
16 nudges for more *#WomenInTech*

Quick and low-cost behavioural measures that bring gender equality to emerging tech



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An old debate, but new urgency





The World Economic Forum (WEF) kicked off 2018 with renewed debate around the link between emerging tech¹ and gender equality. The annual conference in Davos, Switzerland, looked to dust off its image as a male-dominated event. Notorious for the term ‘Davos man’ to indicate the global elite of males who attend WEF every year, WEF announced in November last year that only women would act as its seven co-chairs in 2018. Last year, female attendees amounted to only 20% of the audience, with this proportion reaching just over 21% at the 2018 event.

“Are you a spouse?” was cited as a common question asked of female leaders at WEF, until event organisers made design changes to differentiate ‘spouse’ badges from regular ‘delegate’ badges in an effort to avoid the awkward mix-up.²

The picture at Davos serves as a reminder of global and local gender imbalances, and the pay gap is one way in which the gender gap manifests. Globally, for each US dollar earned by men, women earn approximately 50 cents.³ In South Africa, women earn 60 cents for each rand earned by men.⁴ The lack of female representation in the workforce and especially in leadership positions is another barrier to gender equality. In South Africa, for every ten men, only eight women are employed or actively looking for work,⁵ although women make up more than half of the working-age population.⁶

But expediting gender equality at work pays dividends. According to PwC estimations, closing the pay gap across OECD countries could increase total female earnings by US\$2 trillion, an increase of 23%.⁷ Furthermore, the economic benefits of increasing female employment rates across the OECD countries to match Sweden’s rate of 61% could be over US\$6 trillion in the long run, an increase of 12%.⁸

We estimate sizeable economic benefits if we close the gender gap in South Africa in both pay and representation by just 10%. Our calculations suggest economic growth spin-offs of additional 3.2% in GDP growth and a 6.5% reduction in the number of unemployed job seekers.⁹

1 Emerging tech are technologies that are characterised by novelty, fast growth, impact and uncertainty. Examples of emerging tech include, but are not limited to, artificial intelligence (including machine learning), robotics, virtual reality, augmented reality, blockchain and drone technology.

2 Fortune, 2018. Davos 2018: The World Economic Forum tries to reach the #MeToo movement. Available: <http://fortune.com/2018/01/22/davos-2018-world-economic-forum-women-metoo/>

3 WEF, 2017. The Global Gender Gap Report. Available: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

4 Ibid.

5 Ibid.

6 BMI, 2017

7 PwC, 2018. PwC Women in Work Index: Closing the gender pay gap. Available: <https://www.pwc.co.uk/economic-services/WIWI/women-in-work-index-2018.pdf>

8 Ibid.

9 This analysis was based on data from the South African Quarterly Labour Force Survey, Quarterly Employment Statistics, and WEF’s 2017 Global Gender Gap report among others. We assumed that the gender employment and pay gap were to close by 10%, respectively, based on the current gender employment and compensation gaps in various industries of the economy. We considered all sectors of the South African economy, except for real estate and agriculture. The gaps in employment and compensation were calculated using the shares of skilled and salaried semi-skilled employees of total formal employment in each industry. This assumption was based on the understanding that semi-skilled hourly workers and unskilled (usually hourly) workers would in many instances receive labour union support which would enforce a 50/50 parity in pay between female and male labourers. PwC utilised an Input-Output analysis based on a PwC Social Accounting Matrix for South Africa. The analysis is static in nature as each industry is considered in isolation, as a result, some influence of double counting is possible. Furthermore, the economic benefits are once-off and total changes (direct, indirect and induced) due to the 10% change in representation and pay. Information for the nominal GDP and unemployment calculations was sourced from StatsSA and reflects 2016 data. Information for the low-income calculation was based on StatsSA data and PwC calculations. More detailed workings and assumptions in this analysis are available on request.



Does education hold the key?

“Sub-Saharan Africa retains the largest gender gap in the education of girls and boys of any world region, limiting the breadth of sub-Saharan Africa’s available talent pool and furthering social and economic disparities between women and men later in life.”

– WEF, The Future of Jobs and Skills in Africa

The answer is complex and education is one in a multifaceted interplay of drivers that will bring more women into skilled jobs, especially in science, technology, engineering and mathematics (STEM) fields.

In South Africa, the proportion of females to males who graduate with STEM-related degrees is out of kilter: women are underrepresented in maths and statistics (4:5), ICT and technology (2:5), as well as engineering, manufacturing and construction (3:10).¹⁰

According to a 2017 WEF report on the future of jobs in Africa, cultivating an interest in STEM fields must start as early as possible, at schools and in higher education, for example.¹¹ From an early age, behavioural design can help through de-biasing classrooms, changing how our children are taught, as well as through celebrating counter-stereotypical role models.¹²

Additionally, schools should be proactive in exposing young girls to tech capabilities. Computer programming and/or information technology could be included in the curriculum for primary and secondary schools as compulsory subjects for all children.

Globally, more women than men are enrolled in tertiary education, but **why do men outnumber women in skilled jobs?**¹³ The 'leaky pipeline' is key to explaining the lack of female representation in skilled jobs.¹⁴ It refers to the continuous haemorrhaging of women out of work as they exit their careers over time, especially as they become mothers.

For many women, their ambitions for promotion and career advancement are hampered by their desire to have a family. According to a recent PwC survey of 3 600 professional women, 42% feel nervous about the impact that starting a family could have on their career and 48% of new mothers felt overlooked for promotions and special projects upon their return to work.¹⁵

A similar picture emerges in the tech industry, where 45% of women are nervous about the impact that having children could have on their career and 51% feel that taking advantage of work life balance and flexibility programmes has negative career consequences at their workplace. Across sectors and in the tech industry, women are concerned about the implications of motherhood and the flexibility penalty for their careers.¹⁶

Given the urgent need to foster the participation of women in our workforce, addressing the reasons that cause women to leave their careers is vital. Companies should support working-mother employees and nurture their careers through implementing flexible policies, allowing sufficient parental leave (for both parents) and promoting advancement programmes in a way that prevents potential biases and provides organisational solutions that work.^{17,18,19}

Reversing educational and workforce gender imbalances is a top global priority and reflects the 5th United Nations Sustainable Development Goal (SDG), that is, to achieve gender equality and empower all women and girls. The UN underscores women's empowerment as an important development objective and highlights the relevance of gender equality to address a wide range of global challenges.²⁰

10 WEF, 2017. The Global Gender Gap Report. Available: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

11 WEF, 2017. The future of jobs and skills in Africa. Available: http://www3.weforum.org/docs/WEF_EGW_FOJ_Africa.pdf
According to the report, special attention should be given to encouraging female STEM talent, as currently only 17% of students pursuing degrees in science and technology subjects in Kenya are women; only 24%, 18% and 27% are women in Tanzania, Uganda and Rwanda, respectively.

12 Forbes India, 2017. Removing workplace biases with 'behavioural design'. Available: <http://www.forbesindia.com/article/rotman/removing-workplace-biases-with-behavioural-design/48945/1>

13 WEF, 2017. The Global Gender Gap Report. Available: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

14 Forbes India, 2017. Removing workplace biases with 'behavioural design'. Available: <http://www.forbesindia.com/article/rotman/removing-workplace-biases-with-behavioural-design/48945/1>

15 PwC, 2018. Time to talk: what has to change for women at work. Available: www.pwc.com/timetotalk.

16 Ibid.

17 Advancement programmes include career counselling, leadership training and mentoring.

18 Working Mother, 2017. 2017 Working Mother 100 Best Companies. Available: <https://www.workingmother.com/workingmother-100-best-companies-2017>

19 PwC, 2018. Time to talk: what has to change for women at work. Available: www.pwc.com/timetotalk

20 UN, n.d. Sustainable Development Goals. Available: <https://sustainabledevelopment.un.org/?menu=1300>



From Hollywood to Reykjavik: Key events shaping the global conversation about gender equality

Anti-sexual harassment movements like the Time's Up and #MeToo social media campaign are raising global consciousness about the need to level the playing field for women and reshape workplaces globally.

Men are taking a stand for women too. More than 1.2 million men have already committed themselves to the HeForShe campaign, which fosters support for gender equality.²¹ The imperative of expediting progress towards gender equality was discussed globally with renewed fervour during International Women's Day on 8 March, with the theme #PressForProgress trending across media platforms.

Policymakers are listening too: due to rising global and local pressures, Iceland decided to take greater charge of gender equality in the workplace. From 1 January 2018, it is illegal to pay men more than women for equal work. This policy is compulsory for companies with more than 25 employees.

Before the law was passed, Iceland already ranked as the top global performer for gender equality.²² However, despite performing well in terms of gender parity, Icelandic women were still earning significantly less than their male counterparts – 72 cents to every Icelandic man's dollar.²³ These inequalities resulted in growing criticism, leading to the introduction of the new policy to improve prospects for equal opportunities and equal pay in Iceland.

On the literary front, a recently published book by Harvard University behavioural economist Iris Bohnet is ground-breaking in demonstrating how behavioural design can bring about gender equality and female empowerment in the workplace. The book, entitled "What works: gender equality by design", offers practical tools that quash unconscious biases and barriers to greater gender equality.

Transparency is essential in helping us measure our progress. The annual WEF Global Gender Gap report brings the economic imperative of gender equality to the forefront.²⁴ WEF is calling for faster progress: at the current rate of progress, it would take approximately 100 years for the overall global gender gap²⁵ to close; while the global employment gender gap would take 217 years to disappear.²⁶

In the spirit of fostering female engagement with technology, the US-founded Girls Who Code movement is an impactful, gap-closing intervention for women and girls in STEM and emerging tech.²⁷ Similarly, South Africa's GirlHype is a non-profit programme that provides programming and app development training for women and girls, in order to build up their self-efficacy and confidence to work in tech and beyond.²⁸

21 HeForShe, 2016. HeForShe. Available: <http://www.heforshe.org/en>

22 WEF, 2017. The Global Gender Gap Report. Available: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

23 Fortune, 2018. It's now illegal to pay men more than women in Iceland. Available: <http://fortune.com/2018/01/02/illegal-to-pay-men-more-than-women-iceland/>

24 WEF, 2017. The Global Gender Gap Report 2017. Available: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

25 The gender gap refers to global and local gender imbalances, which manifest in different social, political, intellectual, cultural or economic attainments.

26 WEF, 2017. The Global Gender Gap Report 2017. Available: http://www3.weforum.org/docs/WEF_GGGR_2017.pdf

27 Girls who code, 2018. About us. Available: <https://girlswhocode.com/about-us/>

28 GirlHype, 2018. GirlHype. Available: <http://girlhype.co.za/>

Economic benefits of advancing female workforce equality



The scarcity of relevant skills is keeping CEOs up at night. In PwC's 2018 CEO Survey, 38% of surveyed CEOs indicated that the 'availability of key skills' presents a threat to their organisation's growth. Furthermore, 'speed of technological change' also concerned 38% of surveyed CEOs. Some 63% of CEOs in Africa indicated that it is difficult to attract digital talent, compared to a global average of 50%.²⁹ **Accessing the full talent pool, women and men included, is a key solution to reducing the skills gap** that concerns business leaders across the world.

The participation by men and women in the workforce is essential for the viability of businesses and economies. Mixed teams generate solutions that are more creative, with evidence showing strong links between gender diversity, collective intelligence and team performance.^{30,31,32}

Companies that effectively use female talent are 45% more likely to report improved market share.³³ Additionally, through promoting gender equality in their workforce, organisations can enhance their own social licence to operate by gaining greater acceptance from local communities and stakeholders.³⁴ In short, evidence is mounting that companies that promote female representation are more profitable than those that do not. Similarly, economies that promote and embrace women outperform those that do not.^{35,36}

29 PwC, 2018. PwC CEO Survey report 2018. Available: <https://www.pwc.com/gx/en/ceo-survey/2018/pwc-ceo-survey-report-2018.pdf>

30 Woolley et al., 2010. Evidence for a collective intelligence factor in the performance of human groups. *Science* 330: 686 – 688

31 Forbes India, 2017. Removing workplace biases with 'behavioural design'. Available: <http://www.forbesindia.com/article/rotman/removing-workplace-biases-with-behavioural-design/48945/1>

32 University of Castilla la Mancha, Spain. <https://www.nextgeneration.ie/why-arent-there-more-women-in-tech/>

33 Forbes, 2017. Inspiring greatness: Advancing women leaders in the workplace. Available: <https://www.forbes.com/sites/kpmg/2017/06/07/inspiring-greatness-advancing-women-leaders-in-the-workplace/#58bcbdc24c54>

34 Rio Tinto, 2009. Why gender matters. Available: http://www.riotinto.com/documents/ReportsPublications/Rio_Tinto_gender_guide.pdf

35 WEF, 2016. Will the future be gender equal? Available: <https://www.weforum.org/agenda/2016/01/will-the-future-be-gender-equal/>

36 Goldman Sachs Global Markets Institute, 2009. The power of the purse: gender equality and middle-class spending. Available: <http://www.gbaforwomen.org/docs/GOLDMAN-SACHS-Power-of-the-Purse.pdf>

As we highlighted above, our calculations suggest that by closing the gender gap in employment and pay by just 10% across various sectors of the South African economy, we could generate additional economic growth of 3.2% and decrease the number of unemployed job seekers by 6.5%. Closing the gender gap also helps to alleviate poverty: low-income households will receive an estimated 2.9% more income than previously.³⁷ Enormous economic opportunity lies in promoting gender workforce equality.

Levelling the playing field to include more women in skilled jobs, and specifically in the emerging tech environment, is of paramount financial importance for businesses and has broader socio-economic implications for countries looking to prosper. Of course, the argument for gender equality initially rests on a moral imperative. Thus, countries need to pay attention to the gender gap not only because it makes business sense, but also because such inequality is inherently unfair.³⁸ In sum, it does not make moral, business or economic sense to forgo women's participation.

Why we need women in the new wave of industrialisation

Emerging tech is only as well-rounded as the people who teach it. However, in the field of artificial intelligence (AI), a linchpin of emerging tech, women hold only one fifth of executive positions.³⁹ Emerging tech is a crucial field for women to help shape, as every day, our dependence on the speed and efficiency of new technologies grows.⁴⁰ AI, for example, drives how photo apps discern our faces from others and it comprehends when we ask for the nearest restaurants that serve a late-night snack. It also drives more niche applications – for example, in surgical procedures, or search-and-rescue missions, where it helps to deploy drones to the most difficult-to-reach places on earth.⁴¹

AI can capacitate machines to complete some tasks that humans do, including speech recognition, information gathering and decision-making. Here, data is the new oil. AI utilises vast amounts of existing data, however, if the input data is limited or biased, the output will be flawed. This is already a problem.⁴²

The demographic make-up of many emerging tech companies is homogeneous, which can make the industry and its products vulnerable to bias.⁴³ Some of the latest smartphones have had trouble implementing their innovative facial recognition technology. The phones are programmed to detect their owners' facial features, yet their reliability across different ethnicities and genders has been questioned, sparking a debate over the representation of diverse social groups in emerging tech.⁴⁴

If primarily half of the population designs technology, users are missing out on the insights, innovations and solutions of the other half. Fostering inclusivity, and therefore bringing more women into emerging tech and the workforce in general, will help introduce new viewpoints and new ideas to emerging tech. Consequently, gender equality is an ever more urgent goal as emerging tech gains momentum in the new industrial revolution.

Emerging tech is revolutionising the world. Are women helping to shape the brave new world?

37 PwC calculations, see footnote 9.

38 WEF, 2017. What is the gender gap? Available: <https://www.weforum.org/agenda/2017/11/the-gender-gap-actually-got-worse-in-2017/>

39 Google, 2017. For AI, a real-world reality check: An intelligent computer is only as well-rounded as the people who teach it. Available: https://www.google.com/about/stories/gender-balance-diversity-important-to-machine-learning/?utm_source=twitter&utm_medium=social&utm_campaign=

40 Ibid.

41 Ibid.

42 Ibid.

43 Quartz, 2014. The emerging picture of the tech industry's diversity is pretty ugly. Available: <https://qz.com/222870/the-emerging-picture-of-the-tech-industrys-diversity-is-pretty-ugly/>

44 New York Post, 2017. Chinese users claim iPhone X face recognition can't tell them apart. Available: <https://nypost.com/2017/12/21/chinese-users-claim-iphone-x-face-recognition-cant-tell-them-apart/>



Unlearning is slow and painful, but behavioural measures can offer quick wins

Although some strides have been made to advance women in tech, more needs to be done. Women currently hold only 19% of tech-related jobs at the top 10 global tech companies, relative to men who hold 81%. In leadership positions at these global tech giants, women make up 28%, with men representing 72%.⁴⁵

To change the way talent is developed and deployed in today's world requires the undoing and relearning of age-old thought processes and the formation of new norms and values, especially in the education system and labour market. Biases are built deeply into our cognitive processes, and unlearning them is difficult – at best, slow and painful. Contrary to popular belief, being made aware of our biases does not reverse them – even upon instruction, we struggle to suppress the influence of existing biases.^{46,47}

Behavioural measures, or 'nudges', are one instrument in our collective toolbox to correct for gender imbalances in education and work. **Nudges change the context in which we make decisions to help us achieve our goals.** They can offer low-hanging fruit to promote female representation in emerging tech and establish new foundations for inclusive economic growth.

Below we outline some biases and countervailing nudges to help us in this endeavour, with a lifecycle view from school and higher education to hiring, career development and progression.

⁴⁵ PwC calculations from company reports, SEC filings, US Bureau of Labor Statistics, US Department of Labor, ILO, UN Gender Equality Global Compact, World Bank, IMF

⁴⁶ Bohnet, 2016. What works: gender equality by design. England: Belkap Press, p. 36

⁴⁷ Blair et al., 2001. Imagining stereotypes away: the moderation of implicit stereotypes through mental imagery. Journal of Personality and Social Psychology 81: 828 - 841

In school and higher education

Women are more prone than men to avoid guessing, and are less comfortable taking on risks, which steers them away from ambiguous and high-risk environments. An analysis of maths Scholastic Aptitude Test (SAT) scores shows that women's tendency to skip more questions than men can explain up to 40% of the gender gap in SAT scores. Similar effects have been found in multiple-choice tests in South Africa.^{48,49}

Along with being less likely to guess, women are generally less likely to speak up or put forward their opinions. This is evident across the private and public sectors. Women tend to require more assurances than men before running for public office. As start-up ventures and emerging technologies are fast-moving, ambiguous and high-risk environments, many women may not find the risky nature of these environments attractive.⁵⁰ There are many barriers to women's participation and leadership, and **gender differences in willingness to take risks** may present a root cause.⁵¹

Closely linked to risk comfort, men tend to be substantially more overconfident than women. Thus, not only are they more willing to take risks, they are also more **optimistic** when assessing risky situations.⁵² Women tend to be overconfident to a lesser degree and in some instances even cautious. As a result, female students would be more likely to underestimate their ability in maths and overestimate how good they have to be to succeed in advanced maths courses.



48 Tannenbaum, 2012. Do gender differences in risk aversion explain the gender gap in SAT scores? Uncovering risk attitudes and the test score gap

49 Burns, et al., 2012. Gender and risk taking in the classroom. Available: http://opensaldru.uct.ac.za/bitstream/handle/11090/178/2012_87.pdf?sequence=1

50 Bohnet, 2016. What works: gender equality by design. England: Belkap Press, p. 171

51 Fulton et al., 2006. The sense of a woman: gender, ambition and the decision to run for congress. Political Research Quarterly 59: 235 - 248

52 Barber & Odean, 2001. Boys will be boys: gender, overconfidence and common stock investment. The Quarterly Journal of Economics

Generally, female students are more likely than male students to take test results as an indicator of their abilities and mastery of the subject. Thus, they are more prone than their male counterparts to drop courses in which their results are below their expectations. The dip in self-esteem in early maths and science courses is an important reason why women drop out of specialised science and engineering courses.⁵³

This can affect female learning outside of formal education too, as the example of female engagement in cryptocurrencies shows. Indicating gender differences in optimism and risk appetite, research by Barber and Odean showed that men trade stocks 45% more frequently than women.⁵⁴ Furthermore, perceptions of emerging cryptocurrencies are that they are risky, due to drastic price swings and published instances of digital exchange hacks. Unsurprisingly, then, mainly men have bought into cryptocurrencies like Bitcoin.⁵⁵ Engagement statistics for Bitcoin show that 97% of engagement is by men.⁵⁶ Arguably, women are missing out on learning about emerging tech from its inception, which can put them at a disadvantage relative to their male counterparts.



Nudge

1. Design school and work environments to moderate risk, as gender differences in risk seeking can bias outcomes. Provide feedback on how well we are doing compared to others. This can help us to update our potentially biased beliefs and allows us to reassess our performance. Furthermore, feedback can encourage the right people to participate in competitions; not the overconfident ones, but the most capable ones. Frequent feedback has been shown to encourage women to compete.⁵⁷

Even subtle cues can affect what we believe is possible for ourselves. **Stereotype threat** suggests that various situational cues can lead us to confirm the negative or positive stereotypes about the social group to which we belong. For example, when women were told that a maths test was particularly difficult for women, they indeed performed worse than male participants. When the tests were presented as being equally difficult for both genders, the gender gap in performance disappeared.⁵⁸

This phenomenon emerges early on. In experiments priming girls of ages five to seven to consider their gender identity, girls who were given the task of colouring in a picture of a girl with a doll performed significantly worse in a maths test, than in the control condition, where girls coloured in a landscape picture. Girls who were primed in their Asian identity by being required to colour in a picture of Asian children eating from a bowl with chopsticks performed better than the control condition.⁵⁹ Stereotype threat extends across virtually all areas of life and has been found to reduce the performance of negatively stereotyped group members.⁶⁰

53 Seymour & Hewitt, 2000. Talking about leaving: why undergraduates leave the sciences. Boulder: Westview Press

54 Barber & Odean, 2001. Boys will be boys: gender, overconfidence and common stock investment. The Quarterly Journal of Economics

55 Financial Times, 2018. Bitcoin: why is it so male-dominated? Available: <https://www.ft.com/content/259734ca-0b95-11e8-839d-41ca06376bf2>

56 Coin Dance, 2018. Bitcoin Community Engagement by Gender. Available: <https://coin.dance/stats/gender>

57 Gray, 2012. Men are from Mars, women are from Venus: The classic guide to understanding the opposite sex. New York: Harper Paperbacks

58 Andreoni & Vesterlund, 2001. Which is the fair sex? Gender differences in altruism. Quarterly Journal of Economics 116: 293 - 312

59 The underlying stereotypes are that girls perform below average in maths (negative stereotype) and Asian children perform above average (positive stereotype).

60 Ambady et al., 2001. Stereotype susceptibility in children: effects of identity activation on quantitative performance. Psychological Science 12: 385 - 390



Nudge

2. Purge clues that trigger performance-limiting stereotypes. For example, relocate the tick boxes where candidates are asked to select their gender and ethnicity from the beginning to the end of a test.⁶¹

“The quota system had created role models for the girls and their parents, enabling both to imagine and see the value of a different future.”

– Iris Bohnet, Professor of Public Policy & Director of the Women and Public Policy Program at the Harvard Kennedy School

“The evidence is overwhelming that role models influence behaviour ... and any woman in a position of prominence may choose to act as a role model.”

– Iris Bohnet, Professor of Public Policy & Director of the Women and Public Policy Program at the Harvard Kennedy School

A key factor influencing our chosen path is the presence of **role models**, or the lack thereof.⁶² Evidence across the public and private sectors shows that seeing female leaders changes perceptions, making women more confident that they could serve in leadership positions and making men more accepting of women as leaders.⁶³

A prominent example is the advent of a quota for local political leaders in India. With the introduction of female village leaders, the probability that women spoke up in community meetings increased by 25%. If a seat had been reserved for a female leader in the previous election cycle, women were more likely to run in a subsequent open election, competing with men for the role.⁶⁴

Furthermore, community members who were exposed to two or more female village chiefs overcame their initial apprehension of women as leaders and rated male and female leaders equally. These effects were far-reaching. After witnessing two female village leaders, parents were more likely to encourage their daughters to study past secondary school.⁶⁵

Evidence from the US suggests that senior managers are important corporate role models. When the share of female top managers increases, research suggests, the share of women in mid-level management also rises.⁶⁶ The more visible female leadership is, the more likely the positive effects.⁶⁷

In relation to female leadership, ‘**seeing is believing**’.⁶⁸ People need to see counter-stereotypical role models for beliefs to change. Quotas can solve a ‘chicken and egg’ problem here: if people are biased against female leaders and never see a woman in a leadership position, they can never update their beliefs.⁶⁹ Quotas in themselves are no nudge, although they can change men’s and women’s beliefs about what an effective leader looks like and address many of the biases that hinder gender equality.⁷⁰

As an alternative to quotas, organisations that set voluntary targets for female representation can set goals that are realistic and take into account their particular circumstances. Institutions such as the Australian Workplace Gender Equality Agency (WGEA) have expressed their preference for targets, as quotas can create a tick-box mentality, rather than fostering cultural and structural change that ensures sustainable improvement.^{71,72}

61 Eisenkopf et al., 2015. Academic performance and single-sex schooling: evidence from a natural experiment in Switzerland. *Journal of Economic Behavior and Organization* 115: 123 - 143

62 Kahneman, 2011. *Thinking fast and slow*. New York: Farrar, Straus and Giroux

63 Beaman et al., 2012. Female leadership raises aspirations and educational attainment for girls: a policy experiment in India. *Science* 335: 582 - 586

64 Chattopadhyay & Duflo, 2004. Women as policy makers: evidence from a randomized policy experiment in India. *Econometrica* 72: 1409 - 1443

65 Ibid.

66 Kurtulus & Tomaskovic-Devey, 2012. Do women top managers help women advance? A panel study using EEO-1 Records. Available: <http://ftp.iza.org/dp6444.pdf>

67 Bohnet, 2016. *What works: gender equality by design*. England: Belkap Press, p. 210

68 Forbes, 2017. Meet America’s richest self-made women in tech. Available: <https://www.forbes.com/sites/katevinton/2017/05/17/meet-americas-richest-self-made-women-in-tech/#6b94db115a94>

69 Mollerstrom, 2014. Favoritism reduces cooperation. Working Paper: George Mason University

70 Bohnet, 2016. *What works: gender equality by design*. England: Belkap Press, p. 238

71 WGEA, 2018. Setting gender targets. Available: <https://www.wgea.gov.au/lead/setting-gender-targets>

72 DCC Jobs, 2015. Gender diversity: Quotas vs targets. Available: <https://www.dccjobs.com/blog/2015/03/gender-diversity-quotas-vs-targets>



Nudge

3. The tech industry already boasts many exceptional female leaders. It is crucial to bring attention to these role models, especially for girls from a young age. Initiatives in which female maths teachers or engineers, as well as male nurses and primary school teachers speak to school children can be powerful in the formative years for both boys and girls.⁷³ In introductory STEM courses, female students were more likely to continue their studies in a STEM subject when assigned a female professor instead of a male professor. However, the faculty's gender had no effect on male students' choices.⁷⁴
4. Students' attitudes can also be affected by subtle and simple changes. Consider diversifying the portraits on the walls of your organisations.⁷⁵
5. Increase the fraction of counter-stereotypical people in positions of leadership, through quotas⁷⁶ or other means, such as targets. Seeing is believing.⁷⁷

In hiring

Many companies do not harness the full talent pool available. Prevailing gender biases limit both men and women, albeit in different industries. **Gendered language** in job ads and other organisational communications can 'sort' applicants before they have applied.⁷⁸

A job ad for a teaching role at a primary school that refers to the ideal candidate as 'warm and caring' will likely attract fewer men than if the ideal candidate was to present 'exceptional pedagogical skills'. A study on societal attitudes towards male teachers in South Africa found that primary school teachers are usually seen as nannies or caregivers, which are roles stereotypically associated with women.⁷⁹

The same principle applies to jobs in emerging tech, where gendered language could preselect applicants, thereby denying firms the possibility of exploiting the full potential of the talent pool.⁸⁰

We looked at a small sample of 20 job ads for 'data scientist/analyst' and 'UX/UI developer'⁸¹ positions in South Africa. We found 85% of the ads to be masculine coded, while 10% were feminine coded and 5% neutral. This likely reflects the language used in emerging tech job ads in South Africa and represents a barrier women face in partaking in the emerging tech revolution, as well as throws a spanner in the works for organisations looking to benefit from the full breadth of available talent.

73 Forbes India, 2017. Removing workplace biases with 'behavioural design'. Available: <http://www.forbesindia.com/article/rotman/removing-workplace-biases-with-behavioural-design/48945/1>

74 Bettinger & Long, 2005. Do faculty serve as role models? The impact of instructor gender on female students. *American Economic Review* 95: 152 - 157

75 Dasgupta & Asgari, 2004. Seeing is believing: exposure to counterstereotypic women leaders and its effect on the malleability of automatic gender stereotyping. *Journal of Experimental Social Psychology* 40: 642 - 658

76 In some cases, employees hired through gender- or race-based policies experience stigmatisation, by others and themselves. Negative stereotyping is alleviated when merit dominates the hiring decision. Iris Bohnet suggests that a two-stage process could help attenuate quotas being experienced as unfair. Candidates should be first reviewed for merit, ideally in blind evaluations. Thereafter, certain demographic groups could be preferentially treated. Bohnet, 2016. *What works: gender equality by design*. England: Belkap Press, p. 238

77 Ibid., p. 203 - 209

78 Ibid., p. 163

79 Petersen & Petker, 2011. Foundation phase teaching as a career choice: Building the nation where it is needed. *Education as Change*, 15(1): 49 - 61

80 Gaucher et al., 2011. Evidence That Gendered Wording in Job Advertisements Exists and Sustains Gender Inequality. *Journal of Personality and Social Psychology* 101(1): 109 - 28

81 User experience (UX) developers ensure that a program logically flows from one step to the next. User interface (UI) developers are concerned with the overall feel of a program. They are in charge of designing each screen or page with which a user interacts and ensure that the UI visually communicates the path that a UX designer has laid out.



Nudge

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6. Purge gendered language from job ads and other company communications. This is especially important since women consider more factors than men when screening jobs – in particular, cultural fit, values and managerial style. Research suggests establishing a sense of belonging is a major concern for female job seekers.^{82,83}
 7. First impressions also matter in recruitment sessions. In a study of staff recruitment sessions at a US university, only 22% featured female engineers talking about technical work. In the few sessions that featured women speaking on technical subjects in which they connected these issues to real-world impacts, female students were much more engaged, asking questions 65% of the time, compared with only 36% in sessions without these features. The importance of relatability extends therefore across various platforms of recruitment activities, from job ads to recruitment events.⁸⁴

Why do many organisations experience inertia on their path to building a balanced workforce? A confluence of **stereotypes based on gender, representativeness and confirmation biases** are at play in explaining the persistence of gender imbalances in hiring. Attractive talent that does not fit preconceived notions of what talent looks like and where it comes from is easily discarded, commonly with no conscious intention to do so. This is a result of our cognitive make-up. Matching people to existing social categories, like gender, helps us make sense of the world. Naturally, we economise our cognitive effort.⁸⁵

Research suggests that in the instance of what could be regarded a stereotypically male job, evaluators generally preferred male candidates, who later justified their decisions by arbitrarily and selectively drawing on information about candidates' experience and education. Stereotypes are fed by representativeness and entrenched by confirmation bias. The representativeness bias suggests that *what you see is all there is*, or WYSIATI, a concept coined by psychologist Daniel Kahneman, referring to the idea that archetypes and examples that easily come to mind guide our judgments and decisions. When thinking of members of the emerging tech industry, our brains present us with examples that qualify as 'normal' or 'typical'.

82 Groysberg et al., 2004. The risky business of hiring stars. Available: <https://hbr.org/2004/05/the-risky-business-of-hiring-stars>

83 There are many tools to help, check websites such as Kat Matfield's gender decoder (<http://gender-decoder.katmatfield.com/>) and Total Jobs gender bias decoder (<https://www.totaljobs.com/insidejob/>).

84 Wynn & Correll, 2018. Puncturing the pipeline: do technology companies alienate women in recruiting sessions? *Social Studies of Science* 48(1): 149 - 164

85 Bohnet, 2016. *What works: gender equality by design*. England: Belknap Press, p. 35

Test yourself

A father and his son are in a car accident. The father does not survive, and the son is badly injured. An ambulance takes the son to the hospital, where the surgeon cries out: “I cannot operate, because this boy is my son!”

How is this possible?⁸⁶

Furthermore, the need for internal consistency facilitates the confirmation of previously held beliefs, which makes it difficult for us to update and incorporate new information.⁸⁷



“Like so many other industries of our economy, tech desperately needs more women to play a leading role in taking the industry forward. Those companies that have prioritised gender diversity generally outperform their peers, and produce better results. There are already a number of inspirational women that are at the helm of some iconic tech organisations globally, and I look forward to seeing more and more South African women also making their mark. At PwC we believe that the only way we can deliver on our purpose of building trust in society and solving important problems, including those in the tech industry, is by empowering women to enable them to be the best that they can be.”

– Dion Shango, PwC Southern Africa CEO & local market impact champion for the UN Women’s HeForShe movement



⁸⁶ For most of us, our reaction is confusion, at first. However, upon reflection, we realise that the surgeon is the boy’s mother.

⁸⁷ Bohnet, 2016. What works: gender equality by design. England: Belkap Press, p. 35



Nudge

8. Discover talent using ‘The Voice’ approach. Circumvent gender and other biases and anonymise the hiring process as far as possible. Applications should be blinded and assigned to different evaluators. Various tools in the market, including GapJumpers and Talent Sonar, have shown that blinded applications help companies successfully discover untapped talent.
9. Use predictive tests and structured interviews to evaluate candidates. Score answers to questions and score immediately after the interview. Furthermore, evaluate candidates in batches. By using comparators, the evaluators’ attention focuses on skills and experience, rather than stereotypes.⁸⁸
10. Change norms through smarter messaging:
 - Celebrate successes in increasing gender diversity. Instead of describing the small fraction of female representation, focus messaging on the large fraction of companies with gender diverse leadership. This idea is rooted in ‘herding’. Descriptive norms, what many are already doing, turn into prescriptive norms, just by virtue of telling people about them. People are more likely to adopt a new behaviour if they know that many others are already doing it.⁸⁹
 - Sharing information about what others are doing might show laggards they are outliers. This can prompt renewed motivation to join the herd and forge a new norm. Through publishing rankings, for example, we can make public and visible how well a country or company is doing and ultimately promote convergence on the target.⁹⁰ The WEF Global Gender Gap report is an example of such a public ranking, where the progress of 144 countries towards gender parity is published annually. On a firm level, as of 1 April 2018, all UK companies employing more than 250 people have to publish the average salaries paid to female workers together with the average salaries of their male counterparts. This will allow for greater transparency and can allow us to celebrate firms that promote gender equality in the workplace.⁹¹
 - Rules and codes of conduct mirror social norms. Learning about what is allowed or disallowed through rules and codes of conduct indicates society’s norms and expresses society’s view of what forms acceptable behaviour – a powerful cue that can help break down barriers to female representation.⁹²

88 Ibid., p. 144

89 Gerber & Rogers, 2009. Descriptive social norms and motivation to vote: everyone’s voting and so should you. *Journal of Politics* 71 (1): 1 - 14

90 BBC, 2018. Gender pay gap: Charity questions accuracy of data. Available: <http://www.bbc.com/news/uk-england-42611365>

91 Independent, 2017. Soon companies will have to publish information about their gender pay gap by law – and it won’t help. Available: <http://www.independent.co.uk/voices/gender-pay-gap-figures-businesses-quotas-feminism-women-in-workplace-maternity-benefits-help-anyone-a8094546.html>

92 Ibid.

In panel interviews, ‘**group think**’ can overrule the diversity of thought that individuals could offer on their own.⁹³ Groups tend to be more inclined to rely on the representativeness bias and show more pronounced overconfidence in their judgments than individuals do on their own. Sometimes, the group subscribes not to the best outcome, but follows the voice of the loudest in the room.



Nudge

11. Discard panel interviews: the ideal is independent, uncorrelated assessments, not influenced by what other interviewers think. If you have three interviewers, three data points from three individual interviews trump one data point from a collective interview.

In career development and progression

Gender differences in self-confidence are not only a concern in school and higher education, but also in performance appraisals. Many firms ask their employees to evaluate themselves and then to share these self-evaluations with their supervisors. Self-assessments entrench gender biases through **anchoring**, where women will generally underrate their performance, which serves as an unconscious, low, reference point for evaluators.⁹⁴



Nudge

12. Do away with self-assessments wherever possible, or at least avoid sharing self-assessments with evaluators ahead of performance reviews.

Human resource managers and others responsible for personnel decisions may perceive women asking for better compensation as **violating gender norms**. Research suggests that when we do not find women to be agreeable and communal, and they therefore violate social norms, we prefer not to work with them. Women, consequently, are less likely to negotiate than men; if they did, they could face a social penalty. Even when women do negotiate on compensation, they ask for less.⁹⁵

In a field experiment, researchers Leibbrandt and List deployed two different job ads in nine big US cities. One ad suggested that wages were negotiable, while the other ad was ambiguous regarding wages. Male and female job seekers responded differently to these ads. Men were more likely to apply for jobs when it was left unclear whether wages were negotiable.⁹⁶

Men arguably were more comfortable with this ambiguity, potentially because they were expected to do well in situations where negotiations were not specifically prompted. In these instances, the male job seeker was also more likely to negotiate than his female counterpart. The opposite was true for women. They were more willing to negotiate when the ambiguity was removed and the ad ‘invited’ them to negotiate. Given the **negotiation dilemma** women face, external legitimisation helps them overcome the hurdle to negotiate compensation.⁹⁷

93 Sunstein & Hastie, 2014. *Wiser: getting beyond groupthink to make groups smarter*. Boston: Harvard Business Review Press

94 Paustein-Underdahl et al., 2014. Gender and perceptions of leadership effectiveness: a meta-analysis of contextual moderators. *Journal of Applied Psychology* 99: 1129 - 1145

95 Save-Soderbergh, 2007. Are women asking for low wages? Gender differences in wage bargaining strategies and ensuing bargaining success. Available: http://www.sofi.su.se/polopoly_fs/1.65025.1323949620/WP07no7.pdf

96 Leibbrandt & List, 2014. Do women avoid salary negotiations? Evidence from a large-scale natural field experiment. *Management Science* 61: 2016 - 2024

97 Ibid.

In the PwC survey of 3 600 professional women, of the women who were promoted in the past two years, 63% had negotiated for a promotion. Furthermore, of the 53% and 52% of women who had been given a high visibility project or stretch assignment in the past two years, 91% and 86% had negotiated for these opportunities, respectively. Self-advocacy can pay off, especially when support from advocacy and support programmes helps to legitimise self-promotion until it becomes a new social norm.⁹⁸



Nudge

13. Invite team members to speak up and explicitly invite negotiations.

14. Legitimise negotiations through enabling people to negotiate on behalf of others.

The relative numbers of socially and culturally different people in a team can be critical in shaping a team's dynamics.⁹⁹ In teams dominated by one social group, members of the minority group can become **tokens** among peers. Viewed as symbolic representatives of their own social group, they may be unable to contribute their full potential. The Norwegian professor of computer science, for example, becomes the go-to person on all things Scandinavian.¹⁰⁰

This phenomenon affects women in unbalanced team environments. The queen bee syndrome – the lonely woman at the top – can be a result. Rather than eliminating barriers for women following her, as a token member she may look to her majority peers, and assimilate and distance herself from new women entrants. This is particularly prevalent among first-generation women in counter-stereotypical roles.¹⁰¹

Another result of unbalanced team environments is that, women have been found to receive lower performance evaluations than men in teams where they represented less than 20% of the group. As their relative presence increased, so did the results of their performance evaluations.¹⁰²

Stereotypes thus lose their prominence in more balanced teams, and minority members in the team are viewed as individuals and not simply as token representatives. Equal representation is not necessarily required to change experiences and team performance. Research suggests that a critical mass of one third in relative terms and at least three in absolute numbers is required to move teams from being preoccupied by tokenism towards seizing the potential of diversity.¹⁰³

98 PwC, 2018. Time to talk: what has to change for women at work. Available: www.pwc.com/timetotalk

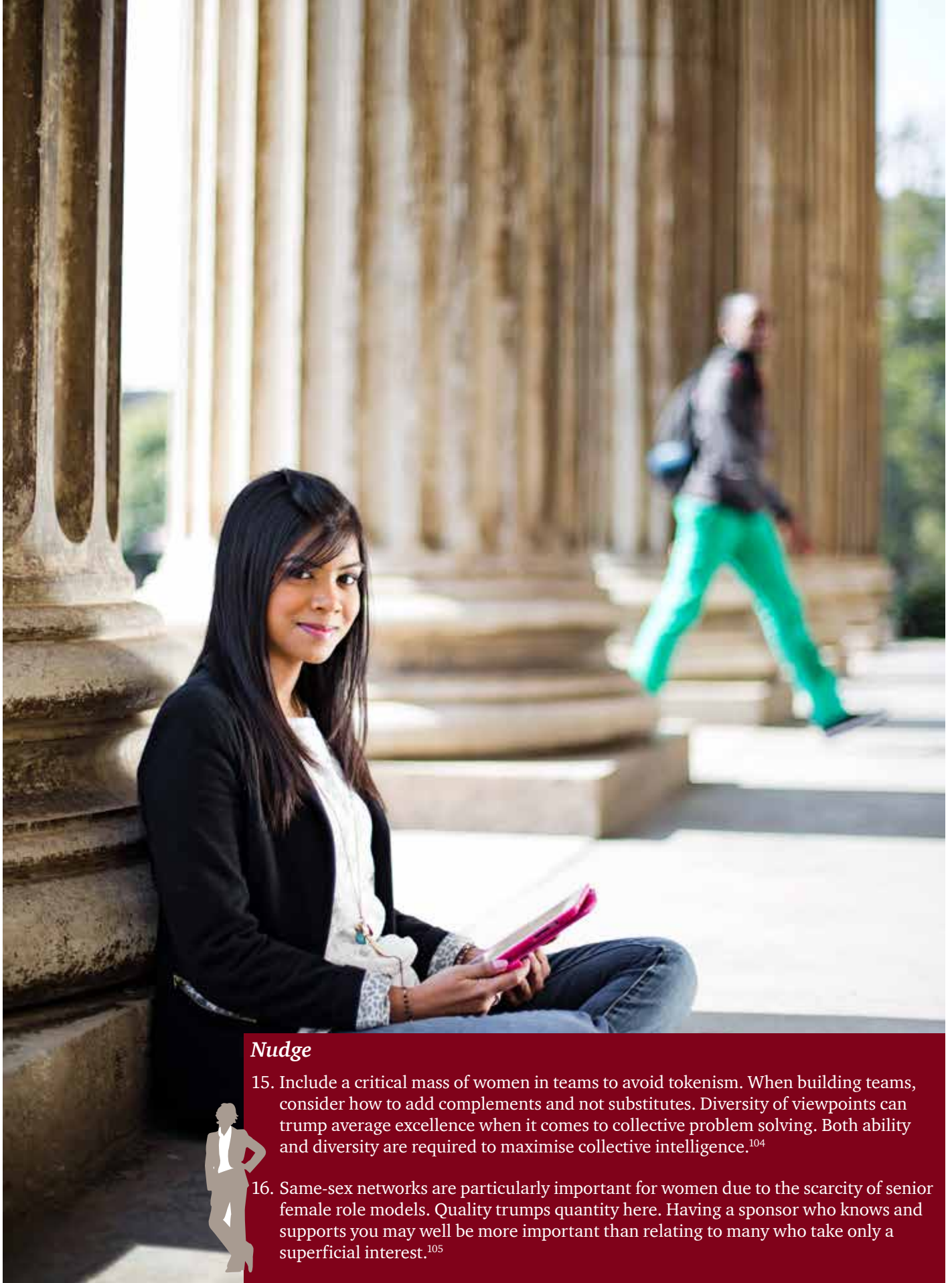
99 Kanter, 1977. Some effects of proportions on group life: skewed sex ratios and responses to token women. *American Journal of Sociology* 82: 965 - 990

100 Deguid, 2011. Female tokens in high-prestige work groups: catalysts or inhibitors of group diversification? *Organizational Behavior and human decision processes* 116: 104 - 115

101 Drexler, 2013. The tyranny of the Queen Bee. Available: <https://www.wsj.com/articles/SB10001424127887323884304578328271526080496>

102 Sunstein & Hastie, 2014. *Wiser: getting beyond groupthink to make groups smarter*. Boston: Harvard Business Review Press

103 Deguid, 2011. Female tokens in high-prestige work groups: catalysts or inhibitors of group diversification? *Organizational Behavior and human decision processes* 116: 104 - 115



Nudge



15. Include a critical mass of women in teams to avoid tokenism. When building teams, consider how to add complements and not substitutes. Diversity of viewpoints can trump average excellence when it comes to collective problem solving. Both ability and diversity are required to maximise collective intelligence.¹⁰⁴
16. Same-sex networks are particularly important for women due to the scarcity of senior female role models. Quality trumps quantity here. Having a sponsor who knows and supports you may well be more important than relating to many who take only a superficial interest.¹⁰⁵

¹⁰⁴ Mannix & Neale, 2005. What differences makes a difference? The promise and reality of diverse teams in organisations. *Psychological Science in the Public Interest* 6: 31 - 55

¹⁰⁵ Ibarra, 1992. Homophily and differential returns: sex differences in network structure and access in an advertising firm. *Administrative Science Quarterly* 37: 422 - 447

Building the workforce of the future



“Governments should engage with organisations developing the use of robotics and AI ... to create a pool of thought leaders with a deep understanding of the interplay between technology and its effect on society.”
– PwC Workforce of the Future¹⁰⁶

There is no doubt that the world we live in is changing, and at a fast pace. PwC’s 2017 “Workforce of the future: The competing forces shaping 2030” report deciphers what our workforce might look like in the near future.¹⁰⁷ Through the lens of four different worlds, we envision the future to be vastly different in each of them. But, the theme of automation and the implications of robotics and AI run through each. Emerging tech will affect all businesses and will upset traditional ways of doing business. Being aware and gaining an understanding of the changing technological landscape can help companies survive and thrive.

To remain relevant, businesses will need to have a clear strategy to attract and retain the right employees, customers and partners. The number of CEOs concerned with the ‘availability of key skills’ shows that skills are already a concern and priority for many.¹⁰⁸ Today, **gender equality is an ever-growing imperative**.¹⁰⁹ Increasing the number of women graduating in STEM fields is critical to enhancing the talent pool available to governments and businesses alike. Furthermore, to help plug the leaky pipeline of women leaving their careers, hiring processes must shift to allow talent to speak for itself. Getting more women into the boardroom would broaden viewpoints and improve outcomes. Indeed, 80% of surveyed women working in tech are determined to seek out opportunities to advance their careers.¹¹⁰

Nudges are powerful weapons in an organisation’s armoury to advance female representation and achieve workforce equality. Simple changes like moving questions on gender and ethnicity to the end of a test or purging gendered language from job ads can change the context in which we make decisions.

Organisations can embrace insights from behavioural design through fostering a culture of data collection. Armed with data, organisations can measure which initiatives work and which do not. This means embracing experimentation founded on insights about human behaviour and backed by data. Behavioural design choices emerging from this approach can change behaviour for good.¹¹¹

The responsibility to be open to change and reinvention does not lie exclusively with businesses, but also with each individual. If we believe the future lies in STEM, we must train ourselves, and our daughters, in the relevant skills. If we have an interest in robotics, we must become acquainted with the foundations. Whatever our profession, let us rethink the way we apply our capabilities in light of the future of work.

The tech industry is abundant with opportunity. Reinvent yourself and unlock the potential of emerging tech. #WomenInTech

106 PwC, 2017. Workforce of the future: The competing forces shaping 2030. Available: <https://www.pwc.com/gx/en/services/people-organisation/workforce-of-the-future/workforce-of-the-future-the-competing-forces-shaping-2030-pwc.pdf>

107 Ibid.

108 PwC, 2018. PwC CEO Survey report 2018. Available: <https://www.pwc.com/gx/en/ceo-survey/2018/pwc-ceo-survey-report-2018.pdf>

109 PwC, 2017. Workforce of the future: The competing forces shaping 2030. Available: <https://www.pwc.com/gx/en/services/people-organisation/workforce-of-the-future/workforce-of-the-future-the-competing-forces-shaping-2030-pwc.pdf>

110 PwC, 2018. Time to talk: what has to change for women at work. Available: www.pwc.com/timetotalk

111 Bohnet, 2016. What works: gender equality by design. England: Belkap Press, p. 288

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For more research on gender equality in the workplace:

- **PwC Women in Work Index: Closing the gender pay gap**

<https://www.pwc.co.uk/economic-services/WIWI/women-in-work-index-2018.pdf>

- **Time to Talk: What has to change for women at work**

<https://www.pwc.com/gx/en/about/diversity/iwd/international-womens-day-pwc-time-to-talk-report.pdf>

- **Women in Tech: Time to close the gender gap**

<https://www.pwc.co.uk/who-we-are/women-in-technology/time-to-close-the-gender-gap.html>

- **Workforce of the future: The competing forces shaping 2030**

<https://www.pwc.com/gx/en/services/people-organisation/workforce-of-the-future/workforce-of-the-future-the-competing-forces-shaping-2030-pwc.pdf>

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