 3. Integrate DE&I commitments within your strategy

Diverse candidates looking to join a STEM business will research its DE&I initiatives and commitments. And they'll judge a business on them. It's important that these are communicated and evidenced – and ultimately experienced when someone joins.

We think companies should demonstrate they believe gender diversity makes business sense. How can women, trans, and non-binary employees help you build better products? How can gender diversity help you better communicate with customers? When we worked with Monica Healthcare to develop a heart-rate monitoring device for foetuses, we involved midwives and mothers from across the company. We understood this would lead to a better product – one that pregnant women would actually use.

## 4. Understand intersectionality

Organisations shouldn't view gender diversity in STEM in isolation from other characteristics and lived experiences. Instead, they need take an intersectional approach. That means taking into consideration the impact of any given policy or initiative on all groups. How does it fit into the bigger picture? How is it going to affect groups it isn't geared towards? Does it inadvertently exclude or discriminate against others?

Ultimately, businesses need to keep in mind that one size does not fit all. How nationality, race, ethnicity, sexuality, socio-economic group, disability, neurodiversity, age, religion, and life stage intersect with gender will create unique dynamics, effects and experiences. Businesses need to be flexible enough to see things from different perspectives and tailor to the needs of their people.

# What's next?

This research has informed our recommendations for some truly practical steps businesses can take to work towards closing the STEM gender gap. They should inspire leaders to put them into practice.

Our people care passionately about the societal and cultural debates of our era. We're already driving change by convening and giving a platform to influential thinkers in the area of diversity in STEM. And we'll continue to find ingenious ways to overcome barriers and create positive change.

Join us on our journey. We're building a community of interest as we partner with clients to run events, offer courses, and share ideas together about gender diversity. Learn more about future events, our Women in Tech network, and how you can drive change with us.

Email [womenintech@paconsulting.com](mailto:womenintech@paconsulting.com) if you'd like to be involved.

# Contact us



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# Research methodology

We carried out quantitative and qualitative research in late 2022. Three hundred people completed our online survey – split 50:50 between the US and the UK. All worked in STEM fields including accountancy, architecture, computing and software development, or in non-STEM fields including HR for STEM-based companies. They all held positions in middle or senior management or C-suite, and ranged evenly in age. Just under 60 percent of respondents were men, just over 40 percent were women, and less than one percent were non-binary.

To supplement this research, we carried out 16 in-depth interviews with gender experts, decision and policy makers and other professionals in STEM businesses. We spoke to 12 women, two men, and two non-binary people. Throughout the report, we have omitted the gender identity from the anonymous quotes – other than where a difference of opinion between different identities is made.

## Endnotes

<sup>1</sup> <https://www.aauw.org/resources/research/the-stem-gap/>  
<sup>2</sup> <https://www.stemwomen.com/women-in-stem-percentages-of-women-in-stem-statistics>  
<sup>3</sup> <https://www.kornferry.com/insights/this-week-in-leadership/talent-crunch-future-of-work>  
<sup>4</sup> <https://go.manpowergroup.com/talent-shortage>  
<sup>5</sup> <https://execpipeline.com/women-count/women-count-2021/>  
<sup>6</sup> Women more likely to leave tech jobs than men | Computer Weekly





## About PA

We believe in the power of ingenuity to build a positive human future.

As strategies, technologies and innovation collide we create opportunity from complexity.

Our diverse teams of experts combine innovative thinking and breakthrough use of technologies to progress further, faster, together. Our clients adapt and transform, and together we achieve enduring results.

We are over 4,000 strategists, innovators, designers, consultants, digital experts, scientists, engineers and technologists. And we have deep expertise in consumer and manufacturing, defence and security, energy and utilities, financial services, government and public services, health and life sciences, and transport.

Our teams operate globally from offices across the UK, Ireland, US, Nordics and Netherlands.

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