McKinsey
Global Institute

The future of women at work in the United Kingdom

Briefing note

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June 2019

Technological change, notably the adoption of digital, automation, and artificial intelligence (AI) technologies, is transforming the way many of us work. Observers of this phenomenon have long asked how automation may affect the working lives of men and women differently, and new research from the McKinsey Global Institute (MGI) attempts to answer that question.[1] MGI has developed several scenarios of automation and job creation to help model how the future of work could affect women and men. We find that the impact of automation on potential job displacement, as well as potential for additional jobs created as the result of shifting population dynamics and growing incomes, could be roughly of the same order of magnitude for men and women globally. However, women could find it more challenging to adapt to what will be a period of disruptive change and to capture future opportunities associated with these new technologies.

Globally, automation could require between 40 million to 160 million women (depending on the pace of automation) and between one million and four million women—or 8 to 29 percent of women employed in 2017—in the United Kingdom to make transitions between occupations by 2030, often into higher-skilled roles.[2] If women are able to make these transitions, they could find more productive, better-paid work; if they are not, they could face wage pressures or could even leave the labour market entirely. Interventions from government and the private sector will be needed to support women in making the changes necessary for them to thrive in the future world of work.

In this briefing note, we explore prospects for women and work in the automation age in the United Kingdom, drawing on new global MGI research that is the latest publication in our ongoing exploration of the future of work as automation and AI technologies diffuse.[3] This work complements MGI's research on the "power of parity" that has, over the past four years, explored trends in gender inequality in work and society around the world, and what can be done to narrow the gender gap.[4] In this note, we also look at growing labour demand in the UK tech sector and tech-enabled occupations, whether women are positioned to tap into that demand, and what can be done to enable them to do so.

Advancing women's equality could boost UK GDP

In 2015, MGI found that countries could add $12 trillion to GDP by 2025 by advancing women's equality.[5] This figure was based on a scenario in which all countries matched the progress toward gender parity of the country in each region that had made most progress toward this goal: a best-in-region scenario. In 2016, MGI looked at the potential economic gains from advancing women's equality in the United Kingdom.[6] We found that if every region of the United Kingdom matched the progress toward parity of the best-performing region, an additional £150 billion could be added to GDP by 2025—more than 5 percent.

At a time when the UK economy faces a great deal of uncertainty related to Brexit, and when productivity growth has been disappointing, this is a prize well worth pursuing. In the aftermath of the financial crisis, the United Kingdom recorded one of the lowest productivity growth rates and steepest declines in productivity growth of comparable mature economies, falling by about 90 percent.[7] From 2008 to 2018, productivity grew at only 0.3 percent a year, significantly below the average of 2.3 percent from 1971 to 2007.

As we enter the automation era, women face new challenges overlaid on long-established ones that have held back their journey toward gender equality in work. In the four years since MGI's original global research, gender inequality in work is still higher than gender inequality in society. For its global research on the power of parity, MGI mapped 15 indicators of gender equality in society and work and compiled them into a gender parity score, or GPS.[8] This year, MGI has updated the GPS, and found that that the global GPS for gender equality in work has risen only marginally, indicating only very slight progress toward parity.

In the rest of this briefing note, we explore potential jobs lost (jobs that could be displaced due to automation), jobs gained (jobs that could be added due to economic growth, investment, and demographic changes), and net jobs (the net increase or decrease in jobs based on additions and losses). We also look at the transitions between occupations that millions of women globally and in the United Kingdom may need to navigate, and what interventions may be needed to enable women to do so (for a summary of our findings, see Exhibit 1).

Exhibit 1

The future of women at work in the United Kingdom

Economic and demographic context

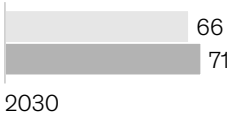
Per capita GDP, $ thousand PPP, 2017

43

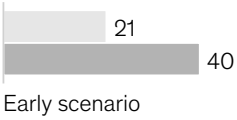
Female labor-force participation rate, 2017

57%

Population, Million



% of work activity hours automatable by 2030[1]



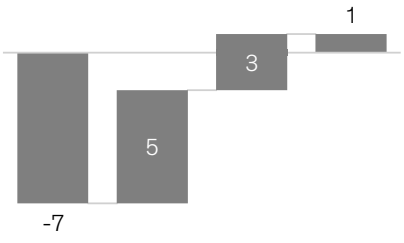
% aged over 65

How women are positioned for the future

Women Men

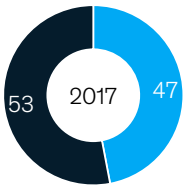
1.4M–4.5M women and **1.7M–5.4M** men may have to transition between occupations or skill levels by 2030

Change in total male and female labor demand in the period to 2030, Million



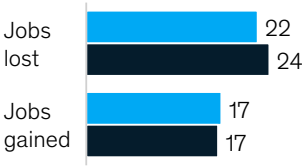
% of 2017 employment: 23 | 17 | 8

Share of employment,[2] %



Female share of employment could increase by **0–1 pp** by 2030

Potential effects on employees by 2030, % of 2017 base employment

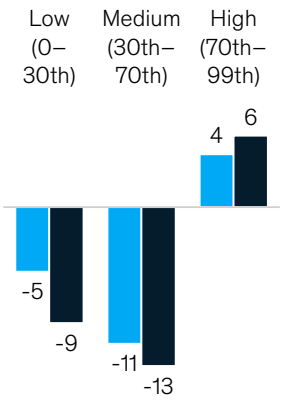


Net jobs demanded by wage level and education

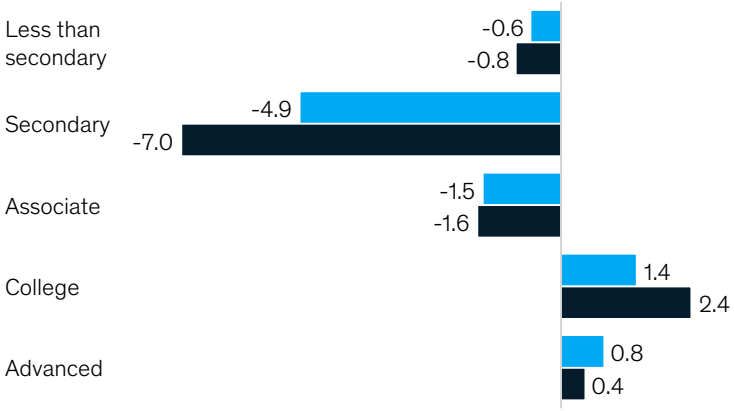
Women Men

% change relative to employment by gender in the period to 2030

By wage level (relative to tercile employment)



By education (relative to total employment)



[1] For detail on automation scenarios, see the technical appendix of *The future of women at work: Transitions in the age of automation*, McKinsey Global Institute, June 2019.
[2] Based on a trend-line scenario for jobs gained and a midpoint automation scenario. Analysis excludes jobs created in new occupations.
[3] Historical analysis suggests that 8-9% of the 2030 labor supply could be employed in entirely new occupations.
Note: Figures may not sum to 100% because of rounding.

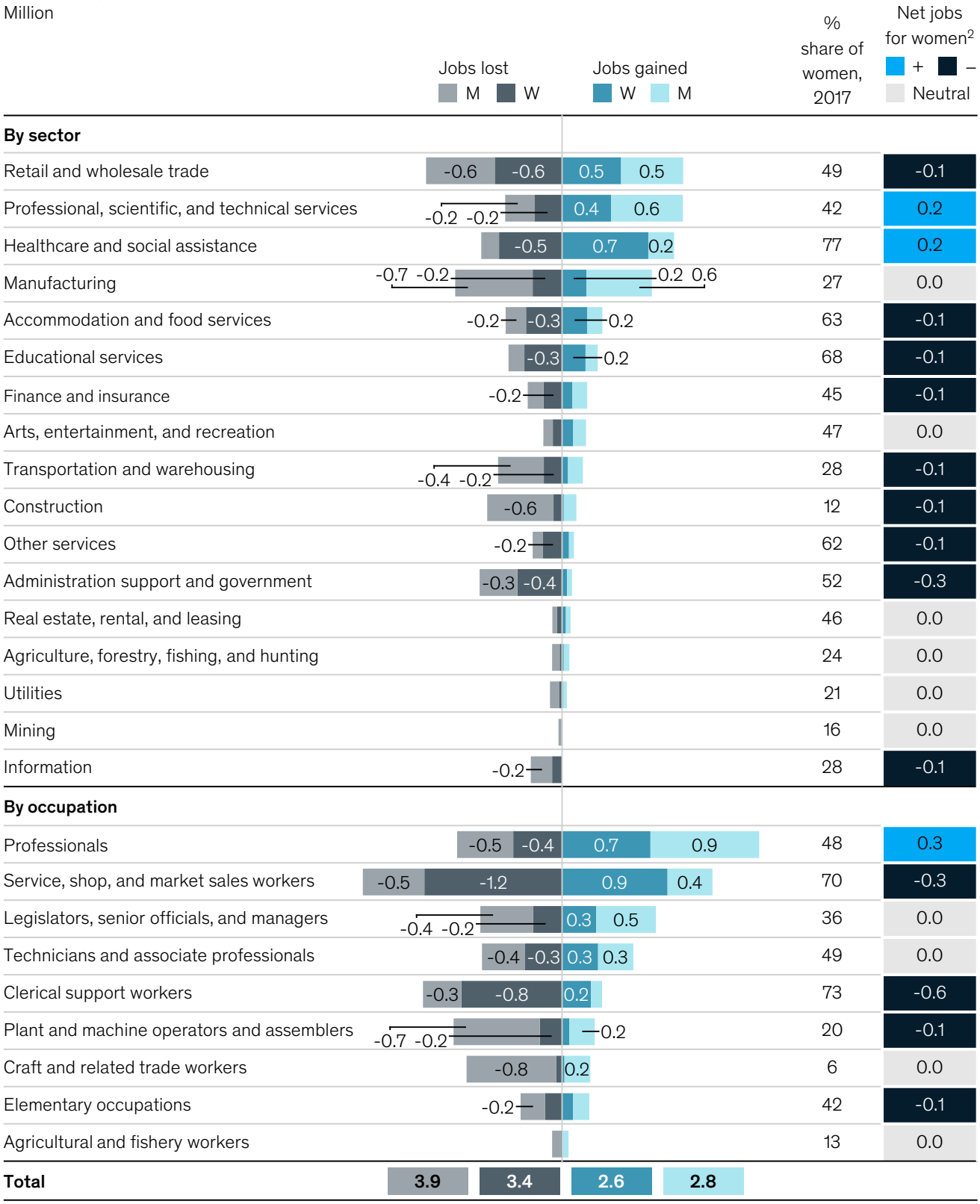
Source: ONS, 2017; ILO, 2017; World Bank, 2018; UNDP World Population Prospects, 2017; McKinsey Global Institute analysis

Exhibit 1 (continued)

The future of women at work in the United Kingdom

Sector and occupation shifts

Incremental jobs gained or lost in the period to 2030,[1]
Million



[1] Based on a trend-line scenario for jobs gained and a midpoint automation scenario.
[2] Assumes current level of female representation across sectors and occupations stays the same.
Note: Data labels <0.2 not shown.

Source: ONS, 2017; ILO, 2017; World Bank, 2018; UNDP World Population Prospects, 2017; McKinsey Global Institute analysis

Women could experience slightly less job displacement by automation, but similar potential for additional job demand, as men

The share of women whose jobs are displaced by automation could be slightly lower than the share of men, but women could gain jobs on a similar scale to men in terms of share of their employment.[9] Our main scenario to 2030 is based on "midpoint" automation adoption, which assumes that automation occurs on a similar scale to that of other major technological disruptions in the past, and job creation driven by economic growth, investment, demographic changes, and technological innovation at a similar pace as current trends.[10] The midpoint scenario is illustrative rather than predictive, but helps us to understand how automation may play out across sectors and occupations for men and women.[11]

Looking at the potential for job displacement first, we find that 22 percent of employed women in the United Kingdom could be displaced by automation by 2030, compared with 24 percent of men (as a share of their 2017 employment). In absolute numbers, that is three million women and four million men (Exhibit 2).[12] The figures are similar to those in other mature economies. In Germany, for instance, 21 percent of women could be displaced by automation, compared with 22 percent of men; in France, the equivalent figures are 22 and 23 percent. Generally, we see a 1 to 2 percentage point difference between genders. Across these economies, women are only slightly less at risk of job displacement from automation than men.

While automation will displace many jobs (or tasks within jobs), demand for workers could increase as economies grow, partly fuelled by productivity and income growth enabled by technological progress. There will be job gains. Rising incomes and consumption especially in developing countries, increasing healthcare for aging societies, and investment in infrastructure and energy are among trends expected to create demand for work that could offset the displacement of workers. Women and men in the United Kingdom are comparably placed to capture these potential job gains assuming patterns of male and female employment in each sector and occupation continue from the present day to 2030.

In the United Kingdom, 17 percent of both women and men could gain jobs from rising demand by 2030. Again, this is broadly in line with the finding for the six mature countries in the MGI sample where, on average, 18 percent of women could gain jobs, compared with 17 percent of men. In Europe as a whole, there tends to be a 1 to 2 percentage point difference between men and women. In Germany, men are slightly better positioned for job gains than women at 24 and 23 percent, respectively. In France, 16 percent of men may gain jobs versus 15 percent of women (Exhibit 3).

Entirely new occupations could be created, but women may find it more challenging than men to fill these jobs

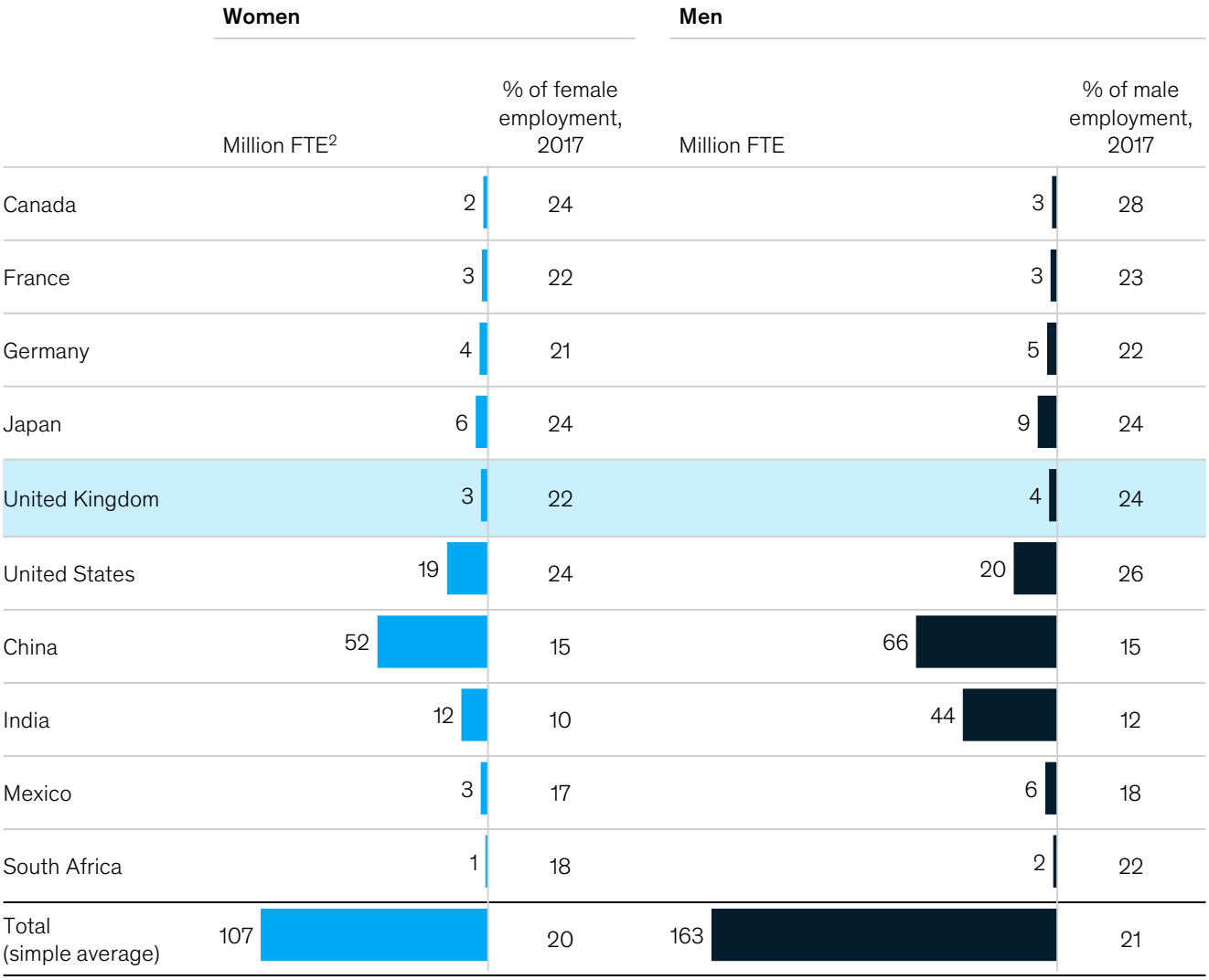
Waves of technological innovation displace or change the nature of many jobs, but they also create new ones. Historical trends in the United States that are applicable to other countries including the United Kingdom suggest that up to 9 percent of the employed population could be working in entirely new occupations by 2030.[13]

However, employment in new occupations may be more challenging for women than for men. MGI analysis of 135 recently created US occupations defined by O*NET in 2009 found that approximately 60 percent of jobs were in occupation categories that are male dominated, and only 16 percent female dominated.

Exhibit 2

Women may be slightly less at risk of being displaced by automation than men in the United Kingdom

Jobs at risk of being displaced by automation by 2030[1]



1 Based on a midpoint automation scenario.
2 Full-time equivalent.
Note: Countries ordered based on mature and emerging economies, and alphabetically within each group.

Source: ILO, 2017; NSS; INEGI; China Population Census; South Africa Quarterly Labour Force Survey, 2018; CPS IPUMs; ONS, 2017; Japan National Survey; Eurostat, 2015; Statistics Canada, 2016 Census; McKinsey Global Institute analysis

Exhibit 3

Before factoring in potential job losses, both women and men in the United Kingdom could expand their current employment by 17 percent

Demand for jobs in 2030, assuming constant female and male share of employment in sectors and occupations[1]

	Women		Men	
	Million FTE	% of female employment, 2017	Million FTE	% of male employment, 2017
Canada	2	24	2	23
France	2	15	2	16
Germany	4	23	5	24
Japan	2	8	3	6
United Kingdom	3	17	3	17
United States	15	19	14	18
China	112	33	120	28
India	23	19	91	24
Mexico	6	29	8	25
South Africa	1	13	1	9
Total (simple average)	171	20	250	19

[1] Figures represent a trend-line scenario of job creation that is based upon current spending trends, and excludes demand for entirely new occupations. In a forthcoming 2019 MGI report on the future of work in the United States, we will explore another scenario.

Note: Countries ordered based on mature and emerging economies, and alphabetically within each group. Analysis excludes jobs created in new occupations and unsized labor demand.

Source: ILO, 2017; NSS; INEGI; China Population Census; South Africa Quarterly Labour Force Survey, 2018; CPS IPUMs; ONS, 2017; Japan National Survey; Eurostat, 2015; Statistics Canada, 2016 Census; McKinsey Global Institute analysis

The composition of potential jobs lost to automation and demand for jobs varies because men and women tend to cluster in different sectors and occupations

While the impact of automation may be similar for men and women, the composition of job displacement and job gains could vary significantly because of long-standing gender differences in which occupations and sectors men and women tend to work.[14]

Globally, services and clerical support occupations could, on average, account for 52 percent of women's jobs displaced by automation, but only 27 percent of men's. By contrast, machine operation and craft work occupations could account for more than 40 percent of male jobs displaced, on average, compared with 15 percent for women. Women are well-represented in the fast-growing healthcare sector, which could, on average, account for 25 percent of potential jobs gained, compared with just 7 percent for men. Both men and women could gain jobs in professional, and in legislator, senior official, and manager occupations that include many of the high-paying positions created by the tech sector.

Similar patterns can be observed in the United Kingdom. More than 32 percent of women in the United Kingdom are today employed in service occupations, compared with 13 percent of men. By contrast, 23 percent of men work in machine operator or craft worker occupations, compared with 4 percent of women. Further, the healthcare sector employs 21 percent of total female workers and the education sector 15 percent, while 13 percent of male workers are found in each of the manufacturing, construction, and retail and wholesale trade sectors.

In the case of potential jobs displaced in the United Kingdom, women's jobs are most likely to be displaced in retail and wholesale trade, healthcare, and administration and government, accounting for 44 percent of potential job displacement. The top three sectors for men are manufacturing, retail and wholesale trade, and construction, accounting for 46 percent of total job displacement.

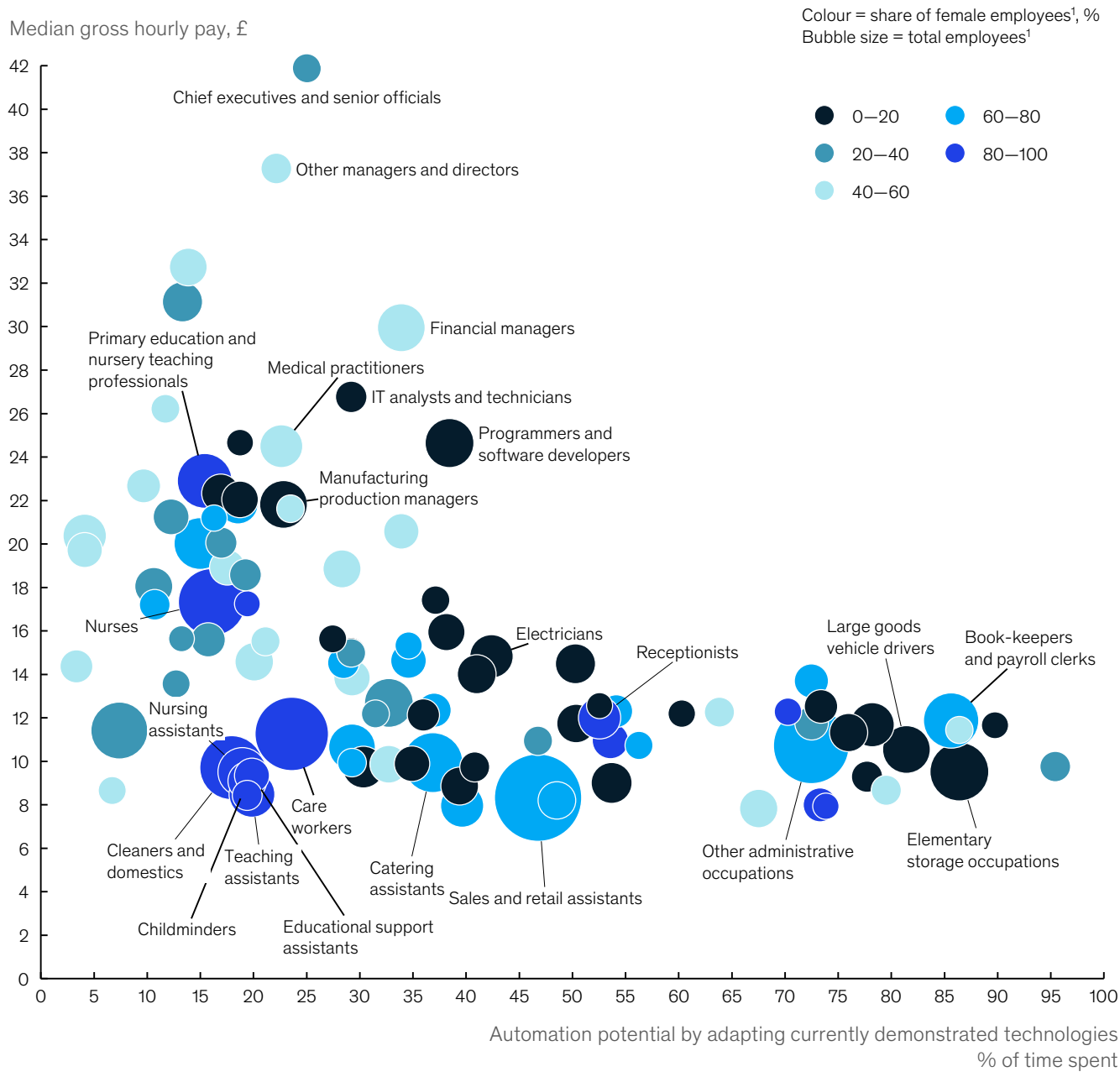
For jobs gained, the healthcare and professional, scientific, and technical (PST) services sectors could fuel the majority of employment growth in the United Kingdom, together accounting for 36 percent of all jobs potentially gained. Women are well-positioned in healthcare, where they could obtain 77 percent of the sector's job gains, while men could gain the majority of jobs in PST (59 percent of job gains). We note that PST includes less purely "technical" subindustries such as accounting, marketing, and consulting where women have relatively strong representation. However, in tech industries, which are another subset of PST and which could be a major source of future employment, women account for only around 15 percent of employees.

We took a closer look at occupations in the United Kingdom. Firstly, we found that there are occupations in which women tend to be strongly represented—for example, sales and retail assistants or administrative occupations—that tend to have relatively high automation potential. We also found that women tend to dominate certain care-centric occupations that are less susceptible to automation, including care workers, nurses, and childminders (Exhibit 4).[15] These occupations use social and emotional skills in face-to-face interactions that machines are less likely to replicate and replace, and could experience significant net growth as the country's population ages and incomes rise. However, some of these jobs like care workers and nursing assistants tend to be relatively lower paid, which in turn could impact the economic viability of automation. In contrast, certain professional and technical occupations where men tend to dominate are relatively high paid—such as programmers and software developers—and could also experience net job growth.

Exhibit 4

Care-centric occupations in the United Kingdom tend to be female-dominated and less easily automated, but are also less well remunerated

UK occupations by automation potential, wage, size and gender balance, 2018



[1] Q2 2018; not seasonally adjusted; includes part-time and self-employed people; top 100 occupations by employment, representing 70% of employees, shown.

Source: McKinsey Global Institute automation model; ONS; McKinsey & Company analysis

Between one million and four million employed women in the United Kingdom may need to transition between occupations, often into higher-skilled roles

Worldwide, 40 million to 160 million women—7 to 24 percent of those currently employed—may need to transition between occupations to ensure that they are positioned for shifts in labour demand.[16] For men, the range is comparable at 8 to 28 percent. The lower end of these ranges assumes a midpoint automation scenario and the upper end a rapid automation scenario. In the United Kingdom, between one million and four million, or 8 to 29 percent of women currently employed, may need to make such transitions (Exhibit 5).

For the United Kingdom and other mature economies, many of these transitions will need to be into higher-skill, higher-wage jobs as these are the kind of jobs that will most be in demand. Our analysis suggests that net demand will only grow for jobs in the top wage tercile and those that require a university degree or higher in the period to 2030 in the United Kingdom.[17] Men could see more demand for high-wage jobs than women, in part due to women's low representation in high-wage tech jobs.

Demand for low- and middle-wage jobs may contract by 2030 in the United Kingdom. Low-wage workers could be somewhat less at risk of job loss than those earning medium wages because the former may not justify the cost of automation. Moreover, middle-wage workers tend to be in jobs that have high automation potential such as plant and machine operating occupations and jobs that involve data gathering and basic data manipulation. Men in low- and medium-wage occupations may face greater displacement—and therefore more need to make transitions—than women in similarly paid occupations.

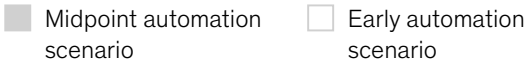
Today, women in the United Kingdom are under-represented in the highest-paying occupations. In 2017, 41 percent of UK men are employed in the two highest-paid occupational categories (professionals and legislators, senior officials and managers) compared with only 34 percent of women. Looking ahead to 2030, both women and men could increase their share of workers in these occupations. Our scenario suggests that if women are able to gain the necessary skills and successfully navigate the occupational transitions we have discussed, they could be on a path to more productive and lucrative employment. By 2030, 38 percent of women in the United Kingdom could be employed in the two highest-paid occupational categories, compared with 47 percent of men. However, if women do not successfully develop their skills to a higher level, enabling them to transition into higher-wage occupations such as those in tech, there is a risk that women remain stuck in relatively low-wage employment.

Some women may even leave the labor force entirely if they are not able to make the necessary occupational transitions. A reduction in demand for low- and middle-wage workers could cause displaced men increasingly to compete for jobs with low- and middle women, exerting downward pressure on wages. Evidence suggests that the labour supply of women is typically more responsive to wage pressure than that of men. For instance, one meta-analysis found that the wage elasticity of labour supply for women may be as much as five times that of men in certain mature economies.[18] Women may, therefore, leave the labour market more readily than men when facing pressure on their wages. The risk of women leaving paid employment may be higher in the United Kingdom than in other comparable economies because childcare costs are significantly higher. Women in the United Kingdom are more likely than their counterparts in most other European countries to choose to reduce their working hours to care for children further.[19]

Exhibit 5

Around one million to four million women in the United Kingdom may face a need to transition between occupations and skill sets by 2030 to remain employed

Occupational transitions



	Women		Men	
	Million FTE	% of women employed, 2017	Million FTE	% of men employed, 2017
Canada	1–3	8–30	1–3	9–36
France	1–4	10–30	2–5	11–33
Germany	1–5	6–24	2–7	8–32
Japan	4–10	15–39	7–17	17–43
United Kingdom	1–4	8–29	2–5	10–33
United States	8–24	10–34	9–28	10–33
China	4–36	1–10	8–67	1–15
India	1–11	0–8	2–27	0–7
Mexico	<1–3	2–12	1–5	2–15
South Africa	1–2	9–26	1–3	13–37
Rest of the world[1]	17–61	5–19	23–107	5–23
Total (simple average)	39–162	7–24	58–275	8–28

[1] Extrapolated by mapping countries in the world to the most similar of the 10 countries studied in this report (53 countries in total) by applying rates of transition by gender to employment for each country.

Note: Countries ordered based on mature and emerging economies, and alphabetically within each group. Analysis excludes jobs created in new occupations and unsized labor demand. Figures represent a trend-line scenario of job creation. In a forthcoming MGI report on the future of work in the United States, we will explore another scenario.

Source: ILO, 2017; NSS; INEGI; China Population Census; South Africa Quarterly Labour Force Survey, 2018; CPS IPUMs; ONS, 2017; Japan National Survey; Eurostat, 2015; Statistics Canada, 2016 Census; McKinsey Global Institute analysis

Women will need to be skilled, flexible and mobile, and tech-savvy, and will need measures to overcome challenges on all three

Men and women need to be skilled, mobile, and tech-savvy in the automation age, but women face pervasive barriers on all three that could make navigating transitions particularly hard. Concerted and creative new solutions—tailored for women's particular challenges—are needed to enable them to position themselves for the future of work. In this section, we first discuss skills and mobility, and then focus on the challenge in tech in more depth.

As millions of women and men in the United Kingdom transition from their existing jobs into new occupations or sectors—or, indeed, remain in their current jobs but have to adapt to working alongside automated systems—they will need to develop new skills that the labour market will demand. Women could find attending vocational training and other reskilling programmes more challenging than men because so many of them carry the "double burden" of paid work and unpaid care work in the home. In the United Kingdom, women do more than 1.8 times the hours of unpaid care work as men. Moreover, women may find the cost of retraining more prohibitive than men. A number of interventions can help to level the playing field including more company provision of training and government subsidies to enable more women to undertake training, and improved transparency about trends in labour demand so that skills can be matched more effectively to where the jobs are likely to be.

Family responsibilities and social norms tend to make women less mobile than men. Women tend to have less access to professional networks than men, and therefore may be less aware of potential employment and career opportunities, compromising their ability to make necessary transitions. Stereotypical views about the types of occupation and sectors in which women (and men) should work are another barrier to mobility. Tailored interventions can help women balance unpaid care work, foster dynamic career paths and networks, and reduce stereotyping. Digital and internet technologies open many doors to opportunity for women, helping to break down barriers to mobility by, for instance, teleworking or in the gig economy, and lowering entry barriers to forming their own businesses by operating in e-commerce.[20]

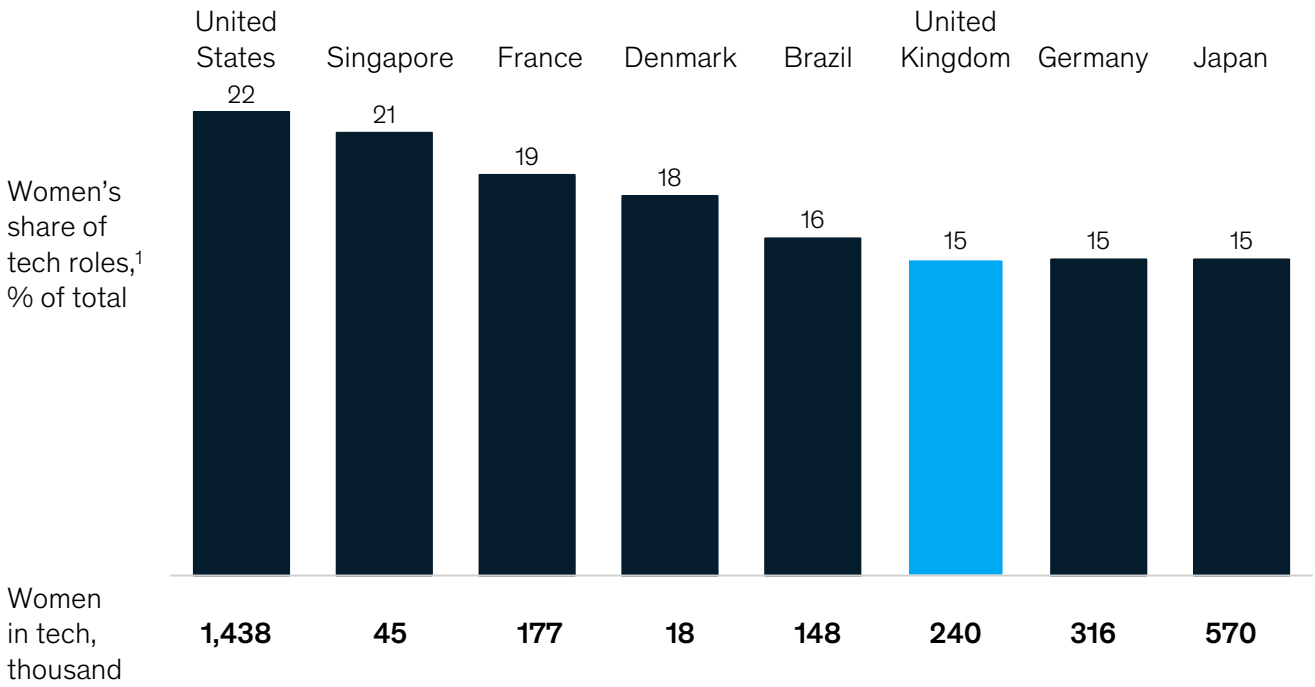
Beyond the power of technology to overcome other barriers, there is a growing imperative for women to be equipped to take advantage of demand for labour that is shifting in the United Kingdom (and in other countries) toward the tech sector and tech-enabled occupations. As discussed earlier, tech is a sector that is expected to grow in the United Kingdom, and in which women are currently underrepresented. Increasing the role of women as creators of technology is important to tap into the benefits of diverse teams. And technology is also going to become an increasing part of all occupations. For example, MGI research finds that there will be a 55 percent increase in the amount of time workers spend using technological skills such as programming or basic digital skills between now and 2030 in the United States and Europe.[21]

However, the United Kingdom has a material gender tech gap. The gap opens up early. Stereotypes can influence parents' expectations and children's attitudes toward different subjects.[22] Girls tend to feel significantly less confident about a career in science, technology, engineering, and math (STEM).[23] As a result, despite doing better academically (except in chemistry), fewer girls in the United Kingdom study core science subjects at A-level. By the time they enter higher education, the gender gap is significant.[24] Among first-year full-time students pursuing higher education in the United Kingdom, only 37 percent of women studied science subjects in 2016–17 versus 48 percent of men.[25] Moreover, more than 40 percent of women who do pursue science careers do so in medicine, dentistry, and allied subjects, compared with 13 percent of men. Only around 8 percent of female first-time full-time students—in contrast to 29 percent of males—study physical, mathematical, computer, or engineering and technology sciences. This has contributed to concern that women are not acquiring the skills needed for or participating in high-growth STEM fields.[26]

This gender imbalance in higher education has, in turn, led to a situation in which women account for only 15 percent of employees in the UK tech industry.[27] This is far lower than the 22 percent in the United States and 21 percent in Singapore (Exhibit 6). Women may also be less involved in the creation of technology-enabled businesses. In part this could be influenced by a funding gap for women entrepreneurs. In 2017, all-male founding teams received 89 percent of UK venture capital investment, while all-female teams received less than one percent.[28]

Exhibit 6

Representation of women in tech is relatively low in the United Kingdom



[1] Mapped country-specific occupation databases to the ISCO08 ILO occupation database. Note that the definition of tech roles varies by country. In general, tech roles within the ISCO08 ILO occupation database were defined as applications programmers, computer network and systems technicians, computer network professionals, database and network professionals not elsewhere classified, database designers and administrators, electrical engineering technicians, electrical engineers, electronic engineers, engineering professionals not elsewhere classified, information and communications technology operations technicians, information and communications technology services managers, information and communications technology user support technicians, mechanical engineering technicians, mechanical engineers, software and applications developers and analysts not elsewhere classified, software developers, systems administrators, systems analysts, telecommunications engineers, web and multimedia developers, and web technicians

Source: National statistics offices and government data; *The diversity opportunity in tech*, McKinsey & Company, forthcoming; McKinsey & Company analysis

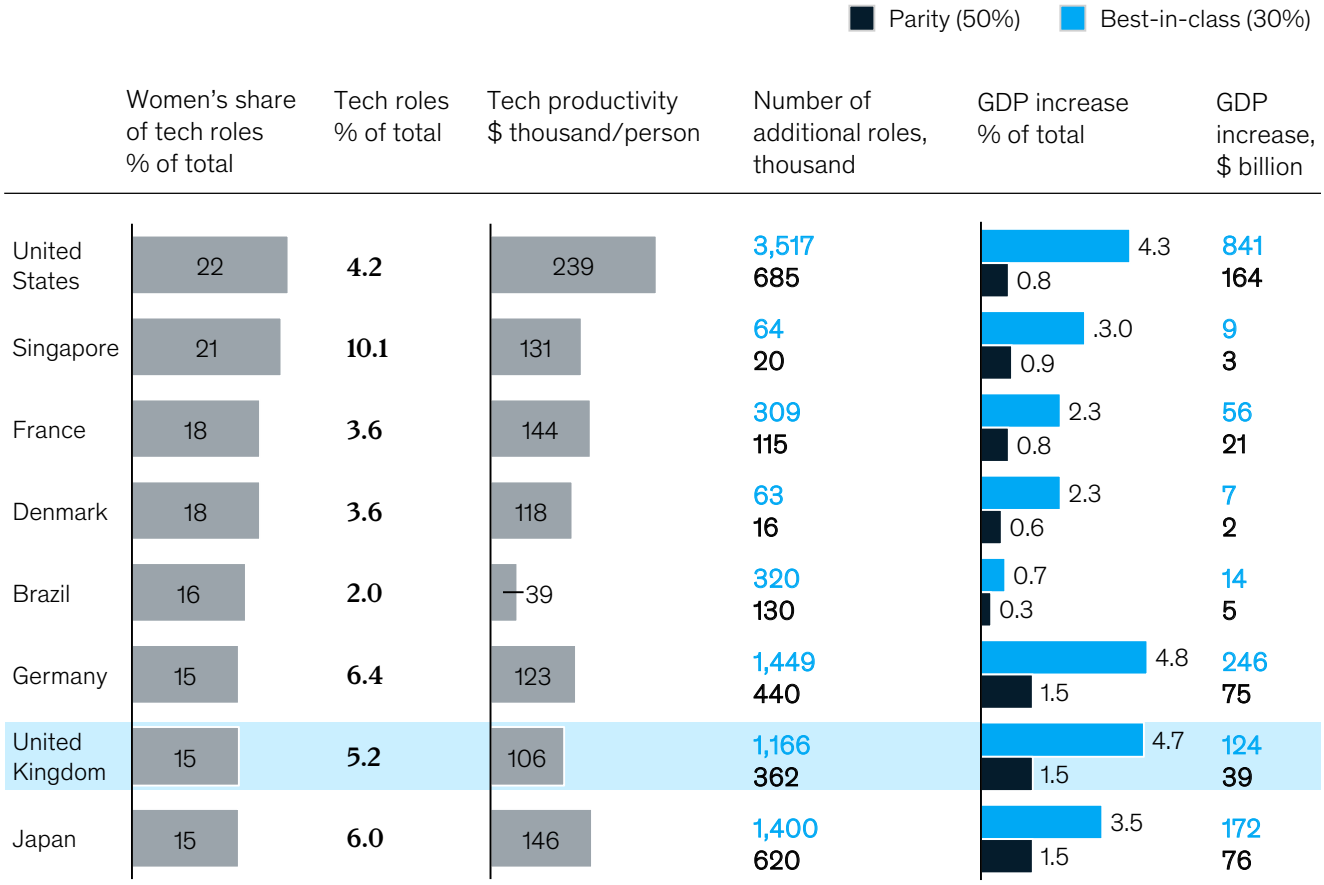
If the United Kingdom were to fully close the gender gap in tech in terms of females employed in the sector, we estimate that it could boost GDP by $39 billion to $124 billion, an increase of close to 5 percent (Exhibit 7).[29] Achieving parity in tech occupations in this manner could impact growth across tech and tech-enabled sectors, closing tech talent gaps that are seen as challenges for growth. In an era in which adoption of automation and AI is increasingly critical to the bottom line for companies, this prize is significant.[30] While these talent gaps could also be closed by men, these figures give a sense of opportunity from expanding and tapping into female talent pools. Equipping more women to work in this sector would undoubtedly help to fill at least part of the tech skills gap faced by the United Kingdom. It is also important to ensure equality of opportunity to enable both women and men to step into careers of their own choosing without barriers.

We suggest three key imperatives to support women to increase their participation and compete in an increasing tech-enabled labour market: (1) attracting female talent into tech roles; (2) maximising the impact and success of female tech talent in companies; and (3) developing a more inclusive image in tech education, industry and society.[31]

1. **Attract female talent into tech careers and roles.** Developing more tech talent is an imperative in the United Kingdom. One study predicts a shortage of core and related engineering roles of between 83,000 and 110,000 per year through 2024.[32] Many UK companies in the tech sector and beyond are making active efforts to attract diverse talent to STEM education and careers, but these efforts tend to be fragmented and on the whole have not succeeded in raising low interest in technology among women. There is scope for companies to review their investment in the talent pipeline to address this issue, including expanding philanthropic initiatives to invest in early interventions for women and girls, create women's technical reskilling initiatives, and

Exhibit 7

If the United Kingdom closed its tech gender gap, GDP could increase by up to 5 percent



Source: The Conference Board, 2017; OECD, 2017; Singapore Ministry of Manpower Data, 2017; National statistics on current number of women in tech, 2017; *The diversity opportunity in tech*, McKinsey & Company, forthcoming; McKinsey & Company analysis

address potential recruitment biases. One such initiative is Step into Stem, a mentoring and work experience program for female students in London supported by corporate partners BT Group, O2, Vodafone, and Ericsson.[33]

2. **Maximise the impact and success of female tech talent in companies.** Even when companies are successful in attracting top female talent, they still face relatively high attrition rates. Women account for 17 percent of professionals in tech, a share that falls to 11 percent at the executive level.[34] Companies could develop a compelling business case for gender diversity in tech, and ensure that frontline managers making hiring and promotion decisions take the business case into consideration. SAP incorporates anti-bias features into its software that includes a tool that triggers a notification when a woman's rating is reduced after a leave of absence or if a strong performer is overlooked for promotion.[35] Additional measures should be considered to help female employees balance family and paid work including expanding maternity (and paternity) benefits, increasing flexible work options, and offering programmes for women re-entering the workforce. London-based investment firm M&G offers childcare vouchers to employees to subsidise costs. AECOM, Lloyds Banking Group, and the Civil Service among others offer returner programmes to workers re-entering the workforce after an extended break.[36]
3. **Build a more inclusive image for tech in society.** Tech products, services, and communications can perpetuate the stereotype that tech is a "male" preserve, limiting girls and young women's interest in pursuing technical careers. A Microsoft survey of girls in the United Kingdom found that girls with a female role model in STEM—fictional and nonfictional—were 60 percent more likely to imagine themselves pursuing a career in a STEM discipline then those without a role model.[37] Companies and organizations should partner do more to tackle gender stereotyping and increase the number and visibility of female role models. Organisations including the Women's Engineering Society and ScienceGrrl are working to challenge stereotypes and inspire girls and women to pursue careers in STEM fields.[38]

In summary, the impact of digitization, automation, and AI will transform the workplace for both women and men. This creates an opportunity for women in the United Kingdom to shift into higher-paid, higher-skilled occupations—but only if there is concerted action to remove barriers women disproportionately face when making these transitions. If successful, such action could see the United Kingdom simultaneously increase its female share of tech workers and tackle a growing need for skilled workers, enabling economic growth.

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Further MGI reading

A future that works: Automation, employment, and productivity, January 2017.

Jobs lost, jobs gained: Workforce transitions in a time of automation, McKinsey Global Institute, December 2017.

Independent work: Choice, necessity, and the gig economy, McKinsey Global Institute, October 2016.

Skill shift: Automation and the future of the workforce, McKinsey Global Institute, May 2018.

Solving the productivity puzzle: The role of demand and the promise of digitization, February 2018.

The future of women at work: Transitions in the age of automation, McKinsey Global Institute, June 2019.

The power of parity: Advancing women's inequality in the United Kingdom, McKinsey Global Institute and McKinsey & Company United Kingdom, September 2016.

The power of parity: How advancing women's equality can add $12 trillion to global growth, McKinsey Global Institute, September 2015.

Endnotes

[1] *The future of women at work: Transitions in the age of automation,* McKinsey Global Institute, June 2019.
[2] Extrapolated by mapping countries in the world to the closest similar of the ten countries studied in global report (53 countries in total) by applying rates of transition by gender to employment for each country
[3] The research used MGI's models on automation and the future of work to create a scenario for the future of work for women and men. We drew out differences in patterns of impact in the period to 2030 in ten countries (six mature economies and four emerging economies) that account for about half of the world's population and that are representative of a wide range of demographic profiles, stages of economic development, and progress toward gender parity. See *A future that works: Automation, employment, and productivity,* McKinsey Global Institute, January 2017; *Jobs lost, jobs gained: Workforce transitions in a time of automation,* McKinsey Global Institute, December 2017; and *Skill shift: Automation and the future of the workforce,* McKinsey Global Institute, May 2018.
[4] *The power of parity: How advancing women's equality can add $12 trillion to global growth,* McKinsey Global Institute, September 2015. Since its original 2015 global research, MGI has looked at gender inequality in France and Western Europe, India, the United States, the United Kingdom, Canada, the Netherlands, and Asia Pacific. All reports can be downloaded at https://www.mckinsey.com/mgi/our-research/productivitycompetitiveness-and-growth.
[5] *The power of parity: How advancing women's equality can add $12 trillion to global growth,* McKinsey Global Institute, September 2015.
[6] *The power of parity: Advancing women's inequality in the United Kingdom,* McKinsey Global Institute and McKinsey & Company United Kingdom, September 2016.
[7] *Solving the United Kingdom's productivity puzzle in a digital age,* McKinsey Global Institute, September 2018.
[8] A GPS score of zero represents no gender parity, while 1.0 represents full gender parity. For instance, a GDP score of 0.95 indicates that 5 percent further progress is needed before full gender parity is attained. See *The power of parity: How advancing women's equality can add $12 trillion to global growth,* McKinsey Global Institute, September 2015.
[9] In this analysis, we assume "jobs" are equivalent to FTEs. For more detail, see the technical appendix of *The Future of women at work: Transitions in the age of automation*
[10] For more detail, see *Jobs lost, jobs gained: Workforce transitions in a time of automation,* McKinsey Global Institute, December 2017.
[11] A key assumption of our model is that we hold the representation of women and men within each sectoral and occupational cross-section constant from 2017 to 2030; this approach was designed to test how well-positioned women were for the future of work given their current representation in the workforce. It also reflects historical trends we have observed in the workforce. It is not meant as a forecast of how women are likely to participate in the economy in the future.
[12] The percentage of potential jobs lost is somewhat higher than the average of six mature economies and four emerging ones (China, India, Mexico, and South Africa), where MGI found that an average of 20 percent of working women, or 107 million women, could find their jobs displaced by automation, compared with men at 21 percent (163 million) in the period to 2030. See *The future of women at work: Transitions in the age of automation,* McKinsey Global Institute, June 2019.
[13] Based on analysis conducted in Jeffrey Lin, "Technological adaptation, cities, and new work," *Review of Economics and Statistics,* May 2011, Volume 93, Number 2.
[14] In the six mature economies MGI studied in its recent report (Canada, France, Germany, Japan, the United Kingdom, and the United States), women account for 15 percent on average of machine operators, but over 70 percent on average of clerical support workers. See The future of women at work: Transitions in the age of automation, McKinsey Global Institute, June 2019.
[15] *How automation could affect employment for women in the United Kingdom and minorities in the United States,* McKinsey Digital, April 2019; and *A future that works: Automation, employment and productivity,* McKinsey Global Institute, January 2017.
[16] To calculate the number of transitions, we examined net demand for ten countries, 59 occupations, and five skill levels. For any occupational or skill category (except for transitions within skill level 1) with a net decline of jobs, we assume workers will need to make a transition. We arrive at a global number by mapping countries in the world to the closest similar country of the ten in our sample in the global report, and extrapolating by applying rates of transition by gender to employment for each country. For more detail, see the technical appendix of *The future of women at work: Transitions in the age of automation,* McKinsey Global Institute, June 2019.
[17] This is for net demand for jobs in existing sectors and occupations. Jobs created in entirely new occupations also tend to be relatively high wage and require higher education levels.
[18] Michiel Evers, Ruud De Mooij, and Danial Van Vuuren, "The wage elasticity of labour supply: A synthesis of empirical estimates," *De Economist,* March 2008, Volume 156, Issue 1.
[18] *The power of parity: Advancing women's inequality in the United Kingdom,* McKinsey Global Institute and McKinsey & Company United Kingdom, September 2016.
[19] To support women in the gig economy, the Taylor Review in July 2017 recommended expanding the definition of "worker," extending minimum wage standards, and ensuring that benefits such as vacation and sick pay cover independent workers. See *Good work: the Taylor review of modern working practices,* Department for Business, Energy & Industrial Strategy, July 11, 2017.
[20] *Skill shift: Automation and the future of the workforce,* McKinsey Global Institute, May 2018.
[21] *What lies behind gender inequality in education? PISA in Focus,* OECD. https://www.oecd-ilibrary.org/education/what-lies-behind-gender-inequality-in-education_5js4xffhhc30-en
[22] Una Tellhed, Martin Bäckström, and Fredrik Björklund, "Will I fit in and do well? The importance of social belongingness and self-efficacy for explaining gender differences in interest in STEM and HEED majors," *Sex Roles,* Volume 77, Issue 1-2, July 2017.
[23] *Analysis of A Level core STEM entrants and results by girls,* WISE. https://www.wisecampaign.org.uk/statistics/analysis-of-a-level-core-stem-entrants-and-results-by-girls-2/
[24] *Higher education student statistics: UK 2016/17 – qualifications achieved,* Statistical First Release SFR247, HESA, January 11, 2018.
[25] A forthcoming McKinsey research report, *The diversity opportunity in tech,* will provide further detail about the underrepresentation of women in tech employment.
[26] Ibid; Note that the definition of tech roles varies by country. In general, this includes, but is not limited to: applications programmers, computer network and system technicians, electrical engineers, information and communication technology managers, mechanical engineers, software developers, systems administrators, and web developers.
[27] *UK VC & Female Founders,* British Business Bank. https://www.british-business-bank.co.uk/uk-vc-female-founders-report/
[28] *The diversity opportunity in tech,* McKinsey & Company, forthcoming.
[29] *Notes from the AI frontier: Tackling Europe's gap in digital and AI,* McKinsey Global Institute, February 2019.
[30] Past MGI research has looked at a broad set of interventions focused on raising women's participation and productivity in the workforce, and on tackling the reskilling and mobility challenges that women may face as they transition to new occupations. For more on interventions to increase women's workforce participation and productivity, see *The power of parity: Advancing women's inequality in the United Kingdom,* McKinsey Global Institute and McKinsey & Company United Kingdom, September 2016. For more on interventions tackling reskilling and mobility regarding transitions to new occupations, see *The future of women at work: Transitions in the age of automation,* McKinsey Global Institute, June 2019.
[31] *Engineering UK 2018: Synopsis and Recommendations,* Engineering UK. https://www.engineeringuk.com/media/1576/7444_enguk18_synopsis_standalone_aw.pdf
[32] *Current Programmes,* Girls Talk London. http://www.girlstalklondon.com/current-programmes/
[33] *Rebooting representation: Using CSR and philanthropy to close the gender gap in tech,* McKinsey & Company and Pivotal Ventures, 2018.
[34] Sarah Kessler, *The HR process is filled with bias, and SAP is selling tech to change that,* Quartz, August 2017.
[35] *Career benefits,* M&G. https://www.mandg.com/careers/benefits/; *Returners programmes vital for addressing gender imbalance and skills shortage, says AECOM,* AECOM press release. https://www.aecom.com/uk/press-releases/returners-programmes-vital-addressing-gender-imbalance-skills-shortage-says-aecom/; *Are you ready to return to work?,* Lloyds Banking Group. https://www.lloydsbankinggroup.com/careers/what-were-up-to/returnship-programme-2019/; *Civil Service Returners Programme,* UK Cabinet Office. https://www.gov.uk/guidance/civil-service-returners-programme
[36] *How role models are changing the face of STEM in Europe,* Microsoft, 2018. https://news.microsoft.com/europe/features/girls-in-stem-the-importance-of-role-models/.
[37] *About WES – who we are,* Women's Engineering Society. https://www.wes.org.uk/content/about-wes-who-we-are; and *About ScienceGrrl,* Science Grrl. https://sciencegrrl.co.uk/about/.

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