

A PwC UK research report

# *Women in Tech*

## Time to close the gender gap

*Realising the potential of females to change the world*



**78%**

of students can't name a famous female working in tech

**3%**

of females say a career in technology is their first choice

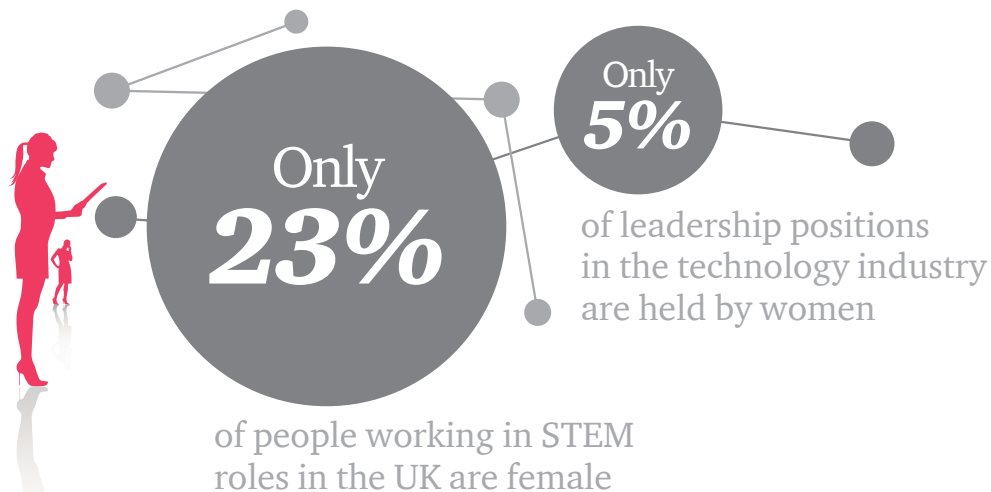




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Despite decades of progress towards workplace equality, women remain woefully underrepresented in the UK's technology workforce. The figures speak for themselves: according to WISE<sup>1</sup>, just 23% of the people working in STEM (Science, Technology, Engineering and Mathematics) roles across the UK are female - and only 5% of leadership positions in the technology industry are held by women<sup>2</sup>.



What's more, the imbalance doesn't appear likely to be redressed any time soon: the UK's future pipeline of technology talent is also heavily skewed towards men, with women accounting for just 15.8% of the UK's current generation of engineering and technology undergraduates<sup>2</sup>. This lack of a strong tech talent pipeline is starting to impact organisations. Our Global CEO Survey<sup>3</sup> reveals that two thirds of UK CEOs say recruiting people with digital skills is difficult, compared with only 43% of CEOs in the US and just 24% in China. CEOs say that STEM skills are also harder to recruit in the UK than elsewhere.

And behind the sobering statistics, it seems there are wider societal problems at play. A study<sup>4</sup> by the Organisation for Economic Co-operation and Development (OECD) found that girls still lack the confidence to pursue high-paid careers in science and technology, despite their school results being as good as – or better than – those achieved by boys.

<sup>1</sup><https://www.wisecampaign.org.uk/statistics/women-in-stem-workforce-2017/>

<sup>2</sup><https://techcrunch.com/2016/05/10/the-lack-of-women-in-tech-is-more-than-a-pipeline-problem/>

<sup>3</sup>[www.pwc.com/davos](http://www.pwc.com/davos)

<sup>4</sup><http://www.bbc.co.uk/news/education-31733742>

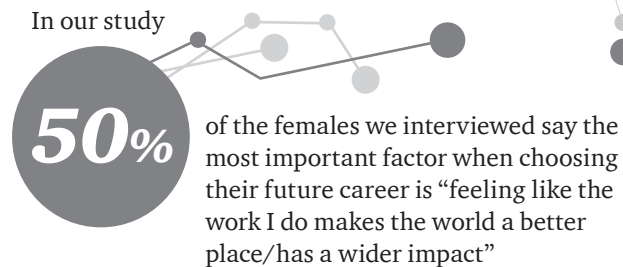
Statistics correct as of 2017

## Impacts beyond the workplace

So, what does this persistent gender imbalance mean? In our view, the gap between men and women studying and working in technology isn't just unjustifiable in societal terms, and unfair with regard to female skills and participation in the workforce. It also means that – as our personal and working lives become increasingly shaped by technology – technology products and services are being developed and delivered based on the perspectives of only one half of the population, and not designed with the needs of everyone in mind. Women make up half of consumers and technology companies need to reflect this in their workforce designing those products.

A further impact of the gender gap is that it's preventing women from playing their full role in shaping the future of our society – or in realising the powerful potential for technology to make the world a better place. Our research shows clearly that improving the world is seen as a more important goal by females than males. Working in technology can provide women with a way to do this.

Again, the statistics tell their own story. In our study, 50% of the females we interviewed say the most important factor when choosing their future career is “feeling like the work I do makes the world a better place/has a wider impact”. The corresponding figure for men is only 31%. In fact, females rate the opportunity to make the world a better place as the second most attractive attribute of a career, with only “having interesting work” ranking higher for them.





## ***A missed opportunity for businesses...***

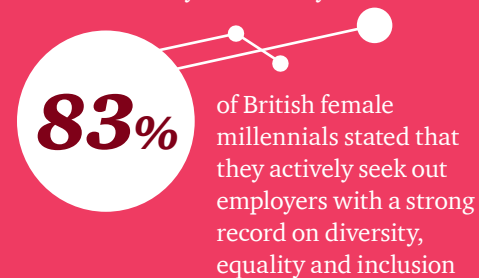
The gender imbalance in technology doesn't just represent a missed opportunity for women and society, but also for businesses. There's a growing body of evidence – supported by everyday experience in organisations across the country – that having a more diverse workforce, including an equitable gender balance, makes for a better business. This reflects the wide range of benefits that flow from workplace diversity, ranging from the ability to engage customers more effectively by mirroring wider society, to enhanced abilities in areas where women are especially strong, such as problem-solving and emotional intelligence.

Put simply, diversity is a business advantage. And other research studies by PwC confirm that the benefits of diversity include having a head-start when it comes to attracting the best technology talent. Indeed, our recent report – “The Female Millennial – The new era of talent”<sup>5</sup> – finds that creating and supporting a diverse workforce is a prerequisite for winning the battle to attract today's top female recruits. In the study, 83% of British female millennials stated that they actively seek out employers with a strong record on diversity, equality and inclusion – and while they say employers talk about diversity, 66% do not feel opportunities are equal for all.

## ***...and for the UK as a whole***

As well as having a negative effect on individuals and businesses, the gender gap in technology also has implications for the productivity and competitiveness of the UK economy as a whole. If half the population is being overlooked as a source of technology talent, then the UK is effectively trying to compete internationally with one hand tied behind its back. So for the UK's businesses and economy to realise their full potential, it's vital that we build up a strong pipeline of women in technology.

Again, recent PwC research underlines the point – and illustrates the challenge faced in all industries, our own included. Our “Women in Work”<sup>6</sup> report shows that the professional and technical services sector, of which PwC is a member, has the fourth-highest gender pay gap of all industries at 23%. If UK businesses are able to attract more women into higher-paying sectors such as technology, this will help reduce the gender pay gap – and also increase female economic empowerment, to the benefit of the UK economy and society.



<sup>5</sup>Sources: [http://pwc.blogs.com/press\\_room/2015/03/british-female-millennials-are-the-most-confident-and-ambitious-of-any-generation.html](http://pwc.blogs.com/press_room/2015/03/british-female-millennials-are-the-most-confident-and-ambitious-of-any-generation.html) and <http://www.pwc.com/femalemillennial>

<sup>6</sup>Source: PwC Women in Work Index [www.pwc.co.uk/womeninwork](http://www.pwc.co.uk/womeninwork)





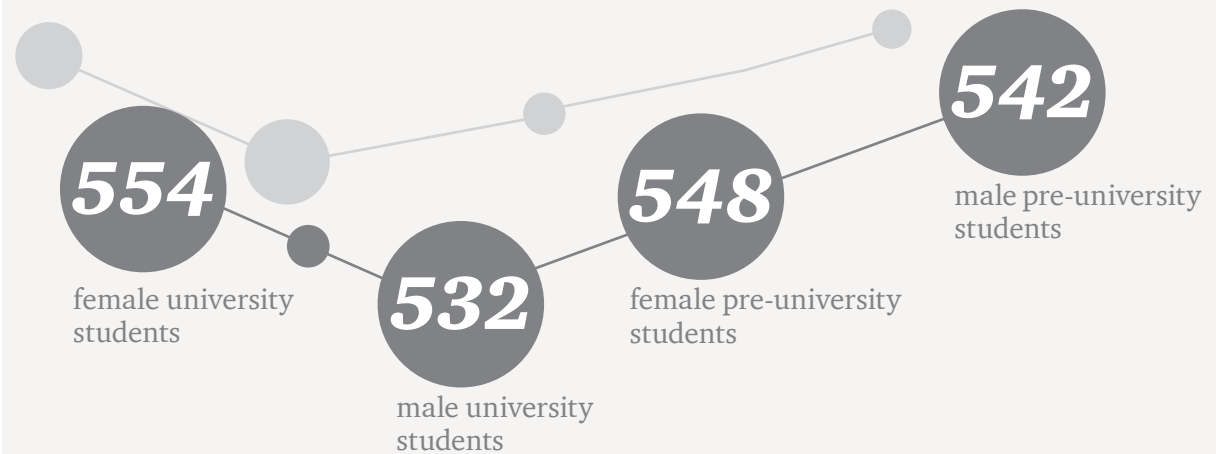
### **Our “Women in Technology” research**

What’s clear is that the gender imbalance in the UK technology industry is a major problem with multiple impacts. Given this context, we decided to conduct a research study to investigate the issue, analyse the root causes and identify potential solutions.

The research approach, methodology and sample are summarised in the accompanying information panel. In the rest of this report, we examine the findings in detail – and draw out some conclusions and suggestions on the best way forward.

#### **Research approach, methodology and sample**

The “Women in Technology” study was conducted on PwC’s behalf by the respected research house Opinium. It involved a survey of 2,176 students across the UK between 27 January and 6 February 2017. These respondents included:



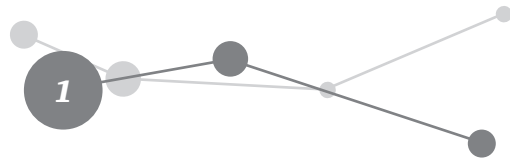
The overall gender split of the survey sample was 1,102 females and 1,074 males. For the purposes of the study, pre-university students are defined as those currently studying for A-Levels, BTEC or equivalent and planning to begin a university course in 2017.

Respondents were sourced from the UCAS database and from a link sent out by PwC to members of its network. The interviewees’ views and perceptions on a range of issues were elicited and recorded, and the results analysed.



## Three key themes emerging from our research

A close analysis of the findings from our study reveals three key themes – each with major implications for future efforts to close the gender gap in technology.



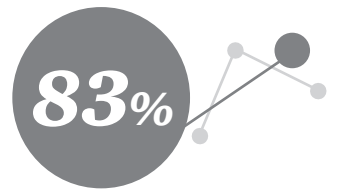
### **Girls are less likely to study STEM subjects at school – and this gap continues through to university**

Our research confirms that the gender bias starts in school and carries on through every stage of girls' and women's lives. Both before university and at university, more boys than girls participating in our research are studying all STEM subjects with the exception of biology. Overall, 83% of males are studying STEM subjects at school, compared to 64% of females. This breaks down to 17% of the males studying physics, compared to 7% of females. The corresponding breakdown for maths is 28% male and 20% female.

A similar divergence emerges at university, where over half (52%) of males are studying a STEM subject, compared to only 30% of females. The biggest gap is in engineering – a subject being studied by 13% of male university students we surveyed and only 2% of females. Maths is being studied by 6% of males and 4% of females. For female students, chemistry and maths show the biggest drop-off between A-levels and university, whereas for males the biggest drop-offs are in biology and maths.

"I chose not to pick a science-based subject as I feel that is not my strong point. Although I did well at science when doing my GCSEs I acknowledged that it becomes increasingly difficult at A-Level, which is why I chose other subjects."

Female pre-university student



83% of males are studying STEM subjects at school compared to 64% of females



### ***A variety of barriers and influences***

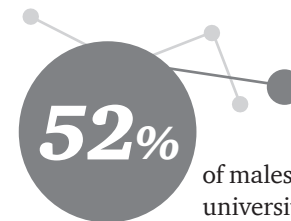
So, what factors are putting girls off STEM subjects? Our research shows that their main reasons for not choosing to study STEM topics include: being better or gaining better grades in humanities or other essay based subjects; not finding STEM subjects as interesting; STEM subjects not being relevant to the career they plan to choose; teachers not making STEM subjects appealing; and the need to get the highest possible grade, as this influences both university entrance and future career options.

A further finding is that girls are more influenced than boys by their likely choice of future career when choosing A-Level subjects. Some 53% of girls say their preferred career was a factor in their choice of A-Levels, compared to just 43% of boys. So girls are thinking ahead – but the future they’re envisaging for themselves doesn’t usually involve a career in technology.

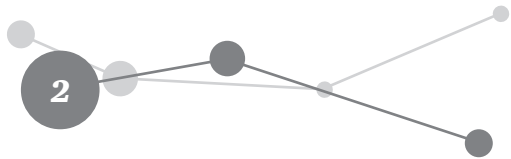


“Although heavily involved in STEM subjects at a younger age, I was discouraged by the sexism that surrounded me when I took part in competitions and conventions.”

**Female pre-university student**

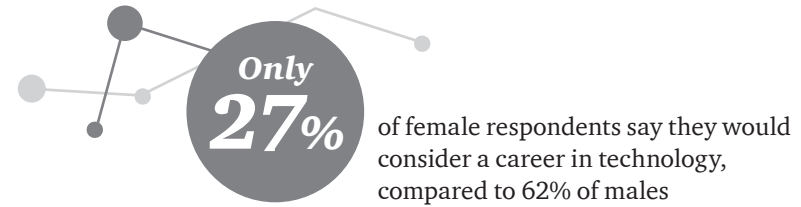


of males are studying a STEM subject at university, compared to 30% of females



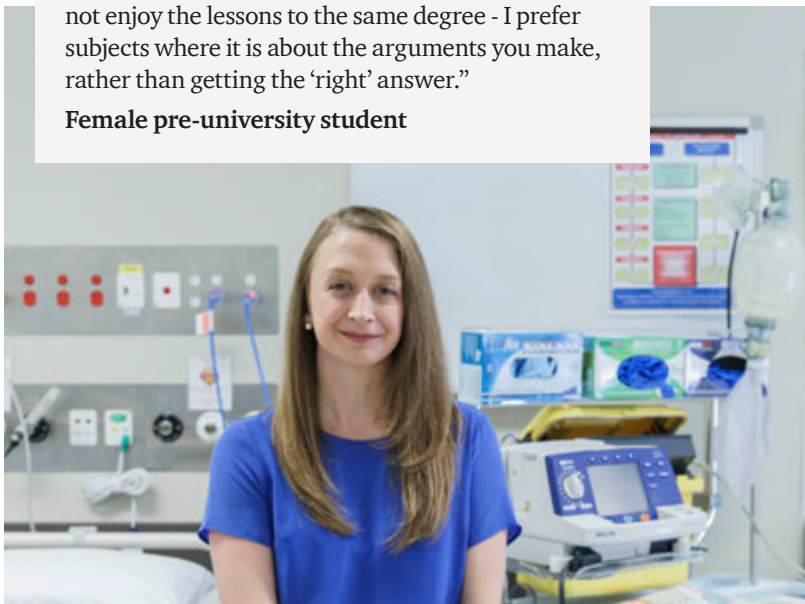
**Females are less likely than males to consider a technology career**

The STEM gender gap at school and university carries on through to girls' career choices. Only 27% of our female respondents overall say they would consider a career in technology, compared to 62% of males. And only 3% of females say a career in technology is their first choice, against 15% of males. Similarly, 5% of females say technology is one of a number of choices they could consider, compared to 19% of males.



“I could pass exams in STEM subjects, but not to the same grade as essay subjects. I also found that I did not enjoy the lessons to the same degree - I prefer subjects where it is about the arguments you make, rather than getting the ‘right’ answer.”

**Female pre-university student**



**Figure 1: Thinking about your future career plans, would you consider a career in technology?<sup>7</sup>**

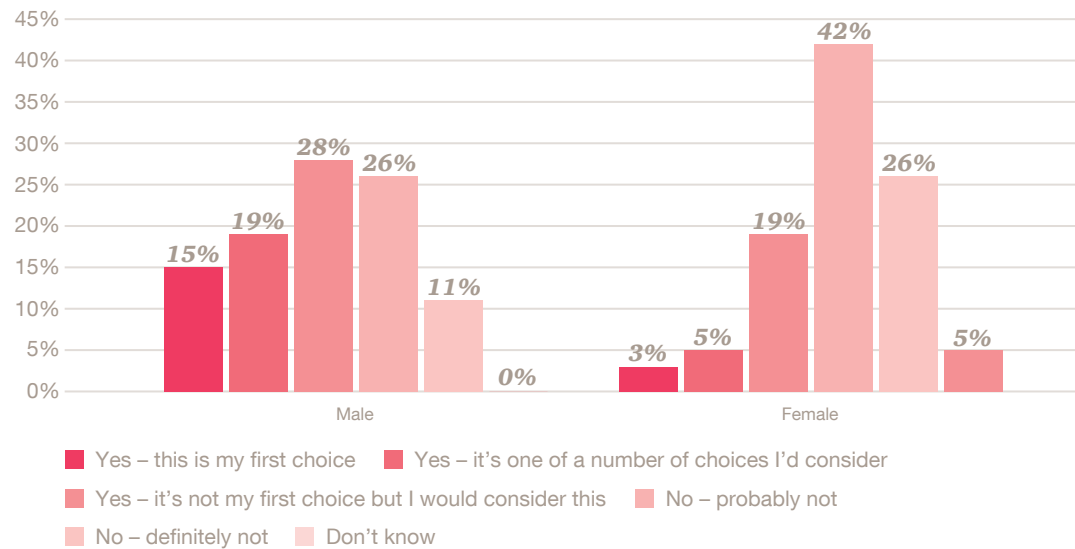


Figure 1 illustrates the stark contrast between females and males in terms of their readiness to consider a career in technology. Indeed, 61% of females in our study say they’ve been put off a career in technology because they’ve been given so little information or advice about what working in the sector involves. At the same time, 26% of female students say technology is too male-dominated, and 20% that it’s not creative enough.

<sup>7</sup>Source: PwC Women in Technology research study

## A vicious circle

What's clear is that there's a vicious circle of perception and reality in terms of gender imbalance. And that schools, universities and industry are failing to show young people – and especially girls – the realities of technology jobs and careers in today's world. Technology careers are now highly creative, particularly around understanding people's behaviour, and working out how to develop digital user experiences.

Examples of technology being used to understand emerging behaviours include the innovative customer journeys that have been created in the retail sector and the new patient experiences being developed in healthcare. In term of the latter, women are more involved with healthcare than men – accounting for 77% of NHS employees<sup>8</sup> – and, according to research from the US<sup>9</sup> females make 80% of buying decisions about healthcare products and services. Combined with women's greater desire to make a positive difference to the world, these attributes suggest females are actually better positioned than men to create technology to help meet the healthcare needs of citizens and customers.

"I prefer creative subjects to academic subjects, and the jobs in the STEM industry do not appeal to me."

**Female pre-university student**

## A lack of advice in schools on technology careers...

Despite such exciting opportunities, girls aren't considering technology as a career – partly because nobody is putting it forward as a possible option. While 33% of male respondents say they've had a career in technology suggested to them, the figure for females is only 16% – a glaring lack of advice that's helping to reinforce the stereotype of a male-dominated industry.

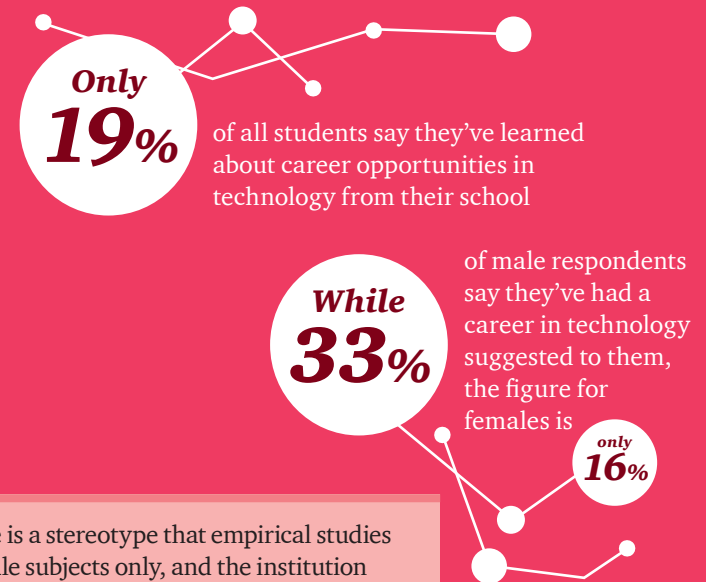
In cases where the suggestion of a technology career is made to either gender, a teacher is the person most likely to do so. But our research suggests that the stereotype of technology as being "for boys only" is prevalent amongst teachers and schools, who are much less likely to suggest a technology career to girls. Just over one fifth (21%) of female students say more information would make them more likely to consider a career in technology.

[I didn't choose technology]  
"because I didn't want to be in a male dominated environment."

**Female university student**

## ...leaves girls with little understanding of what working in technology involves

That schools are not yet providing the guidance young people need is further underlined by the fact that only 19% of all students say they've learned about career opportunities in technology from their school. Indeed, more have learned from using technology or their own research. However, the lack of encouragement means females are not sufficiently inspired or interested to find out for themselves: 31% of males have learned about technology from their own research, against only 12% of females.

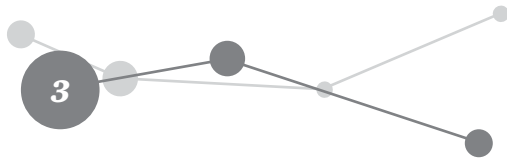


"There is a stereotype that empirical studies are male subjects only, and the institution to which I currently belong perpetuates this belief obliquely. I felt discouraged from taking the sciences."

**Female pre-university student**

<sup>8</sup>Source: <http://www.nhsemployers.org/~media/Employers/Publications/Gender%20in%20the%20NHS.PDF>

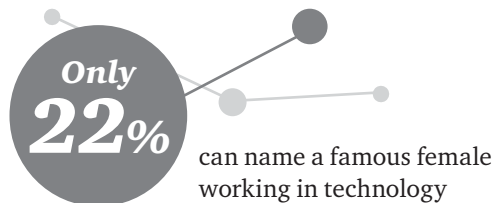
<sup>9</sup><http://www.beckershospitalreview.com/hospital-management-administration/women-make-80-percent-of-healthcare-decisions.html>



**A shortage of female role models is a major barrier – as is a lack of understanding of how technology can enable women to change the world**

When asked which individuals they would most aspire to be like in their future career, 34% of all students say a successful business personality/prominent person in the field they're interested in, with little difference in terms of gender. But when asked to name a role model who has inspired them to pursue a career in technology, 83% of female respondents find it impossible to do so, against only 59% of males, showing a clear gender gap.

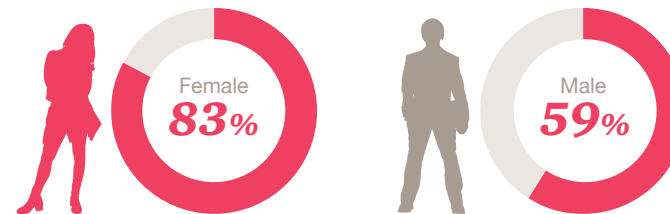
Meanwhile, 66% of respondents overall are able to name a famous man working in technology, while only 22% can name a famous female who does this. And where students can suggest a role model in technology, the males who are mentioned are suggested by far more people than each female mentioned. Also, 12% of females say there aren't enough good role models for them in tech, compared to only 8% of males. So it's clear that females suffer from a dearth of female role models who've been successful in technology and whom they can aspire to emulate.



**Figure 2:** Please name a role model in technology who has inspired you to consider a career in technology

Alan Sugar	Mark Zuckerberg	Ada Lovelace	Marie Curie
Alan Turing	Richard Branson	Ellen Pao	Marissa Mayer
Bill Gates	Steve Jobs	Grace Hopper	Sheryl Sandberg
Elon Musk	Tim Berners-Lee	Margaret Hamilton	

Don't know / no-one





## Girls want to make the world a better place

An equally significant gender difference that emerges from our research is that females are much more committed to choosing a career that enables them to make a positive difference to the world around them. Overall, 40% of students say an important factor in their career choice is feeling that the work they do helps make the world a better place. But this figure rises to 50% among females and falls to 31% among males. In contrast, males are more likely to cite salary as an important factor – with 44% of males saying this, versus 32% of females.

Girls' greater desire to improve the world is a highly significant finding. Technology now makes a huge difference to individuals and societies the world over, delivering dramatic improvements in people's lives. For example, mobile technology is playing an increasingly pivotal role in disaster relief efforts around the world<sup>10</sup>, and developing countries are at the forefront of using mobile health technologies, overcoming their relative lack of physical health infrastructure<sup>11</sup>. Given females' greater desire to have a positive impact, more understanding of transformational effects like these would encourage more of them to get involved in technology as a career.

"I do slightly regret not choosing a STEM subject, but I was put off it at school, and never told the importance of studying sciences in particular at A-Level to boost my career prospects. I was also never fully engaged in STEM subjects at school – it was not made interesting and no one encouraged me to pursue it, even knowing that I was very good at it."

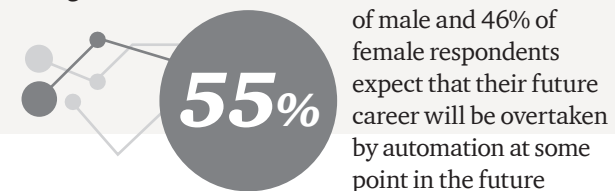
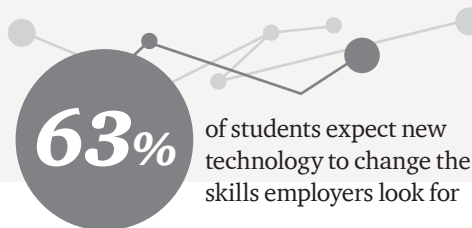
University student

## Technology, automation, gender – and the future of work

Alongside the findings on subject and career choices, our research reveals some fascinating insights into students' expectations for the future of work in an era of increasing automation. Fifty-five per cent of male and 46% of female respondents expect that their future career will be overtaken by automation at some point in the future – with 15% of all students expecting this to happen within the next 20 years, 21% after 20 years, and 14% after they retire. Given that the impact of automation is already starting to be felt, it's interesting that so many students think it's still some years away.

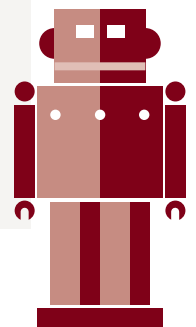
Students also have mixed views on whether new technology creates or destroys jobs. While 76% of all respondents expect new technology to make some jobs redundant, 58% expect it to create new types of jobs and 63% expect it to change the skills employers look for.

Female respondents are slightly less optimistic than males that new technology will create new types of jobs, with 54% of females saying it would compared to 62% of males.



All of this points to a need for young people to be better informed about the disruptive impacts and opportunities that technology is opening up in the workplace. PwC's "Future of Work"<sup>12</sup> report found that over half (53%) of 10,000 adult consumers surveyed across China, Germany, India, the UK and the US thought technology breakthroughs would transform the way people work over the next five to ten years. And with many traditionally male manufacturing jobs already having been automated, more female-orientated office and clerical jobs are next in line. Both genders need to adapt to this reality – and a better understanding of technology will help them do this.

As well as recruiting people with digital skills, organisations need to upskill their workforce to be adaptive, creative and critical thinkers. With the current pace of technological change it is hard to predict what jobs will look like in the future, so it is important that employees are able to respond to the next skills challenge. PwC's Global CEO Survey<sup>13</sup> revealed that the skills most in demand are people-orientated skills such as adaptability and problem-solving (98% of UK CEOs rate them as important), leadership and collaboration (both 96%) and creativity and innovation (both 93%). Those that can display these skills will be in high demand.



<sup>10</sup><http://www.bbc.co.uk/news/business-34715962>

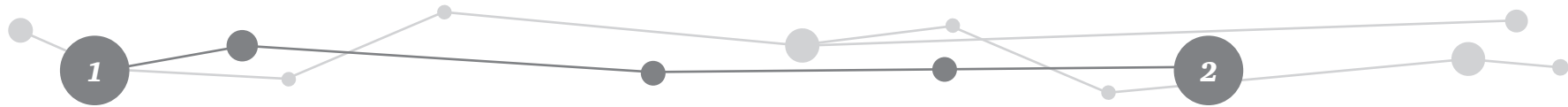
<sup>11</sup>Source: <http://healthmarketinnovations.org/blog/developing-countries-lead-way-mobile-health-technologies>

<sup>12</sup>Source: <http://www.pwc.com/gx/en/issues/talent/future-of-work/journey-to-2022.html>

<sup>13</sup>[www.pwc.com/davos](http://www.pwc.com/davos)

## ***Our call to action: four steps to take***

Taken together, the three key themes emerging from our research point to four actions to boost the number of women working in technology. These are:



### ***The technology industry could play a greater role in educating students about technology and how it's shaping the world we live in***

It's clear from our research that students don't have enough information about what working in technology involves.

The technology industry could work with the education system to develop technology teaching modules that can be delivered in schools by teachers or via virtual reality. These should be designed to educate students on the emerging technology that is reshaping our working and personal lives. It is important these modules particularly highlight how technology can be a force for good, which should help inspire more females to take an interest in the subjects.

And this engagement needs to happen at a much earlier age, before students decide which subjects they will take for GCSE. More interaction with technology companies at school level will benefit both females and males and help to grow the pipeline of technology talent that we need in the UK. The key is to ensure that technology is presented to girls as a potential career choice by people in positions of influence: today it's hardly even mentioned to them as a possibility.

There is a real opportunity for the industry and education sector to work together to help build the technology skills the UK will need to prosper in the future. Educating and inspiring all students about technology careers at a much younger age will help to future-proof young people with the skills needed and help to build a rich talent pipeline. This will help ensure that no-one is left behind by the Fourth Industrial Revolution.

### ***As well as awareness, we need to increase access to technology careers***

Greater awareness of the technology industry and the opportunities available is not enough unless all students feel that a career in technology is within their reach. There needs to be a collective effort from the technology industry to create alternative entry routes into the profession. Approaches might include increasing the availability of apprenticeships in technology, technology companies partnering with universities and offering shadowing and work experience opportunities at younger ages.



3

***You can't be what you can't see: The importance of visible role models at all levels***

To get more females interested in technology as a viable career option we need to give them access to more role models at all levels. We need to shout louder about the role models already working in tech and work harder to promote more women to top positions in the industry so that they become more visible.

4

***Help women to reach their full potential in the industry***

We need to make sure that the technology sector provides an attractive and inclusive working environment and that people are able to reach their full potential. So as well as attracting more females into the sector, we need to make sure that they can progress once they're working there. This requires a dedicated focus. Technology organisations could set themselves gender targets and a programme of initiatives to support women to advance to more senior positions. This could include reverse mentoring, return to work schemes to get women into technology roles following career breaks and sponsorship programmes for high performing females.



For more information about this report, or if you would like to share your ideas for how we can get more women into technology careers, please get in touch.



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***Please get in touch to discuss our research further, or to share your ideas on how we can get more women into technology careers.***

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