Bridging

THE TALENT GAP IN DENMARK

Insights from female representation in STEM

McKinsey&Company

Innovation Fund Denmark

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EXECUTIVE SUMMARY

Denmark has historically been at the forefront of promoting gender equality. Compulsory primary school education for both boys and girls, universal female suffrage, and paid parental leave were all achievements to which Denmark made important contributions. We pride ourselves on high female labor participation rates and educational attainment. However, there is still work to be done.

In the past few years, Nordic neighbor countries have accelerated measures to address sustained gender imbalances and have seen improvements as a result. Danish progress, however, has not kept pace. While in the top five of the World Economic Forum's Global Gender Gap Index in 2014, Denmark's ranking dropped to number 14 in 2017. Norway, Sweden, Finland, and Iceland remain in the top five. Denmark is particularly weak when it comes to female representation in leadership, where it ranks 80th out of 144 countries surveyed.

As international peers surge ahead, Denmark risks being left behind.

The global economy is transforming rapidly. Accelerating technological change, the imperatives of digitization and automation, and the vital role of start-ups in driving employment and growth place new demands on companies and countries. True differentiation hinges on talent and thought leadership, and no talent pool should remain untapped. Leveling the playing field for women can thus contribute to leveling the playing field for Danish companies versus global competition.

Danish talent fundamentals are strong. Women already comprise more than half of university graduates, and their performance is on par or better than men across disciplines. However, women continue to be underrepresented not only in leadership positions but also in areas that increasingly shape society.

The representation of both men and women in science, technology, engineering, and math (STEM) is paramount to developing inclusive technological solutions that do not perpetuate bias but create equal opportunities for all. Moreover, STEM companies are important drivers of economic growth through high productivity, innovation, and export intensity.

This report seeks to contribute to bridging the talent gap by promoting the inclusion of women across the private, public, and academic sectors.

We aim to:

- Provide a fact base for the dialogue on gender diversity in Denmark by laying out the latest data on female representation in leadership, including research and entrepreneurship, and STEM.
- Present new evidence on the hurdles faced by women throughout their career journeys, derived from a case study on gender imbalances in STEM.
- Inspire parents, educational institutions, communities, workplaces, government, and broader society to take concrete action, and to inform these groups about the most effective interventions.

The macroeconomic case for promoting gender diversity rests on the fact that having more women in the workforce brings incremental growth and prosperity, and, despite high female labor force participation, Danish women continue to work significantly fewer hours than men. The microeconomic motivation, in turn, stems from the positive impact of gender diversity on organizational performance. This is due to the higher collective intelligence and innovative capacity of diverse teams. Different backgrounds, problem solving approaches, skills, and strengths stimulate creativity and debate, ensuring additional rigor in identifying solutions.

While recognizing the existence and independent virtue of several other motivations for the pursuit of gender equality, including social and moral considerations, this report focuses solely on the economic perspective.

DENMARK TRAILS ITS PEERS ON FEMALE REPRESENTATION IN LEADERSHIP

As Danish companies strive to stay ahead of competition, the benefits of diverse teams are particularly pertinent to leadership. A strategic perspective that reflects the talents of the entire population is demonstrably more effective and lays the foundations for competitive differentiation.

In Denmark, female leadership representation across the private, public, and academic sectors is low relative to Nordic peers, and current growth rates do not hold promise of catching up. This means that Danish organizations may be missing out on the superior creative and collaborative capabilities of diverse teams.

- The share of women on the corporate boards of the largest publicly-listed Danish companies stands at 31 percent, compared to 36 percent in Sweden.
- Only one in seven executives of those same companies is a woman, relative to one in four in Norway.
- In senior and mid-level management across the private and public sectors, female representation has remained unchanged over the past five years. The 28 percent share is below all surveyed peers, with the U.S., for instance, boasting 40 percent.
- Fewer than one in four entrepreneurs are women, which is below the European average.
- The share of women in parliament has declined by three percentage points since 2013.
- Among senior government officials, we find one woman for every three men, whereas parity has been achieved in Finland and Sweden.
- Female representation in academia suffers from extremely low retention rates, resulting in only one in five professors being a woman. In the U.S., the equivalent number is one in three.

DENMARK FACES SIGNIFICANT GENDER IMBALANCES IN STEM

In a rapidly changing world, it is inevitable that leaders need to develop new skill sets. Being technologically adept is now of significant competitive advantage for those seeking to advance into leadership positions, and, by shaping technological development, tech-savvy leaders are increasingly influencing society.

Notably, the share of women in the fields where these skills are developed is low.

This report uses STEM as a case study in an effort to distill evidence-based insights on how to promote gender diversity in Denmark.

Our findings are based on a novel approach to following the careers of Danish women and men in STEM. Combining data from Statistics Denmark and LinkedIn we follow ~50,000 STEM graduates through their careers. This unique data set allows us to track the educational choices and movement of Danish women in and out of STEM jobs, as well as between the private and public sectors. We investigate how pay levels, work hours, and other structural factors differ and drive career journey dynamics. Our analyses are bolstered with input from organizations and experts engaged in the Danish gender diversity agenda, focus groups with female STEM professionals, and the most recent academic research.

The analyses allowed us to identify four critical moments in a woman's career journey where female talent loss occurs. We label these "inspiring," "attracting," "retaining," and "advancing."

- **INSPIRING.** The problem is not the talent pipeline; it is sparking young women's interest in STEM. In 2018, the share of young women accepted into STEM Bachelor's programs was one-third, unchanged since 2011. The female talent pool should be no smaller than the male talent pool, however, as Danish PISA results for 15-year-old girls in science are not significantly different from those of boys. Inspiring young women to choose non-stereotypical fields of study such as STEM is more difficult in developed countries, since a high level of gender equality has removed the financial necessity constraint from choice of education. We therefore need to address the underlying stereotypes that make these fields seem less of a fit for young Danish women.
- **ATTRACTING.** Female STEM graduates are less attracted to core STEM jobs such as engineering and software development. Men dominate private sector IT jobs in particular. Moreover, despite younger STEM cohorts of both genders increasingly taking their first job in the private sector, significant female overrepresentation in the public sector persists. This compounds the female talent shortage in high-productivity STEM companies. Gender gaps in wages and working hours between graduates with the same educational backgrounds appear from the outset of their careers, even after controlling for public-private sector distribution.
- **RETAINING.** While attrition rates for men and women in STEM jobs are not very different over time, we find that women are set back in their careers in terms of pay and other factors upon having children. New research has established a causal connection between pregnancy and a decline in pay, which never recovers. In the private sector we see a widening wage gap between men and women over time, and this discrepancy correlates closely with the average birth rate. In the public sector, on the other hand, a smaller pay gap is relatively stable over time. These dynamics point to a need for organizations to provide for more flexible work environments.
- **ADVANCING.** The career setbacks experienced by women result in significantly more male than female STEM graduates advancing into management, and the differences are particularly pronounced in the public sector, despite overrepresentation of women. Only one in 50 of the STEM women in STEM jobs make it to a management position in the public sector, whereas the corresponding number for male STEM graduates is one in ten. This suggests that advancement of women cannot be improved simply by increasing female representation in the organization overall.

To drive decisive action on rectifying gender imbalances, all four critical moments require intervention from stakeholders including parents, educational institutions, communities, workplaces, government, and broader society. Measures should aim to enable institutional and cultural change, creating an environment where both men and women can flourish. Addressing three different stakeholder groups, we put forth seven considerations to promote gender diversity in Denmark.

SEVEN CONSIDERATIONS

PARENTS, EDUCATIONAL INSTITUTIONS, AND COMMUNITIES

1. Provide female role models

Female role models are particularly important in inspiring young women to consider traditionally male-dominated fields of study such as STEM. They combat debilitating stereotypes and can take many forms, from female science teachers to peers with like-minded interests or successful female leaders with diverse backgrounds.

2. Speak to women – both explicitly and implicitly

Communication aligned with female affinities has proven influential in inspiring the educational choices of young women. Effective strategies include changing the names of university courses to better reflect the purposes women seek to accomplish, adapting course content, and creating an inviting physical environment.

THE WORKPLACE

3. Commit and make your own business case

Success in promoting gender diversity requires commitment to a target and accountability. It needs to become a strategic priority. Leaders should start by obtaining data and transparency on the status quo. In this way, the case for change and a baseline against which to measure progress is established. To garner sufficient support, leaders should establish and communicate a company-specific business case for prioritized diversity efforts, so that all employees understand the motives behind actions taken and play an active role in their implementation.

4. Reduce bias in recruitment processes

Unconscious bias affects women throughout their career journeys, and in the workplace the first critical moment where this needs to be overcome is in attracting female candidates. Concrete measures include the use of gender neutral language in job postings as well as blinding techniques in application screening and a structured approach to conducting interviews.

5. Promote an inclusive work culture

Changing institutional practices and culture to better attract, retain, and advance women requires systematic action on a number of fronts. We propose ten elements that are conducive to creating an inclusive work environment, centered on flexibility, equal treatment, and greater employee engagement. This entails a cultural shift towards making inclusive practices the socially accepted norm.

6. Advance female talent through mentorship and sponsorship

Female talent loss is much steeper at the transition into management than across the rest of the career journey, which suggests the need for preemptive action. Mentorship and sponsorship programs have been shown to support the advancement of female talent. Given the current gender representation at the top, this is a measure where active engagement on the part of men is paramount. Talent programs can also be a useful tool for developing specific leadership skills among women.

GOVERNMENT AND SOCIETY

7. Take the structural debate – inspired by peer experience

Many countries have put legislative measures in place to address gender diversity. The effectiveness of these interventions is uncertain. However, given Denmark's recent underperformance against Nordic peers, there is a reasonable case for further action. This last consideration seeks to inspire and facilitate debate on what initiatives could be relevant in a Danish context. Earmarked paternity leave may be the most evidence-based intervention to consider.

The challenge of promoting greater gender diversity in Denmark is multifaceted and requires broad stakeholder engagement. However, concrete interventions are available to effectively tackle it head on.

A DANISH PERSPECTIVE ON GENDER DIVERSITY

For more than ten years, McKinsey & Company has sought to contribute to the global dialogue on gender diversity, and provide a fact base to support efforts by companies, governments, and social sector organizations to advance the cause of women in the workplace and beyond.

There remains much work to be done – but we are encouraged by the number of organizations and other actors that are taking the issue of gender to heart, and recognizing that the pursuit of gender equality is both a moral and an economic imperative for success in the twenty-first century.

This report is the first of its kind to place gender diversity in a Danish context and holistically examine prevailing dynamics and effective solutions. We hope to make the case that promoting gender diversity benefits both organizations and society, men and women, families and communities.

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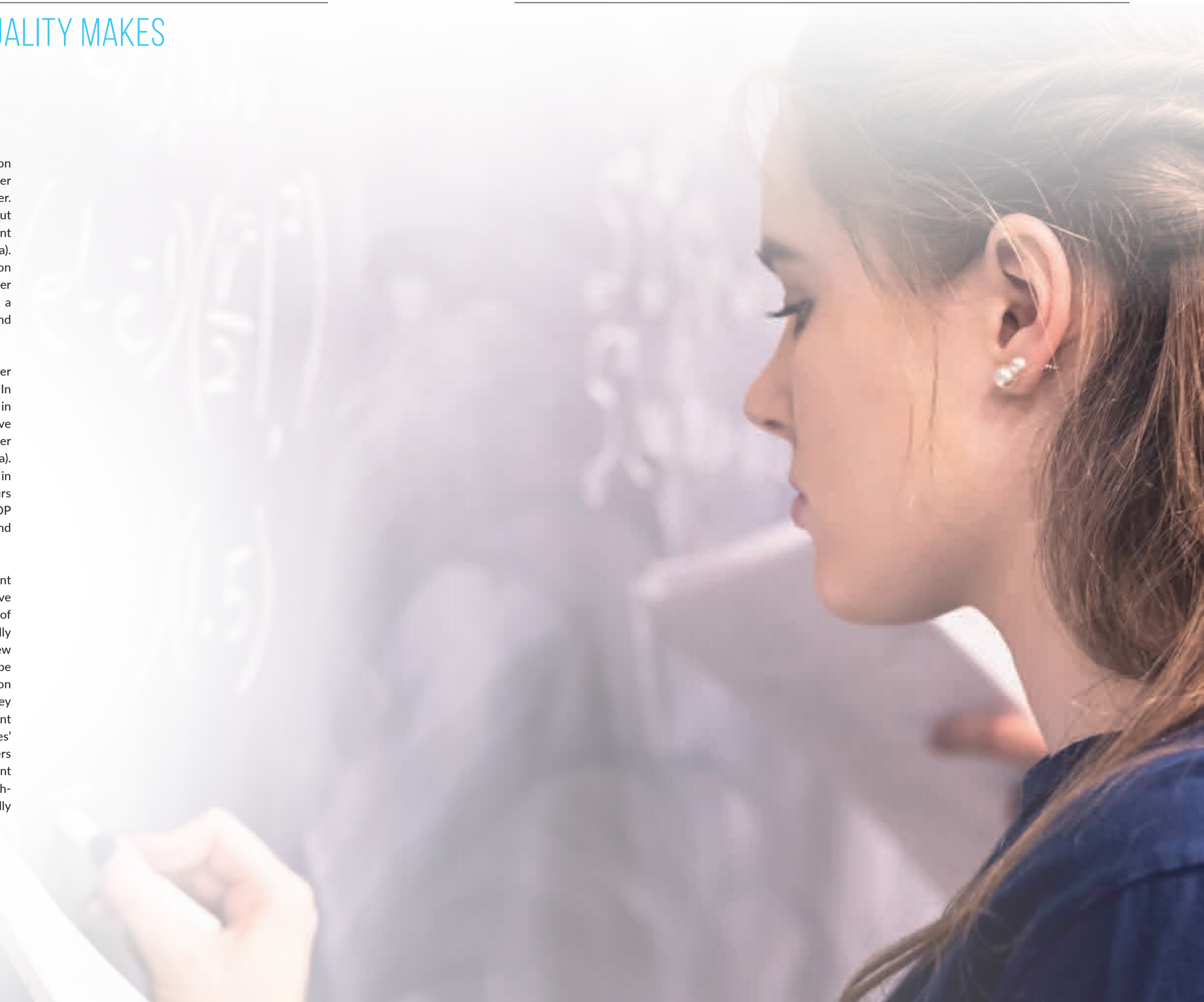
GENDER DIVERSITY MATTERS

PROMOTING GENDER EQUALITY MAKES ECONOMIC SENSE

In the context of increasing international competition for talent, the case for a shift towards greater gender diversity in organizations has never been stronger. Women represent half of the world's population but generate only 37 percent of global GDP (38 percent in Western Europe) (McKinsey & Company, 2017a). Bridging this gap requires higher female participation in the labor force. Globally, some 655 million fewer women than men are economically active, and a disproportionately large share of unpaid domestic and care work still falls on women.

The macroeconomic case for further promoting gender equality is evident when looking at historical data. In Denmark, Iceland, Norway, and Sweden, increases in female employment over the past 40 to 50 years have accounted for 10 to 20 percent of the annual GDP per capita growth rate, according to the OECD (2018a). Still, despite high labor force participation, women in Denmark continue to work significantly fewer hours than men. Closing the gap would boost per capita GDP growth by 19 percentage points between 2013 and 2040 (OECD, 2018a).

In a microeconomic context, attracting top talent has become the number one source of competitive advantage for companies. Given the advancement of digital and automation, workers must be technologically literate, operationally agile, and globally rounded. New McKinsey research finds that employers in Europe and North America alone will require 16 to 18 million more university-educated workers by 2020 (McKinsey & Company, 2017a). Failure to attract and retain talent was cited as the single biggest challenge on executives' minds in a global survey of over 1,000 business leaders (The Conference Board, 2018). Expanding the talent pool through better inclusion of women in high-productivity sectors and the labor force more broadly represents an opportunity that ought to be seized.



GENDER DIVERSITY MAKES FOR BETTER PERFORMING TEAMS

A well-recognized benefit of greater diversity – both endowed (e.g., gender, race) and acquired (e.g., experience, cultural capital) – is superior team performance on measures such as innovation, collaboration, and critical thinking (Sethi, et al., 2001; Egan, 2005; Woolley, et al., 2010). Different problem solving approaches, complementary knowledge, skills, and strengths all serve to promote creativity and debate, ensuring more alternatives are considered and additional rigor is applied when identifying solutions. Studies show that the collective intelligence of a group is strongly correlated with gender diversity, and that problem solving is less effective at either extreme (majority male or female) relative to a more balanced group composition (Woolley, et al., 2015). This points to another lesson, namely that of critical mass (Bohnet, 2016). In groups with a sustained and significant male majority, women are likely to be treated as tokens or symbolic representatives of their gender. They are reduced to their demographic characteristics and may therefore be unable to fully bring their complementary expertise to bear. Research on the tokenism hypothesis finds that the likelihood of increasing the share of non-employee-elected female board members is significantly smaller if one, two, or more women already possess board roles (Smith & Parrotta, 2015).

In academia, greater gender diversity in an author group is shown to correlate with more nuanced research. In the case of medical science, women are found to take physiological and behavioral differences between women and men into account in evaluating and developing new treatments to a greater extent than men (Nielsen, et al., 2017). Moreover, the strongest correlations are observed in cases where a woman had a leading role in the research team. By contrast, single-gender teams are more likely to design solutions catering mostly to their own gender. A U.S. analysis finds that eight out of ten drugs withdrawn from the U.S. market between 1997 and 2000 (when female representation in medicinal research was significantly below current levels) posed greater health risks for women than men (U.S. Government Accountability Office, 2001).

GENDER DIVERSITY IS IMPORTANT FOR DEVELOPING INCLUSIVE TECHNOLOGY

Due to the superior creative capabilities and critical thinking facilitated by team diversity, the inclusion of both men and women in developing new technologies may lead to more innovative solutions. Gender diversity also ensures that digital products and services cater to the needs and interests of both genders, i.e., that the technology shaping our society and future is democratic. A case in point is the design of inclusive algorithms. Machine intelligence learns from observing the data that it is presented with, and if gender stereotypes permeate this data, the resulting application of the technology may perpetuate and even amplify unconscious bias (Bolukbasi, et al., 2016). To be able to see, understand, and correct these biases, the representation of all those potentially affected is paramount.

Further supporting the case for better inclusion of women in developing new technology is the notion of societal readiness. For technological innovations to be effective and lead to better outcomes, it is imperative that they are embraced by all. Women not only constitute half of the population but also hold sway over most purchasing decisions in the household, and their support is therefore critical to ensuring the successful integration of technology into the whole of society.

GENDER DIVERSITY IS LINKED TO BETTER CORPORATE PERFORMANCE

Better performing teams may make for better performing companies. An increasing body of research points to gender-diverse corporate leadership (boards and executive teams) having a positive financial impact. Results, however, are ambiguous, and particular difficulty lies in establishing the direction of causality between diversity and performance. It may be that the firms who decide to employ more women in leadership positions are those that are already performing well. The most reliable studies use panel data to follow the same companies over a number of years and control for firm-specific fixed effects, including firm size and age. One such analysis uses four different measures of performance to analyze a data set of the 2,500 largest Danish companies, observed from 1993 to 2001 (Smith, et al., 2006). A positive effect of having a larger proportion of women in top management is confirmed in three out of these four metrics, even after controlling for unobserved variables and the direction of causality.

Looking beyond Denmark, a 2013 IMF study of two million listed and unlisted firms across 34 European countries (including Denmark) finds a strong positive correlation between the share of women in senior positions (boards and executive committees) and firms' return on assets. Identified effects are robust to controls for firm-specific fixed effects, but the study does not conclusively determine the direction of causality (Christiansen, et al., 2016). New evidence from the venture capital world lends further support to the diversity dividend theory (albeit in this case looking at diversity broadly, including both gender and race) (Gompers & Kovvali, 2018). Decisions in venture capital firms are readily attributable to individuals, and choices have clear business consequences in terms of investment performance. This facilitates the establishment of causality. Analyzing the decisions of thousands of venture capitalists and tens of thousands of investments across a data set extending back to 1990, researchers find that diversity significantly improves financial performance on profitable investments at portfolio-company and fund levels. Still, other studies either do not establish a causal link between greater gender diversity in corporate leadership and financial performance and/or find no, or even negative effects (Smith, 2014; Pletzer, et al., 2015). The examples cited above should therefore be considered as indications only, with a solid positive business case still to be established.

Research also highlights other impact measures from female representation in corporate leadership. One study finds that having gender-diverse boards leads to tougher monitoring of executive teams, more frequent use of incentive schemes in compensation packages, and more willingness to fire the CEO when company performance is poor (Adams & Ferreira, 2009). Research also shows that women tend to be more risk averse relative to their male counterparts, with potential implications for the financial performance of firms. Examining a large sample of Danish firms, female-led firms are found to be less volatile over time with respect to investments, return on equity, profits, and sales (Parrotta & Smith, 2013). The gender of the CEO has the biggest effect, with the gender of the board chair and board composition making less of a difference. Furthermore, female role models and/or mentorship may have a positive effect on the career development of women at lower levels of the organization (Matsa & Miller, 2011).

Still, the impact is not all one way, and negative effects from gender diversity on boards may occur. For instance, a more diverse board with differing opinions may prove less agile in decision making, and conflict is more likely. A reluctance to share information with demographically dissimilar board members may also compromise board efficiency (Ferreira, 2010).

OTHER PERSPECTIVES ON WHY GENDER DIVERSITY MATTERS

Gender equality benefits not only women but also men, families, and broader society, through faster economic growth, societal cohesion, and prosperity. Research shows that more equal countries are more prosperous and more trusting (Klasen & Lamanna, 2009; Cho, 2016). Providing equal opportunities for men and women is also a matter of basic human rights, with intrinsic value in and of itself.

As such, organizations may have various motivations for addressing gender diversity. While fully recognizing the existence and independent virtue of different vantage points, this report focuses solely on the economic perspective.

GENDER DIVERSITY IN DENMARK

DENMARK FACES A TALENT SHORTAGE, PARTICULARLY IN SCIENCE AND ENGINEERING

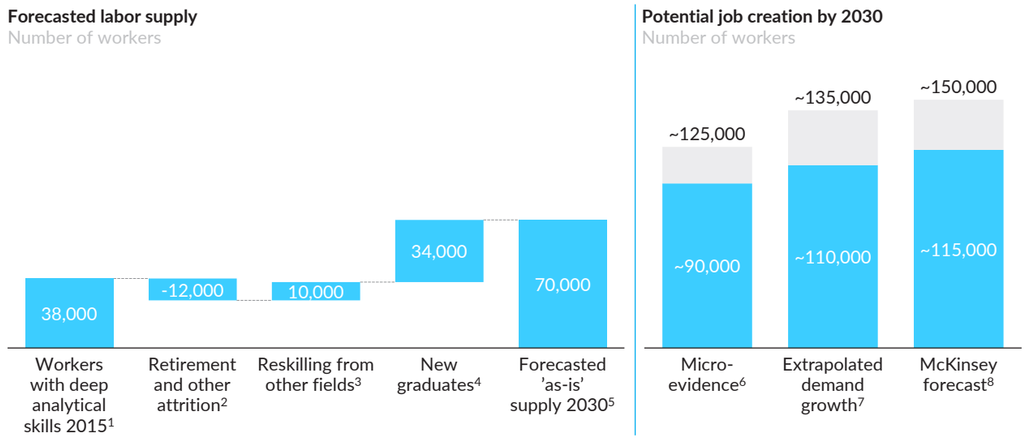
Also in Denmark, digitization and automation has triggered a growing demand for talent. In the sectors with the greatest projected demands (science, IT, and engineering), Denmark faces future scarcity of an estimated 19,000 ICT specialists by 2030 (Højbjerre Brauer Schultz, 2016). Another projection estimates a need for 6,500 engineers and 3,500 science graduates by as early as 2025 (Engineer the Future, 2018). McKinsey research finds similar results when evaluating the need for workers with strong analytical skills across industries towards 2030 (Exhibit 1) (McKinsey & Company, 2017b). New analyses from Statistics Denmark (2018) show that 39 percent of the largest Danish companies (250+ employees) already experience difficulties in attracting the required number of IT specialists. In 2014, this was the case for only 20 percent of the companies.

As we will later show, the fields of science, technology, engineering and math (STEM) see significant female underrepresentation, and further promoting gender diversity can thus help bridge the gap.

STEM companies drive economic growth through high productivity, export intensity, and innovation, analyses from the Danish Academy of Technical Sciences show (ATV & Damvad, 2017). They also pay higher wages. Between 2011 and 2015, the annual wage growth in Danish science and engineering companies was 2.9 percent compared to 1.7 percent for the average Danish company. Moreover, in 2015, these companies employed almost 23 percent of the private workforce and contributed 21 percent of the gross value added to the private sector. They were also 40 percent more productive and had 24 percentage points higher export intensity than the average Danish company.

Exhibit 1

DIGITIZATION AND AUTOMATION WILL CREATE LARGE DEMAND FOR ANALYTICAL TALENT IN DENMARK



1. Includes workers with educations which entail advanced training in mathematics, statistics and/or machine learning, based on 41 selected educations in the 8-digit HFSSP hierarchy from Statistics Denmark out of a total of ~3,000 education codes. 2. Assumes workers older than 51 years old in 2016 will generally have left the workforce by 2030. 3. Based on share of current data scientists in Danish companies that have background outside educations included in (1), based on analysis of LinkedIn profiles. 4. Assumes growth trend from 2007-2015 (3%) will continue towards 2030, net of retirement and attrition. 5. Assumes that all with analytical background supply their skills. 6. Based on micro-level firm evidence of ratio between data scientists and FTE workhours automated in major European financial institutions (robotics process automation). 7. Extrapolation of high-skill IT-related jobs based on number of job postings in 2016 and growth rate from 2012-2016 (~23-25% CAGR). 8. Imputed employment given forecasted capital/labor-ratio and increases in capital investments to facilitate automation.
SOURCE: McKinsey & Company, 2017b

DENMARK HAS BEEN A FRONTRUNNER FOR PROMOTING GENDER EQUALITY

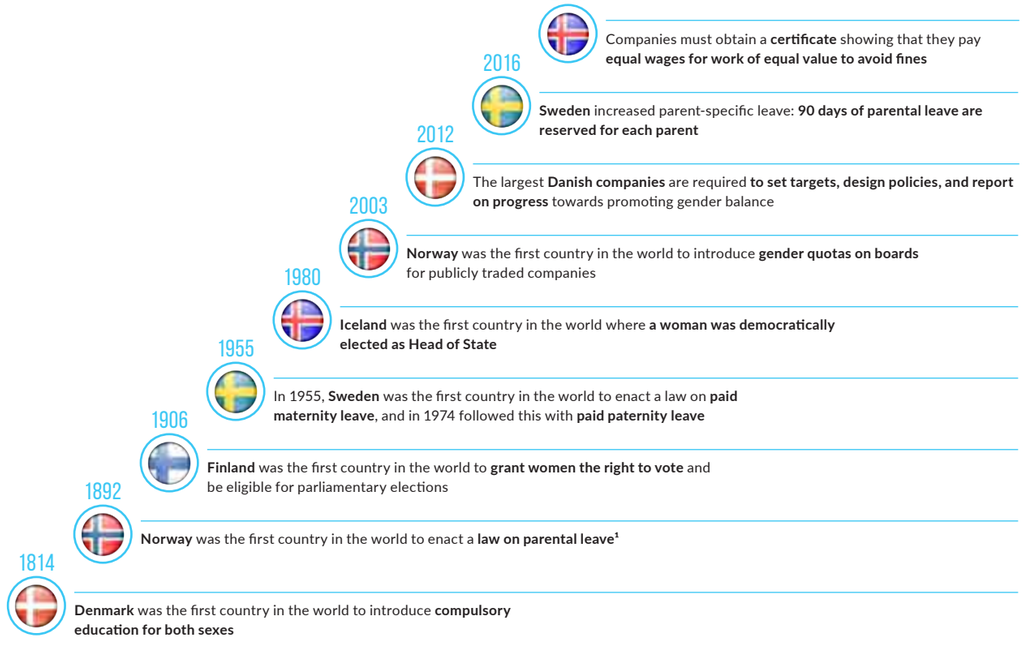
Denmark and the rest of the Nordics have been at the forefront of policy making that promotes gender equality (Exhibit 2). Norway passed a law on parental leave as early as 1892, when wage-earning women in factories were given up to six weeks maternity leave (though without compensation and primarily aimed at reducing child mortality). In 1906, Finland was the first country in the world to grant full suffrage to women and eligibility for parliamentary elections, while Sweden safeguarded working women's right to paid maternity leave in 1955. In 1980, Iceland became the first country to elect a female head of state, and, in 2003, Norway introduced gender quotas for the executive boards of publicly listed companies.

Denmark has also actively addressed gender imbalances, and in 1814 became the first country to introduce compulsory education for both sexes. It granted full female suffrage in 1915. In 1983, men were entitled to take two weeks of parental leave around the time of birth and up to ten weeks in place of the mother during the child's 15th to 24th week of life. At that time, total parental leave rights between both parents amounted to 24 weeks. Today it is 52 weeks (Statistics Denmark, 2015).

Recent Danish efforts include a requirement from 2012 for the largest Danish companies to set targets for female representation on corporate boards and to

Exhibit 2

GENDER EQUALITY IN THE NORDIC COUNTRIES



1. The law granted women who worked in factories six weeks of maternity leave. The first laws on parental leave were enacted primarily to combat infant mortality.
SOURCE: Statistics Denmark, 2015; Nordic Council of Ministers, 2006; Nordic Council of Ministers, 2016; Nordic Social Statistical Committee, 2017; Government Offices of Iceland, 2017

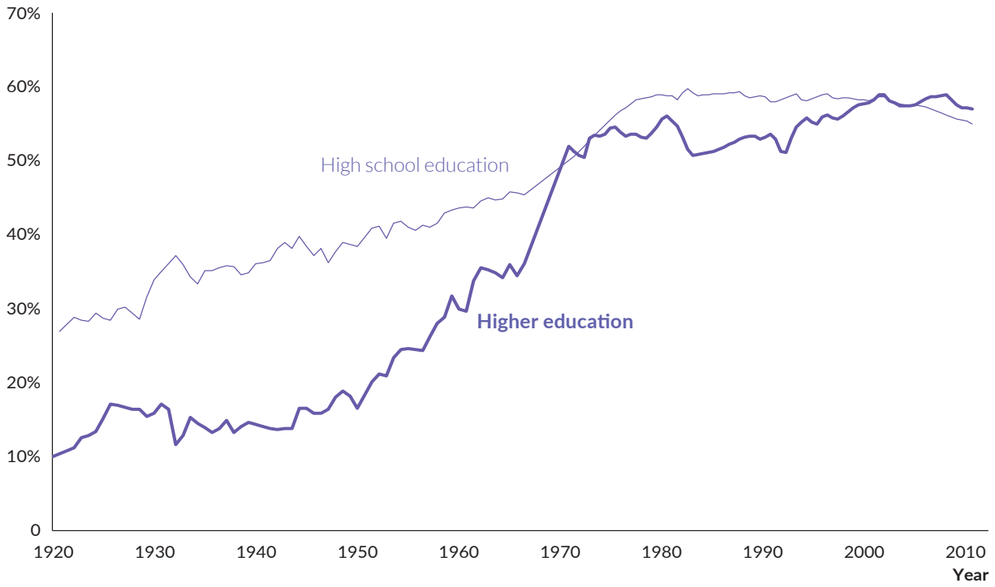
design policies aimed at improving the gender balance at other management levels. Companies must report progress in annual reports. However, targets are determined solely by the individual organization and are not legally binding, i.e., no sanctions apply in case of noncompliance (Danish Business Authority, 2017).

As a result of these developments, women have made inroads in both economic and political participation, educational attainment, and workplace representation. For instance, higher education in Denmark now produces more female than male university graduates (Exhibit 3). The female employment rate stands at 74 percent, which is around seven percentage points higher than the EU-28 average (20 to 64-year-olds) (Eurostat, 2018).

Exhibit 3

WOMEN IN EDUCATION

FEMALE SHARE OF COMPLETED EDUCATIONS[1], DENMARK, PERCENT

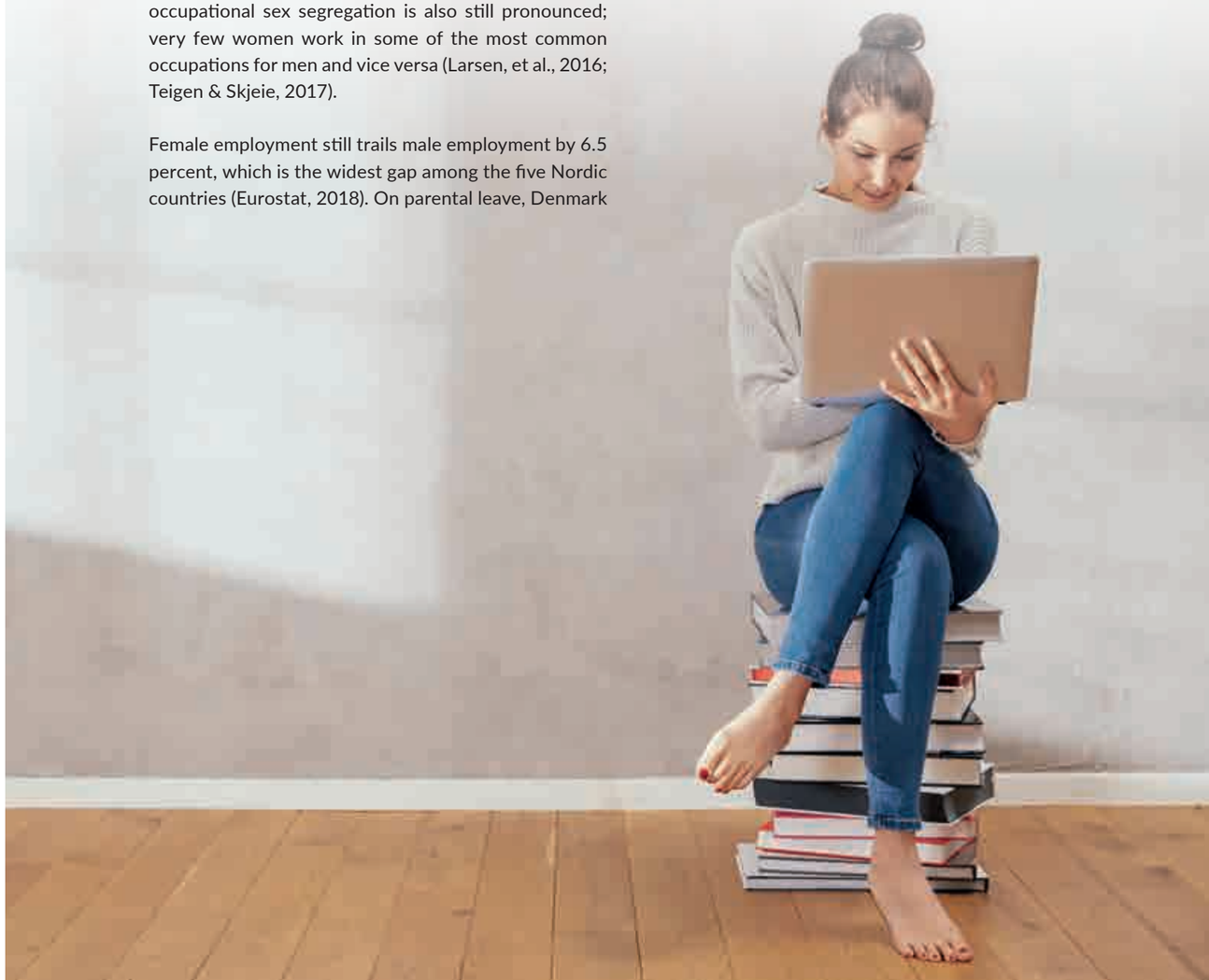


1. Linear interpolation performed for the years 1968-1974 due to lack of data
SOURCE: Statistics Denmark, 2018; McKinsey analysis

THERE IS STILL WORK TO BE DONE

Despite the measures mentioned above, Denmark has fallen behind its peers. The Global Gender Gap Index, published yearly by the World Economic Forum, considers educational, economic, political, and health outcomes. From being in the top five in 2014, Denmark's ranking dropped to number 14 in 2017, whereas Norway, Sweden, Finland, and Iceland remain in the top five (World Economic Forum, 2017). This was due to relatively poor performance on economic participation and opportunity, and particularly on female representation in leadership, where Denmark ranks 80th out of 144 countries surveyed. Moreover, a ranking of 21 for women in parliament masks significant gender segregation on parliamentary committees: men continue to hold at least 70 percent of the seats on the powerful Finance, Defense, and Foreign Affairs Committees (Danish Parliament, 2018). Broader occupational sex segregation is also still pronounced; very few women work in some of the most common occupations for men and vice versa (Larsen, et al., 2016; Teigen & Skjeie, 2017).

Female employment still trails male employment by 6.5 percent, which is the widest gap among the five Nordic countries (Eurostat, 2018). On parental leave, Denmark remains the only country in the Nordics without a separate quota for fathers; the mother may take leave at the same time (Statistics Denmark, 2015). Danish fathers take 10 percent of total parental leave, which is the lowest among Nordic peers (Nordic Council of Ministers, 2017). In Sweden, they take 27 percent.



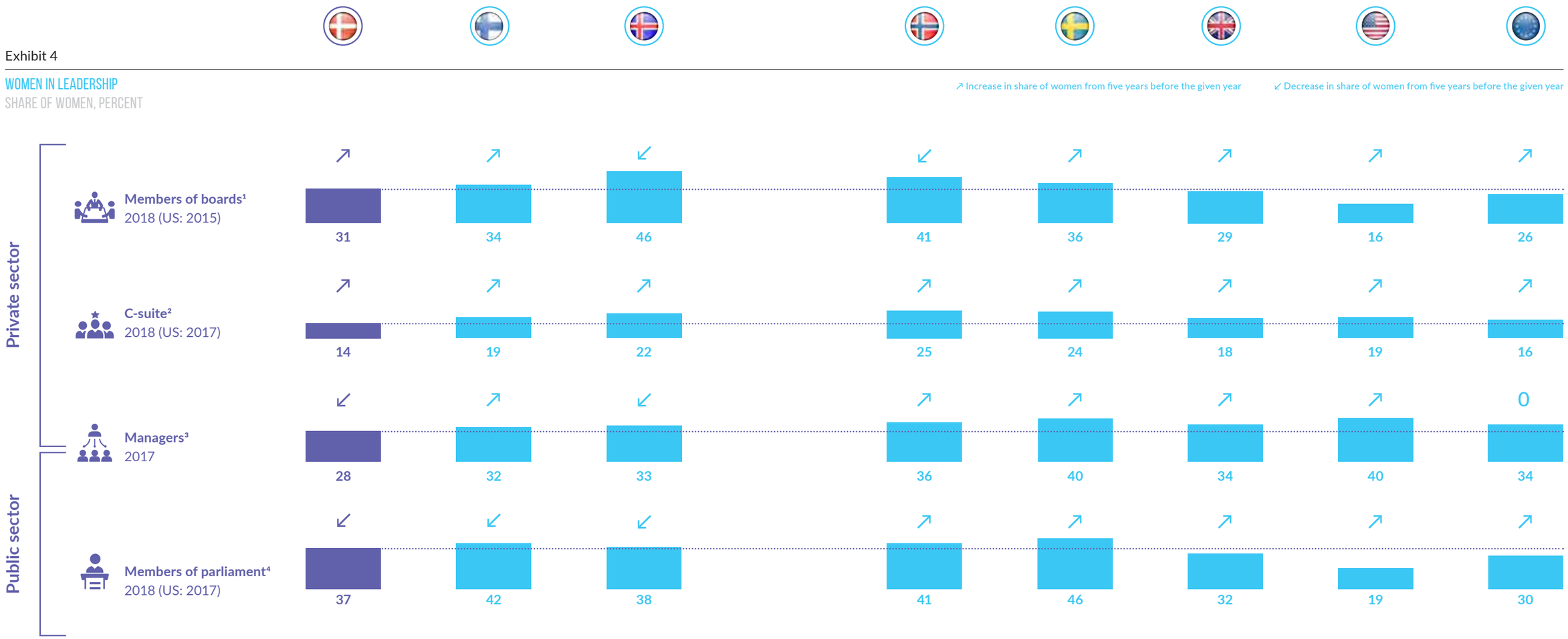
GENDER DIVERSITY IN LEADERSHIP

DENMARK TRAILS ITS PEERS ON FEMALE REPRESENTATION IN LEADERSHIP

Denmark has fallen behind other Nordic countries and international peers on the share of women in leadership, and improvements have been modest (Exhibit 4). Most encouraging is the growth in the representation of women on corporate boards among the largest publicly listed Danish companies, which rose ten percentage points from 2013 to 2018. Still, the current level of 31 percent is lower than peers. Sweden, for example, has 36 percent. Among executives ("the C-suite"), particularly high imbalances persist, with only one in seven executives being a woman. This is the lowest level across all surveyed countries. In addition, the change since 2013 is modest relative to already better performing peers. In senior and mid-level management across the private and public sectors, female representation has remained unchanged over the past

Exhibit 4

WOMEN IN LEADERSHIP
SHARE OF WOMEN, PERCENT

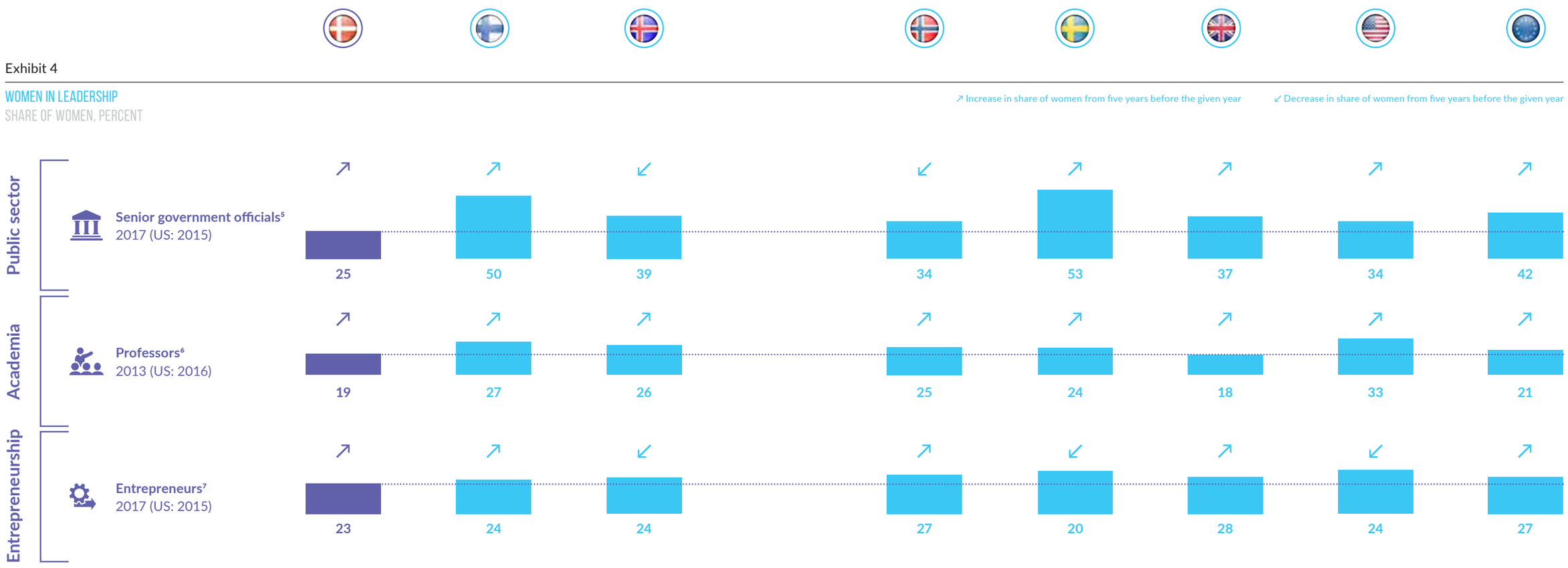


five years, and the absolute share of 28 percent is low compared with the 40 percent seen in the U.S. Some 23 percent of entrepreneurs in Denmark are women, which is below the EU average. The percentage of female members of parliament in Denmark has dropped by three percentage points since 2013, from 40 to 37 percent. In Sweden, 46 percent of MPs are female. Female representation among senior government officials is also lower than elsewhere, with one woman for every three men, while parity has been achieved in Finland and Sweden.

Exhibit 4

WOMEN IN LEADERSHIP

SHARE OF WOMEN, PERCENT



1. 'Members of boards' refers to members of the highest decision-making body in each company. European countries: '2018' refers to 2018 H1. Change over time refers to the period from 2013 H1 to 2018 H1. Data cover the largest publicly listed companies in each country. The "largest" companies are taken to be the members (max.50) of the primary blue-chip index, which is an index maintained by the stock exchange and covers the largest companies by market capitalization and/or market trades. US: '2015' refers to 2015 Q3. Change over timer refers to the period from 2010 Q4 to 2015 Q3. Data cover companies covered by the MSCI's 'global director reference universe'. 2. European countries: '2018' refers to 2018 H1. Change over time refers to the period from 2013 H1 to 2018 H1. 'C-suite' refers to senior executives in the two highest decision-making bodies in each company. See 1. for included companies. US: 'C-suite' refers to each company's definition of its executive management team or executive management committee. 3. 'Managers' refers to senior and middle management in government, large enterprises and institutions corresponding to major group 1 in ISCO-08 minus category 14 in ISCO-08 (hospitality, retail and other services managers), since category 14 comprises mainly managers of small enterprises. EU-28: 'Managers' refers to major group 1 in ISCO-08. Age: From 15 to 64 years. 4. 'Members of parliament' refers to members in national lower or single houses of parliament. Count includes the president (speaker/leader of the house). European countries: '2018' refers to 2018 Q2. 5. European countries: 'Senior government officials' refers to level 1 administrators (all administrative (non-political) positions from the head of the ministry down to the level of head of directorate or similar, where a directorate is a major section within the ministry) and level 2 administrators (all positions below the head of directorate down to the level of head of division/department, where a division/department is the first level of organization below the directorate (i.e. the second level of functional organization). US: 'Senior government officials' refers to levels D1 (corresponding to ISCO-08 group 1112) and D2 (corresponding to ISCO-08 group 11 and 112). 6. European countries: Change over time refers to a three years period, i.e. from 2010 to 2013. 7. 'Entrepreneurs' refers to self-employed with employees. According to OECD (2012), self-employed with employees are more likely than other self-employed to be individuals who work on an entrepreneurial project they can expand or change as market opportunities emerge

SOURCE: EIGE, 2018 (European countries: Members of boards; C-suite; Members of parliament; Senior government officials); European Commission 2012, 2015 (European countries: Professors); Eurostat, 2018 (EU-28: Managers; European countries: Entrepreneurs); ILO, 2018 (Managers); McKinsey Diversity Database (US: C-Suite); National Center for Education Statistics (US: Professors); OECD, 2018 (US: Members of boards; Members of parliament; Senior government officials; Entrepreneurs); McKinsey analysis

FEMALE RETENTION IN ACADEMIA IS PROBLEMATIC

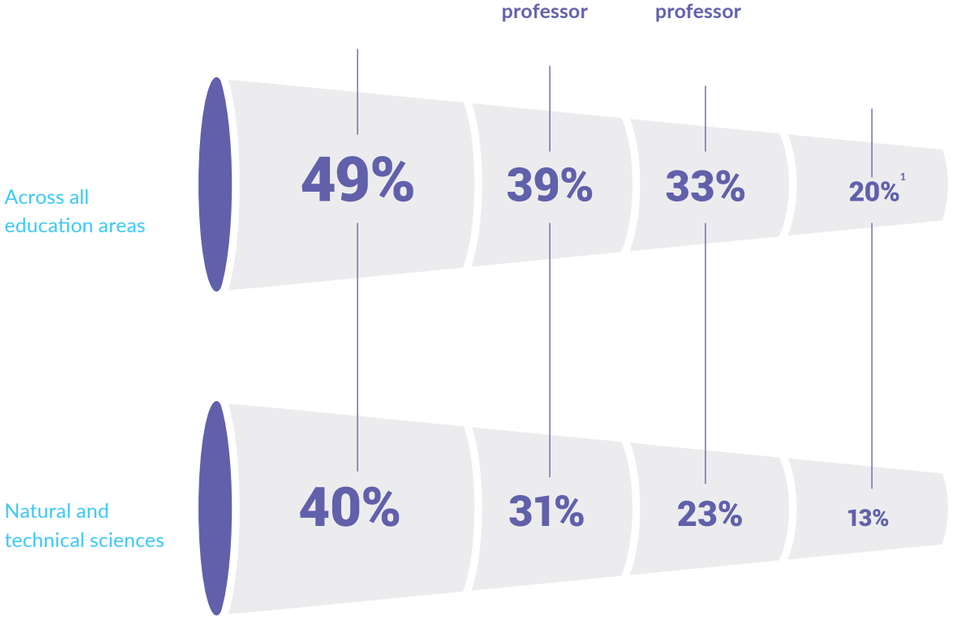
Turning to universities, there is both encouraging and discouraging news. The share of female researchers is consistently on the rise, with Danish women currently earning almost half of all PhDs (Agency for Science and Higher Education, 2017). However, the researcher pipeline starts leaking from PhD onwards. Only one in five professors at Danish universities is a woman and there is a particular lack in science and technology (Exhibit 5). The share is below other countries (Exhibit 4).

Female representation among the "gatekeepers" who determine the allocation of research funding and appointments is lower still. Among academic institution leaders, board members of research councils and other relevant organizations, women hold 14 percent of the seats. In Norway, Sweden and Finland, this share is between 25 and 32 percent (Independent Research Fund Denmark, 2013). Analyses find that men produce 20 to 60 percent more publications than women, and male researchers are cited more frequently (Independent Research Fund Denmark, 2013). Women, on the other hand, spend more time teaching and carrying out administrative tasks that count less towards advancement in the current evaluation schemes. In addition, the peer review process still carries the perception that productivity is closely tied to work hours and achievement early in one's career. This may disproportionately disadvantage women, who tend to have children early in their tenure. A study investigating publication patterns in Norway finds that the difference in publication rates between men and women is most pronounced between the ages of 25 and 40 but subsequently evens out (Sidselrud, et al., 2012). At the current pace of change, gender balance in research is unlikely to be achieved in the foreseeable future. Projections by the Agency for Science and Innovation (2015) based on growth rates in the share of female professors from 1996 to 2013 show gender balance being reached in 2064. Acceleration is required.

Exhibit 5

WOMEN IN RESEARCH

SHARE OF FEMALE RESEARCHERS IN HIGHER EDUCATION, DENMARK, 2015, PERCENT



1. Share of female professors at 19 percent in Exhibit 4 (in 2013) versus 20 percent in Exhibit 5 (in 2015); difference due to lack of 2015 data for other countries
SOURCE: Agency for Science and Higher Education, 2017

GENDER IMBALANCES IN STEM

A USEFUL LENS TO UNDERSTAND SUSTAINED GENDER IMBALANCES

Science, technology, engineering and math (STEM) workers may be engineers configuring robots to do household chores, software developers designing new gaming apps, mathematicians modelling the effects of climate change or geoscientists studying the earth. They may also be high school science teachers and university professors supporting the critical supply of future STEM candidates.

We have chosen STEM as a case study for a number of reasons.

1. **Large imbalances persist**
   STEM is the educational area – in Denmark and most countries – that sees the largest gender imbalances. Increasing the share of women in STEM would also contribute towards rebalancing representation in fields where the balance has tipped in favor of women (e.g., health sciences).

2. **Demand for STEM talent**
   As digitization and automation accelerate, demand for highly analytical talent is on the rise. STEM companies are important drivers of economic growth through high productivity, innovation, and export intensity, and women can help bridge the increasing talent gap.

3. **STEM defines new technologies**
   STEM is at the core of developing new technology. The representation of both men and women in STEM is paramount to designing inclusive technological solutions that do not perpetuate bias and create equal opportunities for all.

4. **Tech skills essential for leaders**
   The developments of the global economy shape the necessary skill set for leaders. Technological savviness is becoming a competitive advantage for candidates seeking to advance into leadership positions, and more women in STEM means strengthening the female leadership pipeline.

5. **Generalizable insights**
   Due to the persistent gender imbalances and pervasive impact of stereotypes in STEM, we believe that insights from a STEM case study may be applicable to other areas, and, on this basis, we aim to distill new insights on how to further promote gender diversity in Denmark.

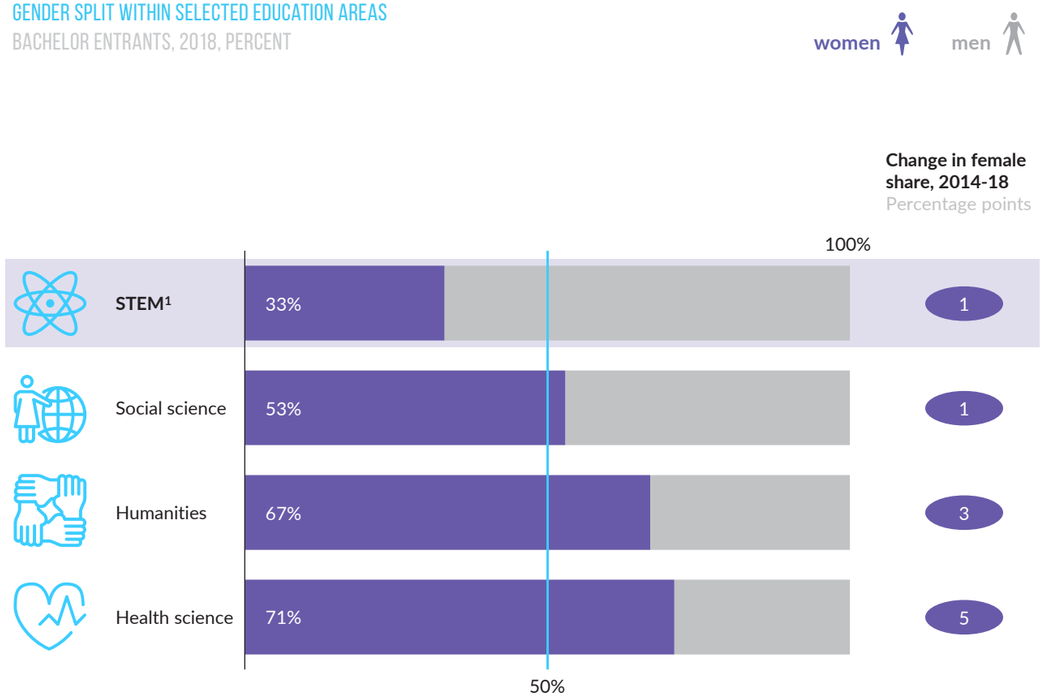
We do not suggest that STEM is more important than other areas of education per se; lower automation potential will place a premium on skills such as creativity, pattern recognition, and social and emotional reasoning (McKinsey Global Institute, 2017). Some fields of study have also been shown to exceed STEM in terms of occupational productivity, including economics and law (Ministry of Finance, 2016). It may be the case, however, that the marginal productivity of STEM workers is particularly high due to spillover effects to other sectors of innovation and technology.

DENMARK FACES SIGNIFICANT GENDER IMBALANCES IN STEM

In 2018, the share of young women accepted into STEM education was a third, unchanged since 2014 (Exhibit 6) (Agency for Science and Higher Education, 2018). The humanities and health sciences had the exact opposite gender distribution, whereas the area with the most balanced gender composition is social sciences. The gender distribution has remained remarkably constant in all educational areas. In Denmark, STEM is thus one of the education areas with the largest gender imbalances in favor of men.

Exhibit 6

GENDER SPLIT WITHIN SELECTED EDUCATION AREAS
BACHELOR ENTRANTS, 2018, PERCENT

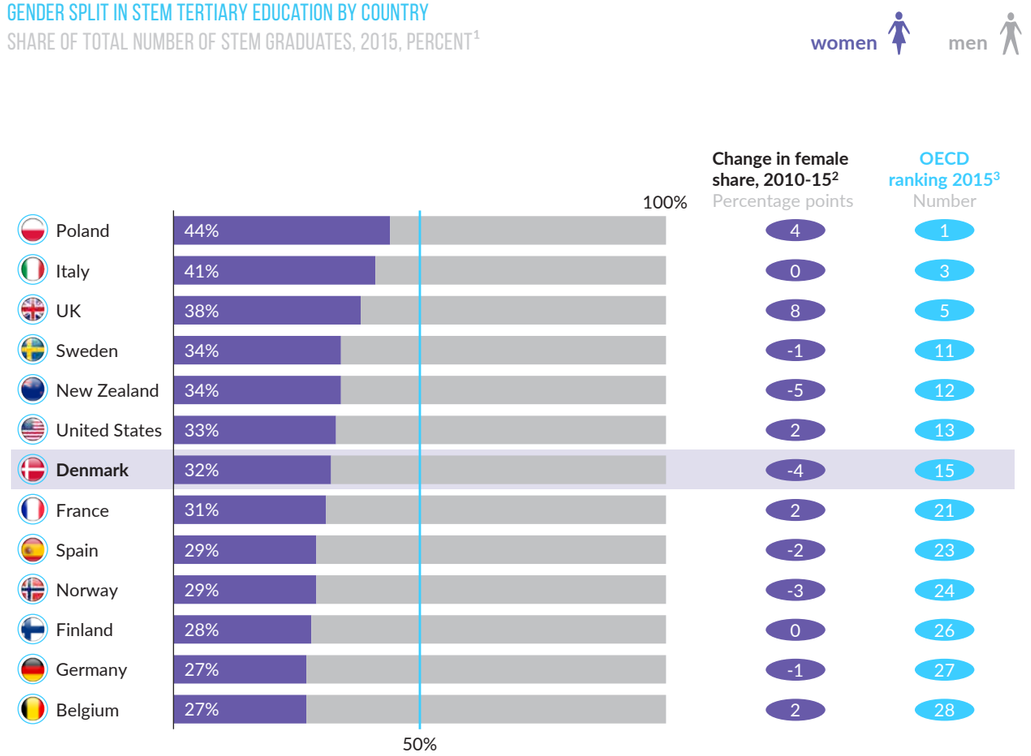


1. 'STEM' refers to educations in natural sciences, mathematics and statistics, or information and communication technologies (ICTs), or engineering, manufacturing and construction defined according to the International Standard Classification ISCED 2011. Data refers to Bachelor's programs, vocational Bachelor's programs and professional educations (only the case for STEM, other areas include Bachelor entrants only).
SOURCE: Agency for Science and Higher Education, 2018; McKinsey analysis

Looking at STEM graduates and comparing to international peers, the latest available numbers are from 2015. Reflecting the undergraduate intake, in 2015 less than one in three Danish graduates in tertiary STEM education was female. Gender imbalances in STEM education are nearly universal across the world, yet – as we will later show – less developed countries come closer to parity. In the OECD, women are outnumbered in all countries. Denmark is at an intermediate level, ranking as number 15 out of the 36 members (Exhibit 7). While Poland takes the lead, the UK saw the greatest positive change between 2010 and 2015.

Exhibit 7

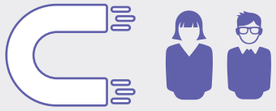
GENDER SPLIT IN STEM TERTIARY EDUCATION BY COUNTRY
SHARE OF TOTAL NUMBER OF STEM GRADUATES, 2015, PERCENT[1]



1. Tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education. It comprises ISCED levels 5, 6, 7 and 8, which are labelled as short-cycle tertiary education, Bachelor's or equivalent level, Master's or equivalent level, and doctoral or equivalent level, respectively. 2. Due to lack of 2010 data other years have been used for Germany (2013-15), New Zealand (2008-15), Italy (2011-15), and France (2009-15). 3. For creating the OECD ranking, due to lack of 2015 data other years have been used for Greece and Netherlands (2014) and Iceland (2012)
SOURCE: UNESCO Institute for Statistics, 2018; McKinsey analysis

4 CRITICAL MOMENTS ALONG A WOMAN'S CAREER JOURNEY

Exhibit 8



ATTRACTING
WOMEN TO STEM JOBS

ADVANCING
WOMEN TO MANAGEMENT ROLES

RETAINING
WOMEN IN STEM CAREERS

INSPIRING
WOMEN TO CHOOSE A STEM EDUCATION

Based on our analyses, expert interviews and academic research, we have identified four critical moments along a woman's career journey. These should not be interpreted as 'discrete' moments in time, but rather as periods along a continuum, at which distinct dynamics come into play and hold women back. In the following, we investigate the career journeys of Danish women in STEM at each of these critical moments and describe the prevailing social, cultural and economic barriers. In Chapter 5 we translate these insights into general considerations for parents, educational institutions, communities, workplaces, government, and broader society to address gender imbalances.

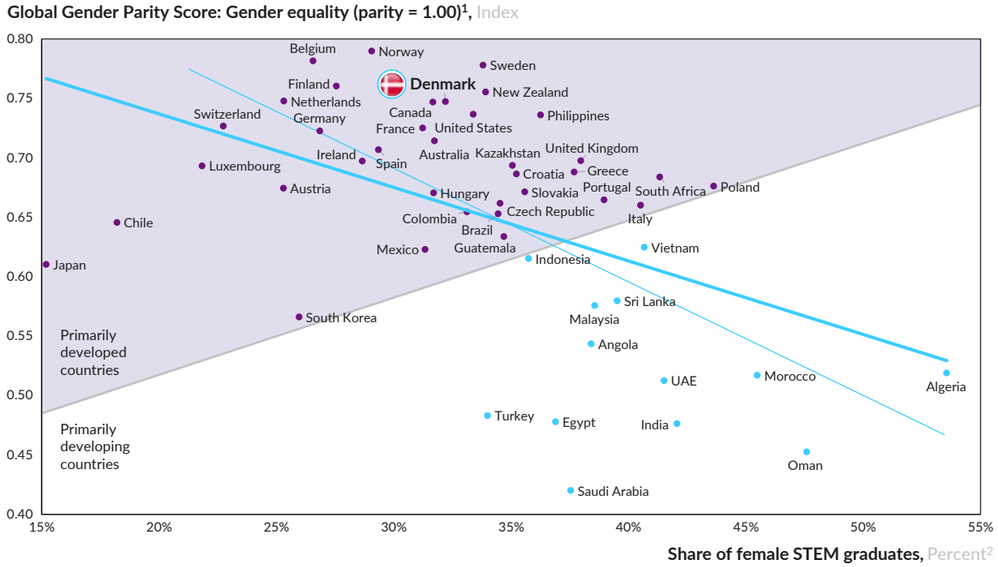
INSPIRING
SPARKING YOUNG WOMEN'S INTEREST IN STEM

We begin by introducing what appears to be a counterintuitive correlation as proposed by Stoet & Geary (2018) in their study "The gender equality paradox in STEM education" (Exhibit 9). More gender-equal countries (measured across several social and economic indicators) tend to have a lower share of women in STEM. This is an apparent paradox, since gender equality should serve to promote female educational empowerment, including in STEM fields. Researchers explain this through the lens of "utility beliefs": in less gender-equal (and often poorer) countries, STEM jobs are associated with greater financial security, which compels parents to encourage their sons and daughters to pursue STEM education. Contrarily, in more gender-equal (and often richer) countries, this "necessity constraint" is less important, and young people of either gender are not encouraged in any particular direction.

This does not mean, however, that STEM educations are not associated with a greater financial upside for women (and men) also in developed countries. One Danish study was able to establish causality between high-ability females taking advanced high school mathematics and a sizeable positive earnings effect upon their entry into the workforce (Joensen & Nielsen, 2016). The parental push towards extra effort in science and math in less gender-equal countries potentially explains the further observation that, while boys perform relatively better in science and math than girls in most countries, the gap widens in more gender-equal societies. Greater parity may therefore indeed mean more female empowerment, but the above results indicate that young women exercise this freedom in active choices away from STEM and towards fields of study better aligned with their comparative strengths. Looking at absolute performance, however, the female talent pool should be no smaller than that of boys, as Danish PISA results for 15-year-old girls in science are both strong versus peers and not significantly different from those of boys (Exhibit 10).

Exhibit 9

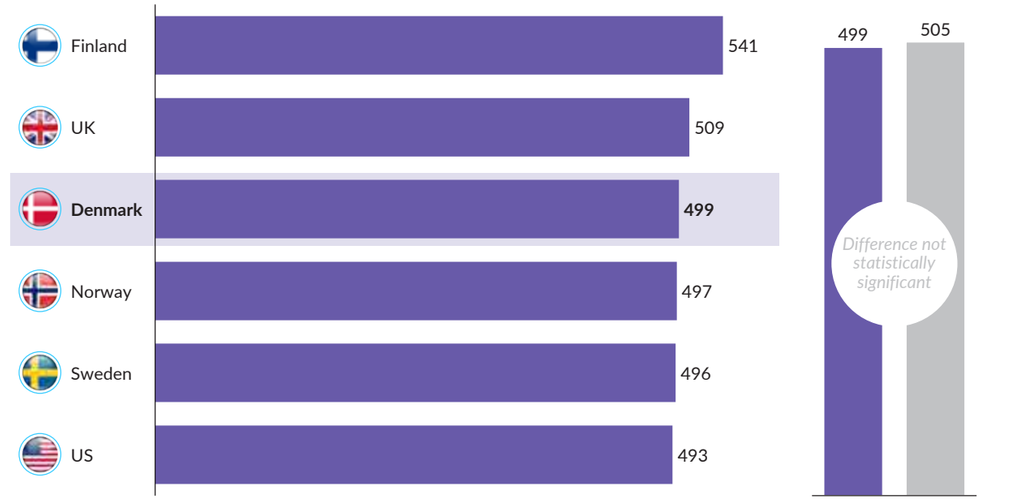
GENDER EQUALITY AND WOMEN AMONG STEM GRADUATES
ACROSS COUNTRIES, 2015



1. Gender Parity Score is an aggregate score where '1.00' refers to complete gender equality. It has been calculated by McKinsey Global Institute (MGI) by considering multiple social and economic factors within a country. 2. Due to lack of 2015 data other years have been used for Philippines (2017), Egypt and Kazakhstan (2016), and Greece and Netherlands (2014).
SOURCE: McKinsey Global Institute, 2015; UNESCO Institute for Statistics, 2018; OECD, 2018a; Stoet & Geary, 2018

Exhibit 10

PISA SCIENCE RESULTS FOR 15-YEAR-OLD GIRLS VS. PEERS (LEFT-HAND SIDE) AND FEMALE VS. MALE AVERAGE IN DENMARK (RIGHT-HAND SIDE)
AVERAGE PISA SCIENCE SCORES, 2015[1]



1. PISA scores are scaled so that the OECD average in each domain (mathematics, reading and science) is 500 and the standard deviation is 100. Maximum score for girls is achieved by Singapore (552).
SOURCE: OECD, 2016

One of the most-cited explanations for the lack of young women in STEM education is the existence of unconscious bias and stereotypes associating science with men. A later section of this report will dig deeper into these phenomena, but some of the STEM-specific dynamics are discussed here.

Stereotypes negatively affect female confidence and interest in particular fields, and they are transmitted between generations. Shapiro & Williams (2012) demonstrate that parents may hold lower expectations for their daughter's math abilities due to stereotypical beliefs that math is a stronghold of boys, and that such reduced expectations lower the child's confidence in the subject in question to the detriment of their actual performance. The impact of cultural beliefs is underpinned by sociological research showing that male students are more likely to perceive themselves as good at math relative to female students with equal math grades and test scores (Correll, 2001). Physiological research further bolsters these findings. A study conducted MRI scans of the brains of a group of female undergraduate students, while asking them to complete a series of math problems. Those confronted with negative stereotypes about women and math ability underperformed relative to the control group, and activity in brain regions associated with depression and social rejection was observed (Krendl, et al., 2008). Stereotypes thus perpetuate themselves: girls come to devalue their own skills, compounding the gap in relative strengths and driving them further away from STEM.

ATTRACTING
FEWER WOMEN THAN MEN TAKE CORE STEM JOBS

It is indeed critical to inspire more young women into STEM fields of study, not least because once women have started STEM educations, they tend to complete them more often than men (Exhibit 12).

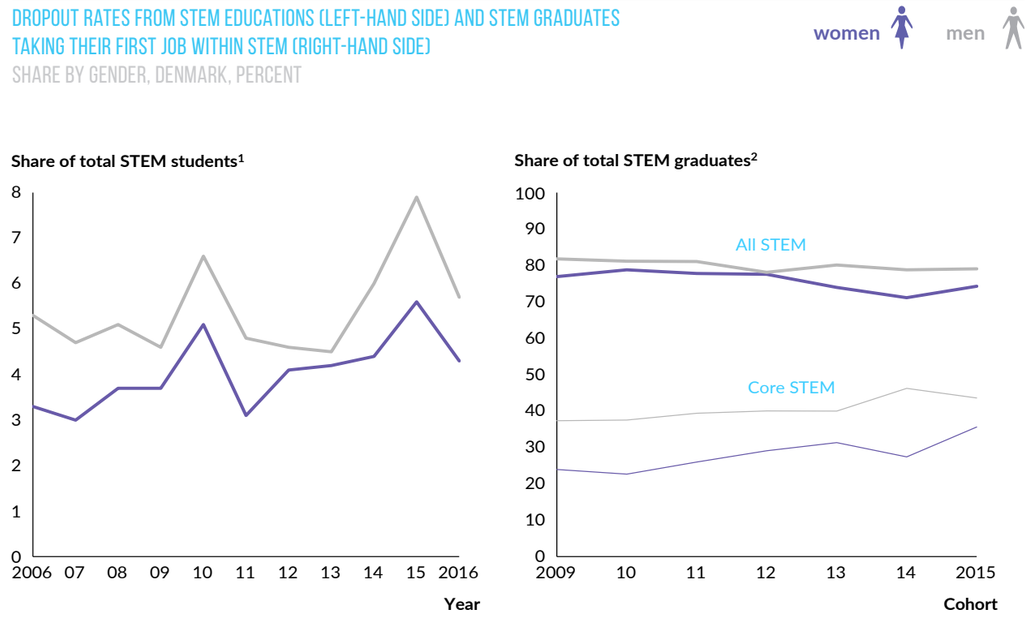
Exhibit 11

ANALYTICAL APPROACH

Registry data analyses	▪ Based on registry data for ~25,000 individuals with a Master's degree within STEM ▪ For selected cohorts, information was collected on education completion, job types, pay, work hours, job sectors (private versus public), job industries, birth rates, and senior high school grade point averages ▪ Two types of analyses — CROSS-SECTIONAL: comparing each cohort in the first year after graduation — LONGITUDINAL: tracking the same group of graduates over time after graduation
LinkedIn data analyses	▪ "Scraping" of publicly available LinkedIn data, covering ~25,000 graduates from, among others, the Technical University of Denmark (DTU) and the IT University of Copenhagen (ITU) ▪ For selected cohorts, information was collected on graduation dates, job titles, tenures, companies etc. for all job entries after graduation (until most recent entries) ▪ Analyses of career progression in STEM jobs throughout sample period — ATTRACTING: share of graduates taking their first job within STEM — RETAINING: share of graduates taking their first job within STEM and staying within STEM jobs throughout sample period — ADVANCING: share of graduates taking their first job within STEM and staying within STEM jobs throughout sample period and reaching management position
Qualitative data	▪ Interviews with public, private, and academic institutions ▪ Focus groups ▪ Academic expert panel ▪ Latest academic research

Exhibit 12

DROPOUT RATES FROM STEM EDUCATIONS (LEFT-HAND SIDE) AND STEM GRADUATES TAKING THEIR FIRST JOB WITHIN STEM (RIGHT-HAND SIDE)
SHARE BY GENDER, DENMARK, PERCENT



1 'STEM students' refers to Master's students in natural and technical sciences. Dropout rates are calculated as number of students having terminated their education during the given year compared to the total number of enrolled students over the year, i.e. the sum of current students and students who have terminated their education. 2. 'STEM graduates' refers to Master's graduates in natural and technical sciences. 'All STEM' refers to jobs within DISCO-08 sub-major groups 20, 21, 23, 25, 26, 30, 31, 34 or 35. 'Core STEM jobs' refers to jobs within DISCO-08 sub-major group 21 (Science and Engineering Professionals) or 25 (Information and Communications Technology Professionals).
SOURCE: Statistics Denmark; McKinsey analysis

Subsequently, however, dynamics between men and women start to differ. For their first job after graduation, around 80 percent of male and 75 percent of female STEM candidates stay within STEM. In terms of core STEM jobs such as engineering and software development, which is where the projected future needs lie, the distribution is significantly more gender polarized, with fewer women attracted to these types of jobs. The female share appears to be trending upwards for younger cohorts but still stands at around only 35 percent, approximately eight percentage points less than for men.

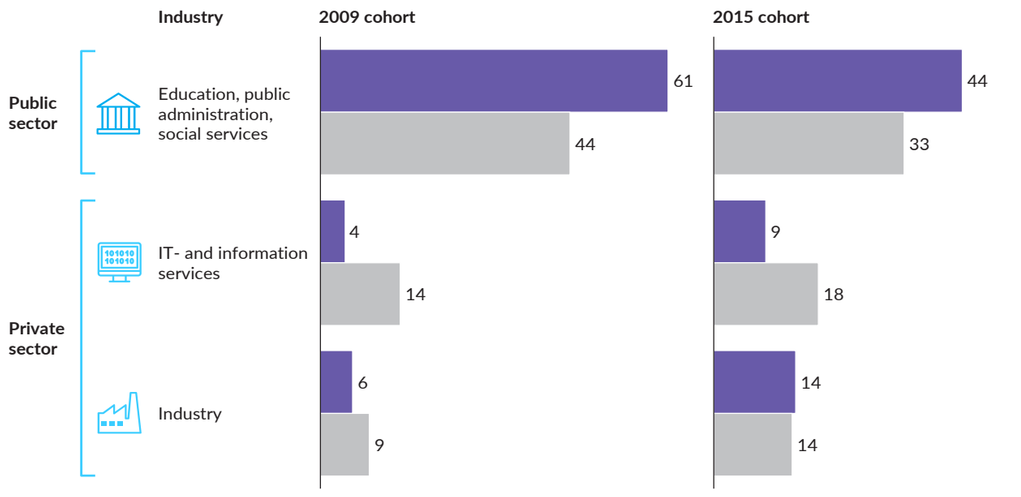
Looking at the choice of sector for the first job after graduation, we see a larger share of women entering the public sector (Exhibit 13). Within the private sector, women and men are roughly equally represented in industry jobs, whereas IT- and information services have a large male majority across cohorts. Moreover, we find that the intragender dynamics are in flux, with both men and women increasingly entering the private sector, though this pattern must be qualified by the concurrent macroeconomic development and sharp decline in private sector employment during the financial crisis (first cohort in the sample is 2009) and subsequent gradual recovery. These dynamics, however exogenous their grounds, have, for younger cohorts, led to 44 percent of STEM women taking a STEM job in the public sector upon graduation and the rest in the private sector, i.e., convergence. For men, sector choices are becoming ever more polarized in favor of corporate STEM jobs. While these trends are good news for employers in high-productivity STEM companies, the size of the untapped female talent pool remains substantial. For the youngest cohorts, ten percentage points more STEM women than men enter STEM jobs in the public sector upon graduation.

As to potential explanations for women's persistent preference for the public sector, research suggests that women possess stronger motivations towards public service, to support and protect their fellow citizens (Andersen & Serritzlev, 2011). Attraction to policy making is another area related to public service

Exhibit 13

PREFERRED INDUSTRIES FOR STEM GRADUATES TAKING THEIR FIRST JOB WITHIN STEM

SHARE OF EMPLOYED GRADUATES WITHIN STEM, SELECTED INDUSTRIES, COHORTS 2009 AND 2015, DENMARK, PERCENT[1]



1. 'STEM graduates' refers to Master's graduates in science and technical science. Population delimited to graduates from cohorts 2009 and 2015 with a job within STEM one year after graduation. 'STEM jobs' refers to jobs within DISCO-08 sub-major groups 20, 21, 23, 25, 26, 30, 31, 34 or 35. Analysis of cohorts 2010-14 confirmed the trends presented above. Statistics Denmark's industry codes DB07 (36 grouping) was used to categorize industries. Public industries include: Education, Public Administration, Military Defence & Police, Health & Social Services, and Culture & Leisure. The largest industries in terms of attraction of the surveyed STEM graduates are listed above, other industries include: Consultancy, Research & Development, Telecommunications, Publishing, TV & Radio, Trade (retail and wholesale), and Finance & Insurance. Due to the inclusion of only selected industries, numbers per gender do not sum to 100%.
SOURCE: Statistics Denmark, McKinsey analysis

motivation, where women have been found to score higher than men (DeHart-Davis, et al., 2006). In the subsequent chapter on retaining, we will elaborate on inclinations – exogenously and endogenously imposed – for women to choose organizations that offer a greater level of flexibility, a quality typically associated more with the public sector than corporate jobs.

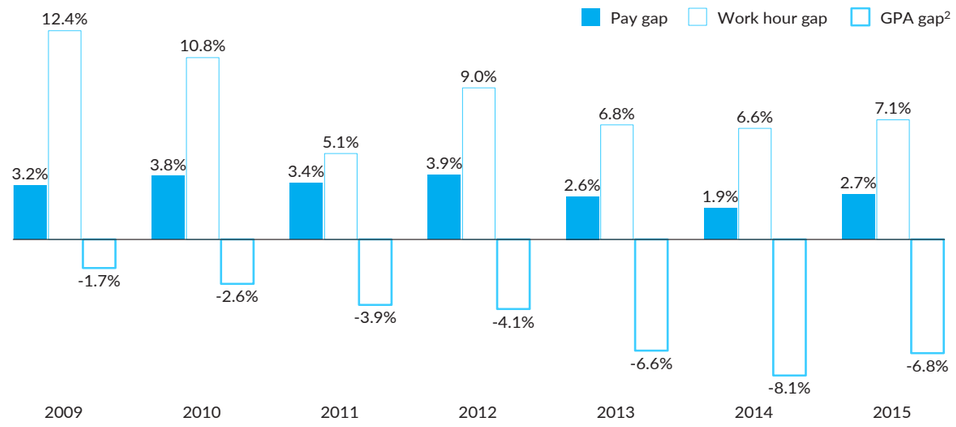
Turning to wage statistics for STEM candidates in their first job after graduation, we see a gender pay gap between men and women of around 3 percent across cohorts (Exhibit 14). Since the choice of private versus public sector jobs can have a pronounced effect on income level, we have controlled for the relative distribution of men and women across sectors. We thus compare earnings within the same sector between male and female graduates with the same educational backgrounds and show a weighted average between the pay gaps in the public and private sectors. Using senior high school ("gymnasium" in Danish) grade point averages (GPAs) as a proxy for innate capabilities (though across subjects, not just in science and math), we find no indication of a lower level of competence; on the contrary, female GPAs are consistently higher than male GPAs across cohorts. Where we do observe a sizeable discrepancy, however, is in the number of hours worked, with men working significantly more than women in both the public and private sectors (here again, sector distribution between men and women has been controlled for). Moreover, the pay gap may be linked to the above-mentioned finding that female STEM graduates enter core STEM jobs to a lesser extent than men.

Several other factors may be at play in explaining the pay gap, including work experience, salary negotiation, etc., making it difficult to draw definitive conclusions. We cannot say what the precise causes and their individual significance may be. What we can say is that a pay gap between male and female STEM graduates with the same educational backgrounds does exist at the outset of STEM careers. The income differences are declining for younger cohorts, a trend seemingly consistent with a decreasing gap in the number of hours worked. Birth rates across cohort have been found to be largely constant and thus not an apparent driver of the observed development.

Exhibit 14

PAY, WORK HOUR, AND GPA GENDER GAPS FOR STEM GRADUATES TAKING THEIR FIRST JOB WITHIN STEM

DIFFERENCES BETWEEN MEN AND WOMEN WITHIN COHORT, PERCENT[1]



1. Data on pay, work hours and grade point average (GPA) collected for the same individuals. 'STEM graduates' refers to Master's graduates in science and technical sciences. 'STEM jobs' refers to jobs within DISCO-08 sub-major groups 20, 21, 23, 25, 26, 30, 31, 34 or 35. Gaps are defined as the difference between men and women relative to women (e.g. a positive wage gap indicates men are paid more than women). Pay was measured as gross hourly wages ("smalt lønbeløb" from DST). Relatively more women entered the public sector compared to men, which was controlled for using the following method: Pay gap residual after controlling for sector was the remaining pay gap, when the distribution of men and women across sectors was accounted for. Same approach for work hour gap. The gap residuals (work hour and pay) were calculated as the weighted average of the gap in private sector and the gap in public sector - weights corresponding to the share of graduates within the sectors. 2. 'GPA' refers to the high school grade point average for the individual students across all subjects. Data from higher educational levels were not available. Grades were converted to the Danish 7-point scale.
SOURCE: Statistics Denmark; McKinsey analysis

RETAINING
CAREER SETBACKS AFTER HAVING CHILDREN

While fewer women than men are attracted to STEM – and particularly core STEM – jobs, the discrepancy in attrition rates between men and women is small, and its magnitude closely resembles the original difference in attraction rates. This is true for both the broad category of STEM occupations as well as core STEM jobs (the former shown in Exhibit 15). We do, however, observe a slight acceleration over time, with the gap in attraction rates of five percentage points reaching a retention gap of eight percentage points in the seventh year after graduation (the oldest cohorts in our sample). Moreover, the percentage change in attrition from year one to year seven after graduation is 25 percent for women and only 20 percent for men. In terms of timing for leaving STEM jobs, attrition rates for both men and women are particularly steep in the first five years after graduation, indicating that early tenure is a critical time for retention.

Similarly, differences in female versus male retention in STEM jobs based on our LinkedIn data were also found to be small and not statistically significant (Exhibit 18). These results suggest that women to a large extent remain affiliated with their workplaces during maternity leave and, upon return, either return to their old jobs or continue their STEM career elsewhere.

Exhibit 15

STEM GRADUATES IN STEM JOBS OVER TIME[1]
PERCENT, YEARS AFTER GRADUATION

ATTRACTING
SHARE OF GRADUATES TAKING FIRST JOB WITHIN STEM

	women	men
YEAR 1	75%	80%

RETAINING
SHARE OF GRADUATES STAYING IN STEM JOBS

	women	men
YEAR 3	63%	69%
YEAR 5	57%	64%
YEAR 7	56%	64%

1. 'STEM graduates' refers to master's graduates in science and technical science. Population delimited to graduates from cohorts 2009 to 2015 with a job within STEM jobs one year after graduation. 'STEM jobs' refers to jobs within DISCO-08 sub-major groups 20, 21, 23, 25, 26, 30, 31, 34 or 35. If a graduate leaves a STEM job, the person is still included if he/she returns to a STEM job at a later point in time. The first year after graduation, all cohorts are represented, afterwards one cohort is cut off per year after graduation since data is only available until 2016 (e.g. meaning 2015-cohort cannot be tracked two years after graduation). Different cohorts show similar patterns over time, meaning results are not skewed by decreasing sample sizes.
SOURCE: Statistics Denmark; McKinsey analysis

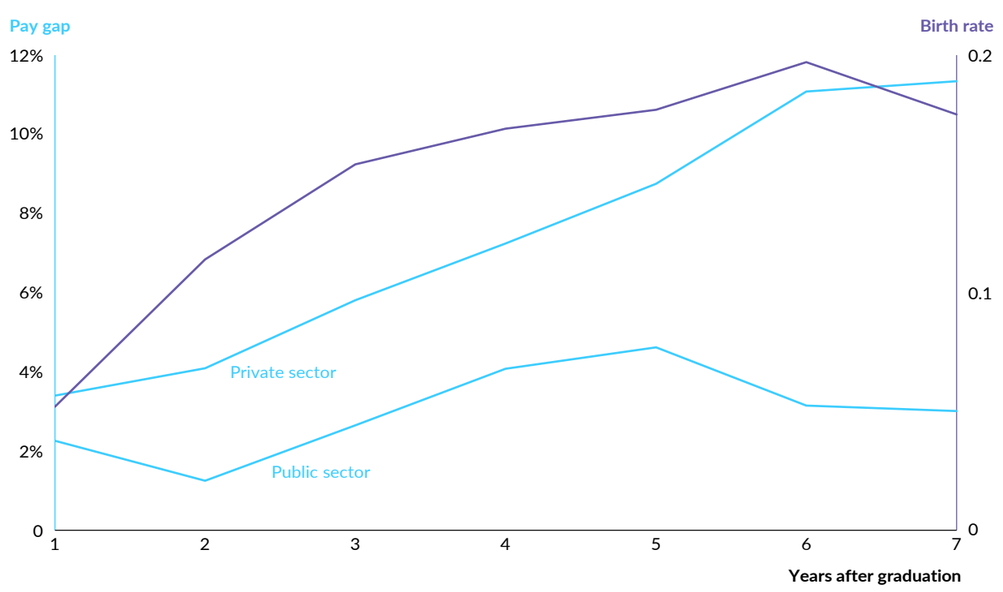
While attrition rates for men and women in STEM jobs are close to equal over time, we find that after having children women are set back in their careers on factors including pay.

In the previous chapter we showed that the pay gap between STEM men and women in their first job after graduation is around 3 percent across cohorts. In the private sector, this gap increases over time (Exhibit 16). Moreover, the widening private sector wage gap correlates closely with a gradual increase in the average birth rate, confirming that women are set back in their careers upon having children. Seven years after graduation, the pay gap between men and women in the private sector reaches 11 percent. In the public sector, a pay gap also exists, though much smaller than in the private sector and relatively stable over time. Notably, birth rates in the private and public sector show the same increasing trend, and the setbacks in women's careers after having children thus appear more pronounced in the private sector.

The extent to which pay gaps can be explained by maternity leave and resulting setbacks in women's careers versus inexplicable discrimination has been much studied in academia. One Danish study finds that the pay gap between men and women is largely due to women having children, which "does not rule out discrimination, but implies that potential discrimination operates through the impacts of children" (Søgaard, et al., 2018).

Exhibit 16

GENDER PAY GAPS PRIVATE VERSUS PUBLIC SECTOR AND BIRTH RATES FOR STEM GRADUATES TAKING THEIR FIRST JOB WITHIN STEM
PAY GAP BETWEEN MALE AND FEMALE STEM GRADUATES[1], PERCENT (LEFT-HAND SIDE AXIS)
NUMBER OF BIRTHS PER WOMAN (RIGHT-HAND SIDE AXIS)



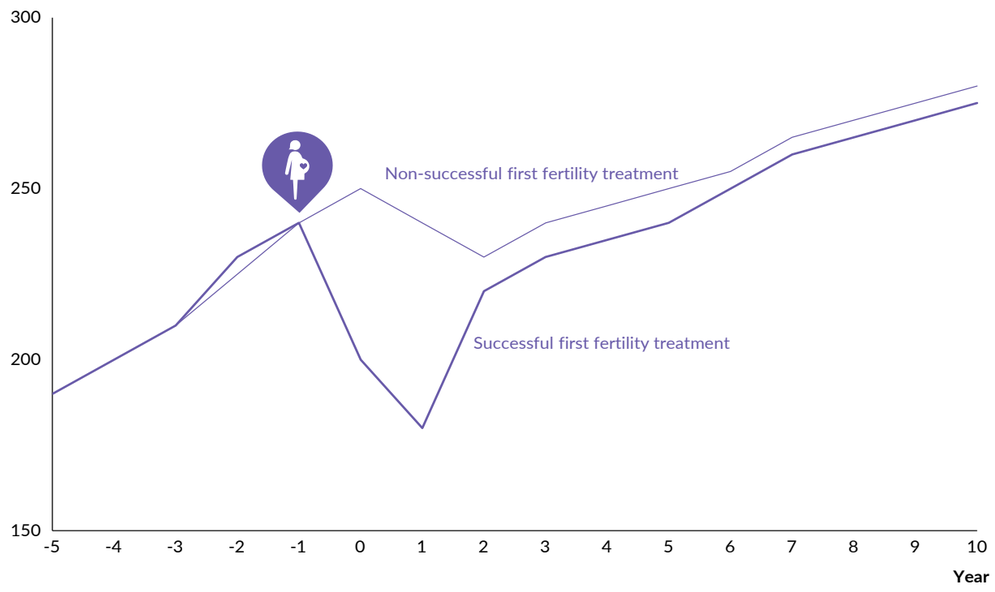
1. Data on pay and birth rates are collected for the same individuals. 'STEM graduates' refers to Master's graduates in science and technical science. Population delimited to graduates from cohorts 2009 to 2015 having taken a job within STEM one year after graduation. 'STEM jobs' refers to jobs within DISCO-08 sub-major groups 20, 21, 23, 25, 26, 30, 31, 34 or 35. In subsequent years, graduates are not delimited to any particular job fields (i.e. all DISCO-08s included). Pay gaps are defined as the difference between average hourly wages for men and women relative to women (e.g. a positive wage gap indicates men are paid more than women). The first year after graduation, all cohorts are represented, afterwards one cohort is cut off per year after graduation since data is only available until 2016 (e.g. meaning 2015-cohort cannot be tracked two years after graduation) .
SOURCE: Statistics Denmark, McKinsey analysis

New research, however, has been able to establish a causal relationship between women having children and a negative income effect (Lundborg, et al., 2017). The analysis compares Danish women undergoing fertility treatment and looks at the development in wages of those who successfully get pregnant on their first attempt and those who do not. This allows researchers to isolate the effects of childbirth and determine the direction of causality (Exhibit 17). Results show a large income decline around the time of childbirth, and despite wages picking back up three to four years later, a pay gap relative to non-childbearing women persists over time. These authors further find that fertility effects on earnings are driven by lower hourly wages, not labor supply, which confirms the above finding that mothers overwhelmingly return to the workforce.

NEW RESEARCH HAS ESTABLISHED A CAUSAL RELATIONSHIP BETWEEN WOMEN HAVING CHILDREN AND A NEGATIVE INCOME EFFECT

Exhibit 17

ANNUAL LABOR INCOME[1]
THOUSAND DKK



1. The figure plots mean annual labor net income in Danish krones (2008 DKK) by IVF treatment success. Sample consist of childless women entering their first IVF treatment 1995-2005. Year zero denotes the year of the (potential) child birth
SOURCE: Lundborg, et al., 2014

Explanations for the observed pay gaps after having children are manifold and closely interwoven. A primary driver is the circumstance that time out of the workforce may set back one's career, and this is more pronounced for women due to longer parental leave periods than men. On average, women in Denmark still take approximately 90 percent of total parental leave (Statistics Denmark, 2018). A 2017 survey of 232 top executives of Denmark's largest companies confirmed that 77 percent of the leaders believe maternity leave negatively influences a woman's career (Hyltoft, 2017).

Beyond parental leave, a disproportionately large share of unpaid domestic and care work still falls on women (Bonke, et al., 2012), and this discrepancy may be further amplified by having children. One reason is rational utility maximization. The average Danish man has children later than the average Danish woman, meaning that men are likely to be more advanced in their careers before women go on maternity leave (Statistics Denmark, 2018). If this is the case, it makes better economic sense for the mother to shoulder most of the incremental housework than if the roles were reversed. This "sacrifice" on behalf of women may be further compounded by the added expense of having children and physical needs for more space, which can compel families to move away from the city. Increased transportation costs and time frequently lead to one parent contenting him- or, indeed, most often herself with a lower paying job closer to home and child care institutions. Moreover, the need for more flexibility and fewer working hours is often better met in the public versus the private sector, with a decline in pay potentially occurring as a result.

These dynamics, in turn, may also be the result of some organizations making flexibility available to employees only at a high cost, inducing women to seek other solutions. We will return to the potential for promoting a more inclusive work culture in a later chapter on workplace considerations. However exogenous the grounds of the career choices by women, research shows that women self-select into occupations and organizations that allow for more flexibility (Goldin, 2014).

It is worth mentioning that better inclusion of women in the workplace does not change the chores that need doing at home. In order to make it feasible for women to increase the number of paid working hours without men accepting a proportional cut, household work would need to be outsourced, and this does not come cheap. Promoting further gender diversity in the labor market may therefore require societal structures be put in place to support dual-career households. In Denmark, efforts in this direction have been made with the introduction of tax deductions on household work, amounting to 115DKK per week per person (Danish Customs and Tax Administration, 2018).

Finally, a lack of female role models and peers manifests itself in a retention context, lowering women's sense of belonging and not providing a tangible image of corporate success that is compatible with family responsibilities. Interviews with STEM women revealed that a perceived lack of clear career pathways combined with less frequent promotion rates for women may speed up attrition.

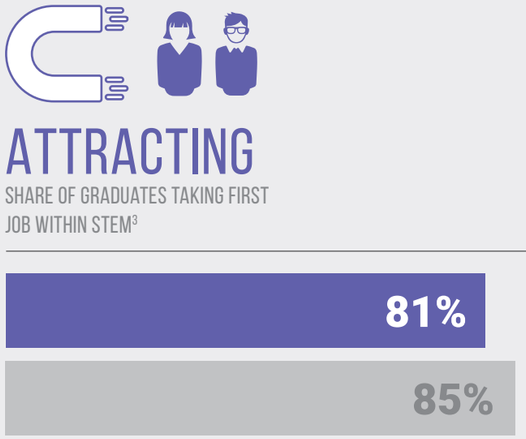
ADVANCING
FEWER WOMEN THAN MEN MAKE IT TO MANAGEMENT

To explore the root causes for the lack of women in leadership, we again turn to STEM for generalizable insights. Using LinkedIn data, we follow STEM graduates from the Technical University of Denmark (DTU) and the IT University of Copenhagen (ITU) on their path to management.

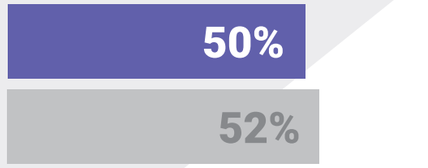
Exhibit 18

ATTRACTION, RETENTION AND ADVANCEMENT OF STEM GRADUATES, ITU AND DTU COHORTS[1]
PERCENT

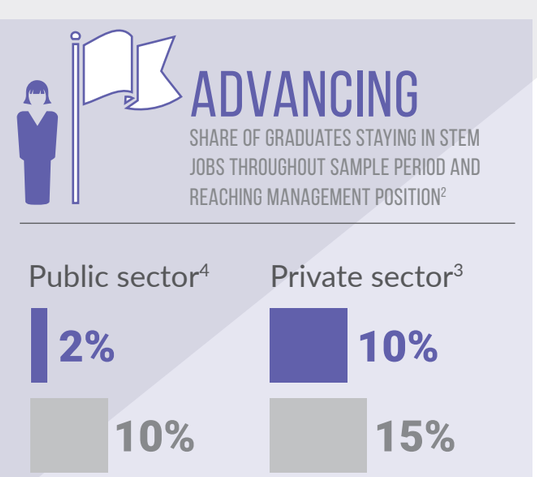
ATTRACTING
SHARE OF GRADUATES TAKING FIRST JOB WITHIN STEM[3]



RETAINING
SHARE OF GRADUATES STAYING IN STEM JOBS THROUGHOUT SAMPLE PERIOD



ADVANCING
SHARE OF GRADUATES STAYING IN STEM JOBS THROUGHOUT SAMPLE PERIOD AND REACHING MANAGEMENT POSITION[2]



1. Data includes ITU and DTU 2005-08 and 2010-12 graduate cohorts. To test that results were not skewed based on the selected sample, STEM educational backgrounds were broken down into 'soft' (e.g. communication and design) and 'hard' (e.g. mechanical engineering) study programs reflecting the gender ratios, and this more granular view did not change the fidnings. 2. 'Management position' refers to team leader and above, including board members. Only 2005-2008 cohorts included due to limited time period since graduation for younger cohorts. 3. Differences are significant at the 10% level. 4. Differences are significant at the 5% level
SOURCE: LinkedIn; McKinsey analysis

Mirroring the registry data for cohorts across educational institutions as studied above, we find that around 80 percent of both male and female STEM graduates take a STEM job upon graduation (Exhibit 18). Retention rates are generally lower according to the LinkedIn data, due to a slightly different analytical approach; we find that roughly half of the graduates stay in STEM jobs for the entire sample period (from graduation until today)[1]. Importantly, despite the different methodologies, the LinkedIn data reveals the same pattern in retention rates as in the registry data analysis above, namely that the differences between men and women are not statistically significant.

In the last critical moment, advancement, the greatest gender differences reveal themselves: a significantly larger share of male STEM graduates make it to management. Differences between male and female leadership shares, however, become even more pronounced when looking at different sectors. Consistent with previous findings, we see a lower tendency for female DTU and ITU alumni to take jobs in the corporate sector relative to their male counterparts. Moreover, although there are relatively more STEM women in the public than private sector, the former is where we observe the largest gender imbalances in terms of leadership representation. Only one in 50 of the STEM women staying in STEM jobs throughout the sample period make it to a management position in the public sector, whereas the corresponding number for male graduates is one in ten. These findings indicate that the share of women in leadership cannot be augmented simply by increasing female representation in the organization overall.

While wage gaps occur as a result of women being set back in their careers after having children, they may also reflect reasons not directly related to time out of the labor force. For mothers in particular, studies find that they are more likely to receive lower performance ratings than non-mothers and are perceived as less committed to their jobs (Correll, et al., 2007; Benard & Correll, 2010).

Looking at the gender dynamics around promotions for women, research cites poorer female performance in competitive environments and less willingness to compete as potential explanations (Niederle & Vesterlund, 2007; Hogarth, et al., 2012). Women are also found less likely to take risks and negotiate salaries relative to men (Babcock & Laschever, 2003; Bowles, et al., 2005; Niederle & Yestrumskas, 2008, Dohmen, et al., 2011). This is not to say that the solution lies in women simply learning to compete and negotiate; institutional structures should be changed to ensure that women are rewarded for their merits and not their ability to compete and take risks.

Moreover, women appear to be driven by other aspects of their jobs than men. Studies find that women value intrinsic motivations such as meaningful work, whereas extrinsic rewards including promotion opportunities matter more to men (Tolbert & Moen, 1998; Hjort, 2015). Together with the above-mentioned gender-specific traits, this may translate into women seeking out promotions to a lesser extent than men.

However, women who do enter management positions have been found to be no less ambitious as men. A McKinsey survey among 1,400 global executives finds that 79 percent of female senior and mid-level managers agree or strongly agree with the following statement: "Over the course of my career, I have the desire to reach a top management position (e.g., a role in the C-suite)" (McKinsey & Company, 2017a). For men, the number came out at 81 percent. Moreover, 61 percent of the same women declare themselves ready to "sacrifice a part of my personal life to reach a top management position" versus 64 percent of the men. Gender discrepancies become apparent only when it comes to confidence in successfully reaching the top. Here women are significantly less hopeful than men. As we will discuss below, culturally conditioned unconscious biases play a pivotal role in shaping these beliefs.

1. Retention rates are generally lower according to the LinkedIn data, since the greater level of detail (i.e., multiple job entries per individual) allows us to follow those who stayed in STEM jobs throughout the entire sample period. The registry data, on the other hand, includes all individuals taking their first job within STEM – but does not control for intermediate "detours" into non-STEM jobs. In other words, the LinkedIn analysis took a "once you have left, you have left" approach, whereas the registry data provides a view of attrition rates on a yearly basis by tracking movement in and out of STEM jobs

UNCONSCIOUS BIAS IS A MAJOR BARRIER TO CORRECTING GENDER IMBALANCES

Unconscious biases are cognitive rules of thumb: automatic and instinctive associations that help the mind simplify information processing by creating shortcuts. Shortcuts that relate to people – or the tendency to put people into boxes based on their gender, appearance or behavior – are known as stereotypes.

Unconscious biases are shaped over time through cultural conditioning and individual experiences. Examples of their everyday manifestation abound; from the language we use to the images we see. From expressions such as "working mothers" (no "working fathers" equivalent) to companies perpetuating female stereotypes through advertising a new cleaning agent in the hands of an apron-adorned woman.

Biases shape decision making, and they matter in the context of gender diversity because they often affect women in the workplace more negatively than men – as we will illustrate in later examples.

We see four bias archetypes in people-related decision making:

I. **Pattern recognition bias** leads us to recognize patterns where there are none

II. **Social bias** arises from the preference for harmony over conflict

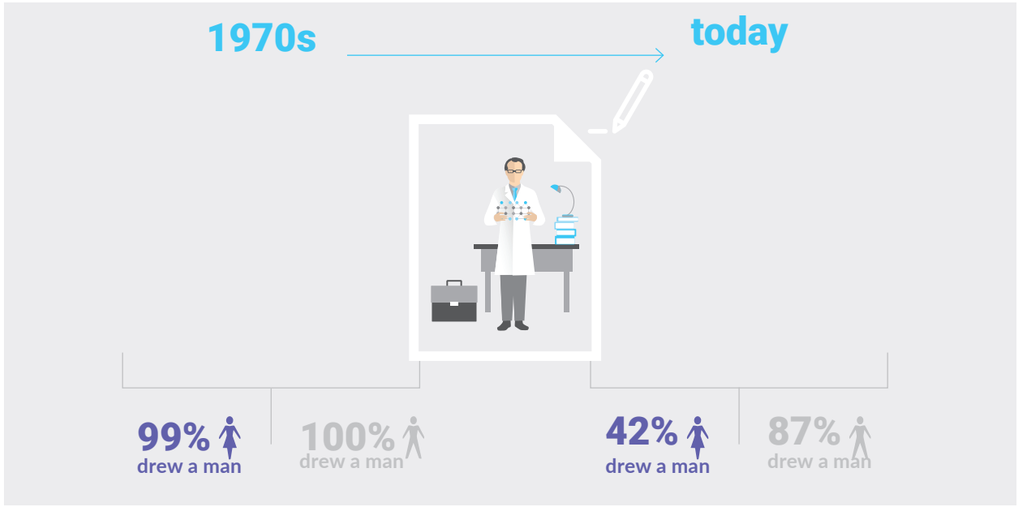
III. **Stability bias** creates a tendency towards inertia in the presence of uncertainty

IV. **Interest bias** comes to the fore in the presence of conflicting incentives

Looking at the bias-induced challenges for women across the four critical career moments, several types of the above-mentioned biases come into play. The below examples are mostly external biases that are projected upon women by others; however, some also work from the inside, with women themselves having internalized these beliefs to the point of influencing their own behavior. In any case, interventions against biases serve to combat both the external and internal expressions hereof.

Exhibit 19

DRAW A SCIENTIST



SOURCE: Miller, et al., 2018

Pattern recognition bias is particularly salient for **INSPIRING** young women to choose certain jobs or fields of study, through what is better known as stereotyping. Stereotypes hold young women back due to constraining associations about the "right" gender for certain occupations. Think about a pilot, and most people picture a man. Some occupation types even explicitly embody gender biases; a firefighter is more commonly known as a fireman, and the Danish equivalent of a scientist also refers specifically to the masculine sex (videnskabs*mand*). The reverse stereotypical images naturally also hold true, and addressing the low share of male nurses or childminders (in Danish explicitly tied to the female sex, dagplej*emor*) arguably deserves the same scrutiny as increasing the share of women in STEM, but that discussion is beyond the scope of this report. The frequency of gender specific designations, however, is decidedly tipped in favor of men. For every one Danish word with "woman" as a suffix, there exists about seven ending in "man" (Dansk Sprognævn, 2012).

The extent to which language systems are gendered is shown to correlate with the general level of gender equality in a society (Prewitt-Freilino, et al., 2012). Countries where languages have both gender specified nouns and pronouns are found to be less gender equal than for instance Scandinavian countries, where languages only contain gendered pronouns.

Intergenerational transmission of stereotypes means that stereotypes "stick" and manifest themselves from early childhood. Gender-stereotypical labor market behavior on the part of parents is for instance found to predict gender-stereotypical choices of education for their children, with female choices correlating with the mother's behavior, while sons emulate their fathers (Humlum, et al., 2018). In turn, numerous rounds of the "draw a scientist" study, where children of different ages are asked to depict a scientist, confirm this cultural conditioning (Exhibit 19). The most recent renditions still find that almost half of the girls portray male scientists, while for boys a female scientist is a particularly rare event of 1 in 10 drawings (Miller, et al., 2018). Moreover, female depictions occur less often among older children, indicating that stereotypes are strengthened over time.

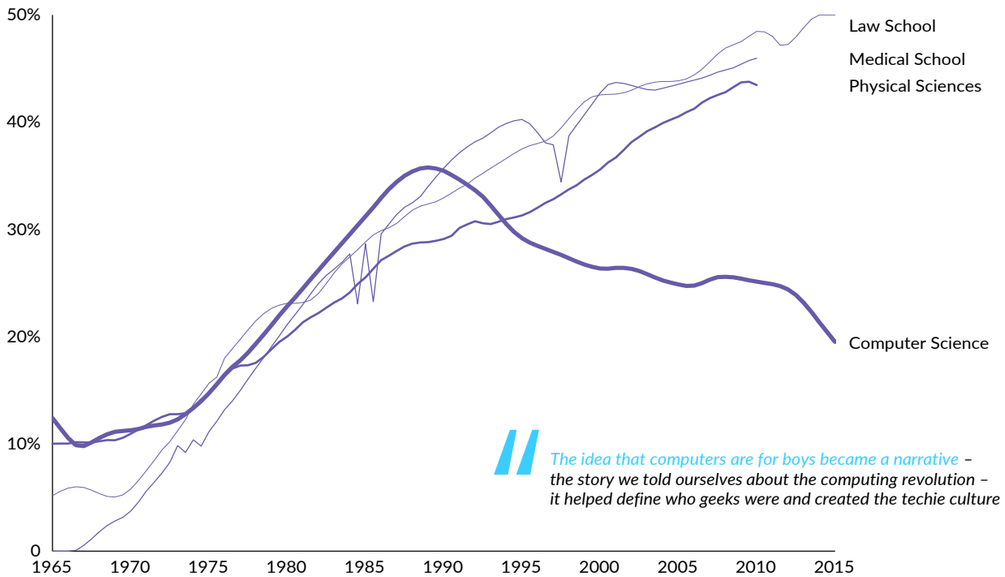
Upon reaching adulthood, every one of us has been hardwired to draw inferences about the right and wrong gender with respect to different job types; this persistently precludes young women from considering certain occupations through self-selection bias. Research shows that women watching a commercial for a science conference with a majority of male participants showed increased symptoms of stress and were less likely to express desire to participate in the actual event (Murphy, et al., 2007).

Stereotypes are also preserved through masculine messaging and marketing around these disciplines; their influence is exemplified by the historical development of U.S. women in computer science (Henn, 2014). Along with the general increase in female labor force participation throughout the 1970s and 1980s, the share of women taking a university degree in computer science rose steadily, until around 1990 when it plunged while other majors kept rising (Exhibit 20). The plunge started roughly around the same time as personal computers showed up in significant numbers – primarily perceived as gaming toys and marketed almost entirely to men and boys. Researchers see a correlation between these events, as stereotypical notions of computer science as a "geek culture" also began to form through movies and popular culture (Henn, 2014).

The **ATTRACTING** moment is also prone to unconscious bias holding women back. First of all, since stereotypes are held by everyone alike, hiring decisions may disadvantage women through exactly the same associative mechanism as described above ("we need an engineer = we need a man"). The recruiter may filter observed evidence about a candidate so as to support what they "know" about the particular category of people that the individual belongs to (in this case, women). Besides stereotypical pattern recognition, bias archetypes at work in mitigating the entry of women into STEM jobs include social biases. Affinity bias, for instance, may compel men to prefer male candidates due to their perceived similarity to themselves. A study combining recruitment statistics and interviews with department heads at a Danish university finds a significant discrepancy between the institutionalized beliefs among managers in the existence of a genuine meritocracy and the de facto functioning of the recruitment recruitment processes (Nielsen, 2016). Of the vacancies for associate and full professorships, 19 percent were announced using closed procedures, with such circumstances serving to perpetuate an existing male-dominated gender distribution.

Exhibit 20

FEMALE MAJORS BY FIELD OF STUDY, US, 1965-2015
PERCENT



SOURCE: Henn, 2014

One of the most important factors for **RETENTION** of women is, as discussed above, the provision of flexible work arrangements. The associated requirements for change, however, are countered by the existence of stability biases, which dictate a preference for the status quo. As such, people (both men and women) may lean towards established and proven working models instead of embracing more innovative solutions that allow for more flexibility. Moreover, women in the workplace sometimes walk a tightrope in terms of managing stereotypical anticipations of female behavior. Women are expected to be humble about their own abilities, polite, and sensitive to the needs of others, yet while perceived as congruent, this exact behavior can be considered too soft and not effective, by male colleagues in particular. At the same time, acting in violation of female gender stereotypes by talking a lot in public settings, expressing anger, or negotiating for a higher salary, can also be judged negatively as "bossy" or insufficiently nice and considerate. Derivative effects of stereotypical female behavior may include not being considered for promotions, while nonconformity with gendered traits has been shown to lower performance evaluations.

Moving to the final critical moment of **ADVANCING** women into management, the tendency for women to adopt typically masculine traits is a bias type in itself that becomes particularly pronounced in the context of leadership. Assimilation bias may make women adapt their behavior to align with the general expectations of what it takes to "fit in". This is the tyranny of stereotypes at work once more, as a "leader" in people's minds translates into a male image (in suit and tie). Leaders (= men) act assertively, seek power, and confidently speak their mind. Yet, as described above, adopting this behavior may run counter to women's advancement prospects. Finally, interest biases lend some support to the notion of men promoting men, in the sense that inappropriate attachments (one type of interest bias) may lead to a preference for promoting one's peers and discounting objective qualifications in favor of subjective sentiment.

While the above descriptions are themselves generalizations, they point to the ubiquity of unconscious bias and to how this may negatively affect women in the workplace. Moreover, unconscious biases and associated stereotyping manifest themselves throughout the female career journey and must accordingly be taken into account at each critical moment when designing effective solutions.

We turn to this next.

SEVEN CONSIDERATIONS TO ADDRESS GENDER IMBALANCES

ALL FOUR CRITICAL MOMENTS NEED TO BE ADDRESSED BY MULTIPLE ACTORS

The analyses above reveal that women face hurdles at every step in the career journey for reasons that are social, cultural and economic. Stereotypical notions of what men and women can do start manifesting themselves in early childhood, and the counter-cultural conditioning required to reverse this is profound. Moreover, changing firmly embedded institutional practices, systems and societal structures is not an easy task. Nonetheless, interventions do exist and have proven effective elsewhere.

Action should be taken at each of the four critical moments of the career journey (Exhibit 21). Multiple actors are required, including parents, educational institutions, communities, workplaces, government, and broader society, and the below considerations are therefore addressed to each of these stakeholder groups in turn. An important principle is that both men and women actively engage in driving change.

The following seven considerations are the synthesis of this report's analytical findings and input from organizations and experts engaged in the gender diversity agenda, focus groups with female STEM professionals, and the most recent academic research.

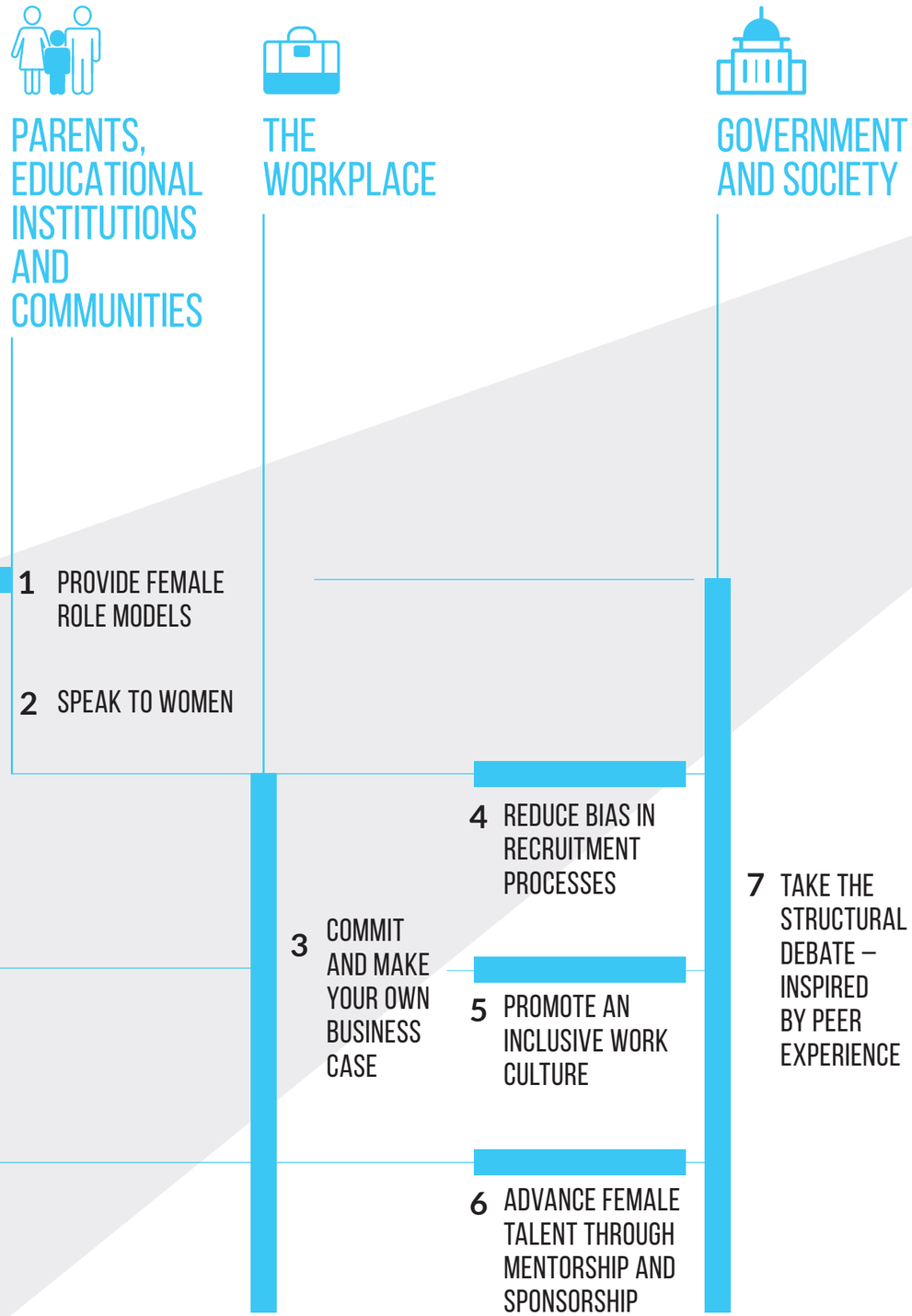
INSPIRING

ATTRACTING

RETAINING

ADVANCING

Exhibit 21



CONSIDERATION 1
PROVIDE FEMALE ROLE MODELS

As we have learned from the "draw a scientist" research and other studies, stereotyping starts in early childhood. Interventions in this realm are some of the most difficult to pin down – or to pin to any particular group of people – as the dynamics permeate our cultural and societal fabric. One tool, however, that has proven effective is the provision of strong female role models during girls' upbringing. Female role models have been shown to positively influence women towards considering counter-stereotypical fields of study (Dasgupta & Asgari, 2004). Other research finds that female students perform significantly better in introductory math and science courses when taught by female rather than male faculty, while there was minimal impact on male students. The positive effect of female professors was most prominent among high-ability female students and, for this group of students, also translated into an increased likelihood of taking future math and science courses and graduating with a STEM degree. Results were robust to the inclusion of controls for students' initial ability.

Parents have enormous authority in demonstrating to their daughters through their actions what women can and cannot do. Research from UNESCO & The Global Education 2030 Agenda (2017) shows that mothers with higher education qualifications positively influence girls' achievement in science more than fathers. Further, parents are gatekeepers to toys, which from an early age direct girls' (and boys') interests and nurture stereotyping. Feminine toys typically involve caregiving (e.g., dolls), domesticity (e.g., cleaning, shopping), and attractiveness (e.g., fashion, makeup), whereas masculine toys center around transportation (e.g., cars, trucks, planes), construction (e.g., building sets), adventure, danger, and aggression (Reich, et al., 2018).

There is an argument to be made against limiting access to toys based on gender, as for instance traditional boys' activities such as playing with construction sets develop children's spatial skills, which may in turn promote success in engineering (Jirout & Newcombe, 2015). Research shows that toys have become increasingly gender segregated in their design and marketing (Sweet, 2014). Lego, for example, markets significantly different universes towards girls and boys (Reich, et al., 2018). "Lego Friends" invites girls to build doll houses and cultivate hobbies such as horse riding, while "Lego City" encourages boys to enact various skilled professions, heroism, and expertise. Toy makers have, however, started to engage in combatting gender stereotypes and broadening female interests. Taking Lego again as a case in point, recent renditions of the famous mini figures pay homage to the pioneering female role models of the National Aeronautics & Space Administration (NASA), allowing girls to identify themselves with a female computer scientist or astronaut (Lego, 2018).

While exposure to role models from an early age is critical in preventing the development of debilitating stereotypes, role models remain important throughout women's career journeys. Female leaders with diverse educational and professional profiles, and particularly from counter-stereotypical environments such as STEM, should therefore be made more visible and accessible. In both a university and workplace setting, this can sometimes involve simple actions like diversifying portraits hung on walls. At Harvard University, an inventory found that out of 60 figures portrayed only three were women, two of which tending to children (Bohnet, 2016). Externally oriented campaigns can also be effective. The Danish corporate alliance "The Diversity Council" has, together with the Minister for Equal Opportunities, launched a platform called "Lead the Future" featuring female role models from some of Denmark's largest companies (Lead the Future, 2018). The women interact directly with aspiring female leaders through participation in educational fairs and social media communication.

ROLE MODELS AMONG PEERS

Role models among peers can also have a profound positive effect on building girls' confidence and promoting an "I can be anything" mindset. A survey of 11,500 girls and young women aged 11 to 30 in 12 European countries found that when young women have a role model in STEM (other than a parent or teacher) their interest in STEM doubles (Microsoft & KRC Research, 2018).

Exposing girls to science-related activities in a social context has proved immensely successful in sparking interest and curiosity in STEM – and particularly if combined with a parental education component, so that parents learn how to actively encourage their daughters. A prime example is the U.S.-based nonprofit Girls Who Code (GWC) community founded in 2011. GWC gives 6th to 12th grade girls the chance to explore coding and computer science in a fun and friendly environment, providing hands-on experience along with a supportive sisterhood of peers and role models. In Denmark, there are similar initiatives (e.g., DigiPippi), though on a much smaller scale. A study by Google (2014) confirms that encouragement and exposure are some of the most important controllable factors influencing girls' decisions to choose a computer science education.

Universities engage in similar outreach programs, with for instance the IT University of Copenhagen holding IT summer camps for high-school girls taught by current female students. Out of the first group of 50 participants, 11 girls were later admitted to its Bachelor's programs (Borsotti, 2018).

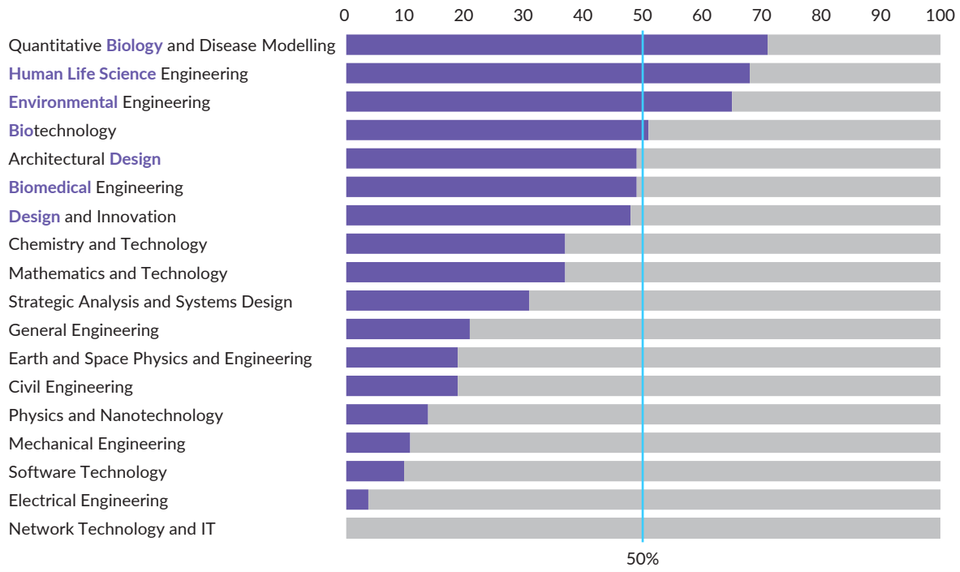
CONSIDERATION 2
SPEAK TO WOMEN – EXPLICITLY AND IMPLICITLY

Combatting unconscious bias should not only take the form of promoting "I can be anything" mindsets. Efforts can also be made to change systems and environments. So-called 'nudging' is one avenue through which to accomplish this: nudges are positive reinforcements and indirect suggestions to influence people's behavior in a desired direction.

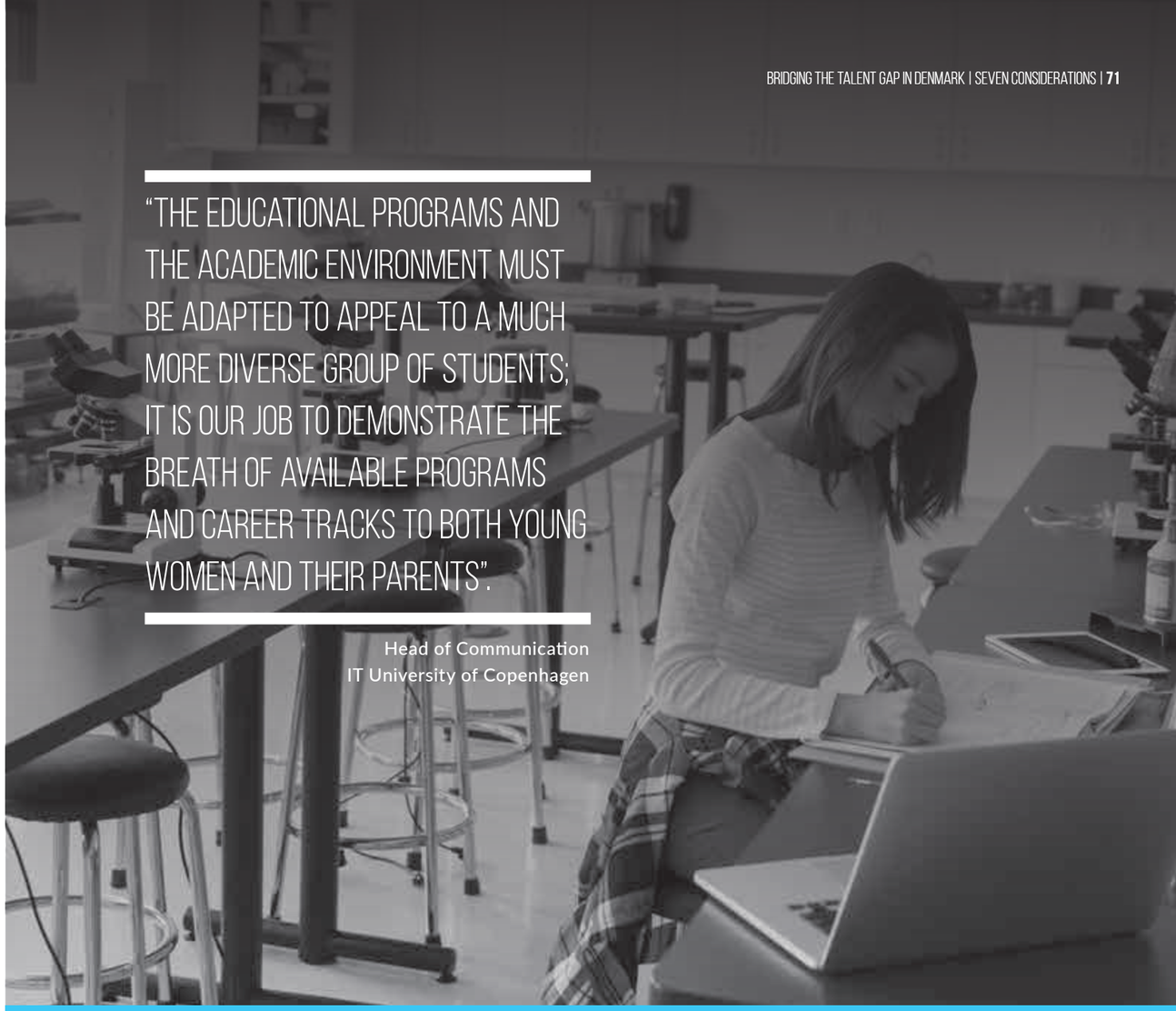
Beyond the example of explicit communication mentioned in the case opposite, implicit communication can have a pronounced impact. A randomized controlled trial among female ninth and tenth grade students found that the girls showed higher comprehension in a chemistry lesson when the images in their textbooks included female scientists (Good, et al., 2010). The physical environment is also important in promoting a sense of belonging – and seemingly so for women in particular. Research has shown that exposure to stereotypical computer science classrooms, with cables and soda cans scattered about, insufficient lighting, and Star Trek posters on the walls dissuaded women from considering majoring in computer science (Master, et al., 2016). Another group of female students, introduced to a computer classroom with art posters, books, plants, and water bottles, expressed more interest in entering the field. In both cases, the environment did not affect male students. In fact, neither the cited institutional examples nor academic literature have found such communication initiatives to affect young men in any particular way. In other words, appealing to women through more inclusive language is a no-regret move.

Exhibit 22

GENDER SPLIT OF BACHELOR ENTRANTS AT THE TECHNICAL UNIVERSITY OF DENMARK, 2016
PERCENT



SOURCE: Technical University of Denmark, 2016



"THE EDUCATIONAL PROGRAMS AND THE ACADEMIC ENVIRONMENT MUST BE ADAPTED TO APPEAL TO A MUCH MORE DIVERSE GROUP OF STUDENTS; IT IS OUR JOB TO DEMONSTRATE THE BREATH OF AVAILABLE PROGRAMS AND CAREER TRACKS TO BOTH YOUNG WOMEN AND THEIR PARENTS".

Head of Communication
IT University of Copenhagen

USING TARGETED COMMUNICATION

Using targeted communication to remedy a lack of female identification with certain fields of study can be very effective. Even subtle cues hidden in pictures and words can be interpreted through a lens of unconscious bias to match what we see to what we "know".

In STEM, young women are driven away not only by stereotypes of nerdy and socially isolated men, but also by language that quite literally loses them in translation. The Technical University of Denmark (DTU) has attempted to address this by highlighting descriptors of their programs and program titles that better express the purposes women seek to accomplish through education. Words such as "bio" and "life science" (cf. the majority of female graduates in health sciences) as well as "environment" and "design" have been proven to have a positive effect on attracting young women. Exhibit 22 shows the gender split of bachelor entrants at DTU, and the aforementioned words are contained in the titles of the seven programs that have around 50 percent female students.

Moreover, DTU has been successful in speaking to women by placing its programs in a broader purpose-driven context, emphasizing diverse applications and societal impact through technological breakthroughs and social sector interaction.

In addition to changing the language around their programs, universities may also consider adjustments to course content.

CONSIDERATION 3
COMMIT AND MAKE YOUR OWN BUSINESS CASE

Top management commitment is pivotal to the successful promotion of gender diversity, and the workplace considerations below will not be effective in its absence. Leaders should start by obtaining transparency on the status quo, including hard data on metrics such as the share of female applicants and new hires, the proportion of women at different organizational levels, attrition and promotion rates, and pay gaps. In this way, the case for change and a baseline is established. Management must then commit to a target and put structures in place to track progress and ensure accountability.

Institutionalizing accountability is one of the most important factors in moving the needle on diversity (Kalev, et al., 2006). Assigning responsibility for gender diversity to a dedicated executive, task force or similar was found to be strongly correlated with increased diversity (both gender and race). Salesforce has a "Chief Equality Officer" and Johnson & Johnson a "Chief Diversity Officer", and this role has in the U.S. become a mainstay of job search sites (Salesforce, 2018; Johnson & Johnson, 2018; Indeed, 2018). Organizations with well-established accountability measures see more positive effects from diversity training and evaluations, networks, and mentoring programs (Kalev, et al., 2006). Best practice suggests that organizations set high but achievable targets while also introducing sub goals. Smaller interim goals have been found to positively promote a sense of accomplishment, interest in the task and persistence (Colby & Chapman, 2013). Targets should be measurable and continuously tracked.

Leadership commitment to gender diversity presupposes a mindset shift towards making this a genuine priority. Our interviews revealed different motivations for embracing this agenda. These include the belief that ensuring equal opportunities for both genders is simply the right thing to do and the willingness to actively engage as part of the company's CSR strategy. Others take note of the superior innovation performance of diverse teams, and some organizations cite a first mover advantage from tapping into the female talent pool. Whatever the perspective, a mindset based on personal conviction is paramount to making change happen. Explaining to the broader organization why diversity efforts are prioritized is also important so that all employees understand the motives behind actions taken and play an active role in their implementation.

The dominance of men in management means that male leaders must play an active role in setting the right tone if progress is to be achieved. Acknowledging this, 130 male business and government leaders from across Australia have formed the "Male Champions of Change" association. The collective influence of this group has succeeded in bringing critical issues such as sexism in the workplace to national attention and has led to change in members' own organizations. In 2017, the group achieved gender balance or made progress towards gender balance in 83 percent of their leadership groups. Some 80 percent of participating organizations have mainstreamed flexible work hours and conducted pay equity audits in the last two years (Male Champions of Change, 2018).

GLOBAL SERVICES COMPANY SODEXO

Global services company Sodexo exemplifies all of these elements. Sodexo has set up a dedicated Diversity Leadership Council for its diversity programs (which cover more than just gender diversity). The company has publicly committed to a goal of 40 percent women on global executive teams by 2025 as well as to promoting gender diversity more broadly in the organization (Sodexo, 2018a). It has developed diversity scorecards that measure progress on a monthly basis, and a share of managers' bonuses is tied to achieving these goals: 25 percent for executives and 10 to 15 percent for senior and mid-level managers (Catalyst, 2012).

Sodexo has in nine years increased the share of women in senior management from 17 percent in 2008 to 32 percent in 2017, and women now make up 50 percent of the Board of Directors (Sodexo, 2018a). Worldwide, 54 percent of Sodexo employees are female (Sodexo, 2018b). Moreover, Sodexo has understood the imperative to ensure broader organizational buy-in – including from male employees – through establishing and communicating an internal business case. The company's own research shows that greater representation of women in management positions – between 40 and 60 percent women – delivers the best results on measures such as customer satisfaction and retention, and employee engagement (Sodexo, 2018c). Sodexo's inclusive and diverse work environment has also turned out to be competitive differentiator in terms of attracting the best (and most diverse) talent.

CONSIDERATION 4
REDUCE BIAS IN THE RECRUITMENT PROCESSES

In the workplace, unconscious bias occurs throughout female career journeys, but the first critical moment where it needs to be overcome is in **ATTRACTING** female candidates. Studies confirm the potentially adverse impact of gender stereotypes and bias on employment decision making (Koch, et al., 2015; Reuben, et al., 2014; Moss-Racusin, et al., 2012). Some companies have instituted employee training on unconscious bias, however research points to this having limited and only temporary effect (Dobbin & Kalev, 2016). Moreover, since bias and stereotyping are integral parts of human nature, they can never truly be eradicated. We must therefore turn to changes in systems and practices to reduce their influence, and below we discuss specific adjustments to recruitment processes which have proven effective in increasing the share of female hires.

One strategy is to remove gender-biased language from job descriptions and advertising material. Research shows that job listings in male-dominated fields employ more words associated with male stereotypes such as “leader” and “competitive” (Gaucher, et al., 2011). Women found these job advertisements less appealing; an effect mediated by a lower perception of belongingness (not perceived skills). Employers should also avoid excessive use of superlatives such as “expert environment,” “superior career prospects,” or “world-class institution”. In addition, women have been found to react more negatively to ambiguity than men. A study investigating women’s behavior with regards to salary negotiation found that job descriptions that explicitly stated the salary was negotiable attracted an equal share of male and female applicants, whereas when no information was given there appeared a gender gap in favor of men (Leibbrandt & List, 2014).

Turning to the evaluation of applications, blinding has proven effective in circumventing unconscious bias, leading to the selection of more female candidates. This practice entails removing all gender-related cues (name, picture, volunteer work in parent-teacher associations and the like) before screening applications and was originally conceived by US symphony orchestras, which placed auditioning musicians behind a screen (Goldin & Rouse, 2000).

Organizations employ a variety of tactics to eliminate the impact of bias in the interview process, synthesized opposite (Exhibit 23).

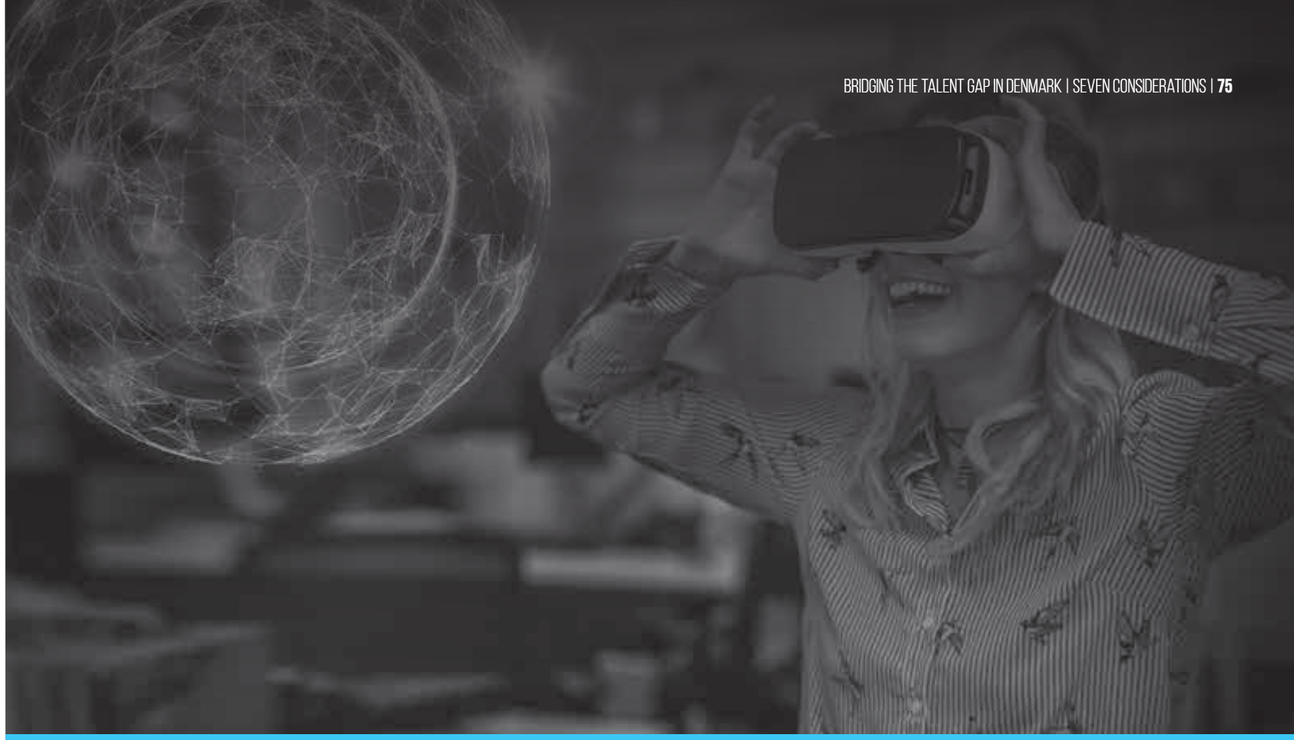


Exhibit 23

DE-BIASING THE INTERVIEW PROCESS

STAGE	INTERVENTION	DESCRIPTION
BEFORE THE INTERVIEW	Use a diverse team of evaluators	Set up a multi-stage interview process where individual interviews are conducted by different evaluators, who subsequently meet to discuss and argue their case (for or against hiring) in a joint decision meeting. Use a diverse team of evaluators in terms of characteristics such as gender, age, educational background, nationality etc.
	Define selection criteria checklists	Prespecify standardized criteria and required qualifications to make responses comparable across candidates
IN THE INTERVIEW	Use structured interviews	Base interviews on a predetermined format and sequence of questions directly related to the selection criteria
	Take notes	Ensure you probe for sufficient evidence of each capability being evaluated and write it down
AFTER THE INTERVIEW	Judge only on criteria covered in checklists	Let the selection criteria checklist and the evaluators' notes guide the discussion
	Strictly focus on evidence	Avoid introducing criteria not listed on qualification checklists

CONSIDERATION 5
PROMOTE AN INCLUSIVE WORK CULTURE

The complex causes of poor female **RETENTION** call for a comprehensive approach to effective intervention, or what we in the above analyses referred to as an inclusive work culture. Moreover, the constraints and career setbacks experienced by women after having children point to a need for a more supportive institutional setting.

Research has looked at specific organizational interventions that may serve these purposes. In a field experiment at a large US IT company, more than 800 employees were randomly assigned to the "treatment" or "business as usual" group (Moen, et al., 2016). The intervention program gave employees greater control over their schedules and involved active supervisor support for providing flexibility to prioritize family and personal life. Participants were surveyed over 12 months, and the measures were found to both increase job-related well-being among IT workers, as well as general well-being among women.

Flexible work models, however, are still associated with negative stigma, including beliefs that employees working part time or from home are not serious about their careers. As such, there is a large cultural component to establishing an inclusive work environment, including mindset shifts. Change will thus take time, but leaders can act as role models and institute concrete measures.

Opposite this page we summarize best practice elements of a more inclusive work culture, gathered from organizations, experts and McKinsey experience. Organizations typically implement some of these elements in different constellations. One company, for instance, has introduced a four-day work week coupled with a cultural drive towards results rather than long hours. Concrete measures include strict time management, such as working in short sprints, and fixed Outlook calendar settings making it impossible to schedule meetings with a duration of over 45 minutes.

In the Danish medtech company Coloplast, the top management has developed a shared language and understanding of key concepts of inclusive leadership. One example is a change of focus in meetings towards listening more than talking. Coloplast aims to integrate inclusive leadership behaviors into the organization's general leadership principles, so that inclusion and diversity becomes an integral part of the company culture.

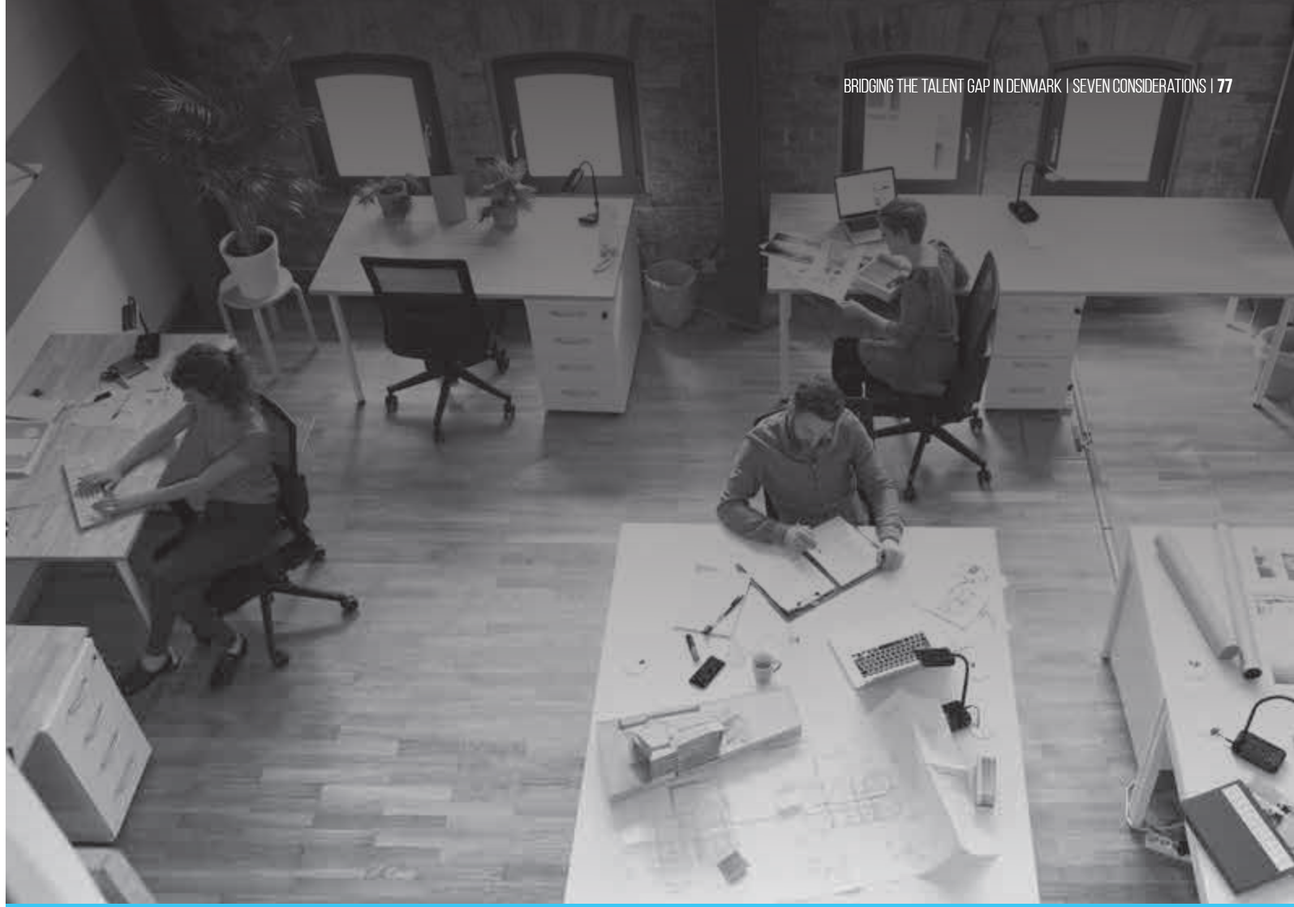


Exhibit 24

10 ELEMENTS OF AN INCLUSIVE WORK CULTURE

1. Setting up a systematic "keep in touch" program with employees on parental leave.
2. Introducing parent-friendly rules and policies, e.g., exempting parents from travel for one year after the birth of a child or offering on-site child care.
3. Allowing for flexible work arrangements, including part time, non-traditional hours and remote working.
4. Running informal or formal talks on work-life balance, giving employees the chance to share experiences and/or bringing in external speakers to provide insight and advice.
5. Performing equal pay for equal work audits across the organization.
6. Conducting higher frequency (less comprehensive) employee satisfaction surveys and following up with low-scoring departments.
7. Ensuring that social activities are not gender-biased, for example avoiding extreme sports for team building events.
8. Paying for performance rather than face time.
9. Encouraging men to take longer periods of paternity leave, with male managers walking the talk and making it the norm.
10. Promoting a culture of continuous feedback and positive recognition.

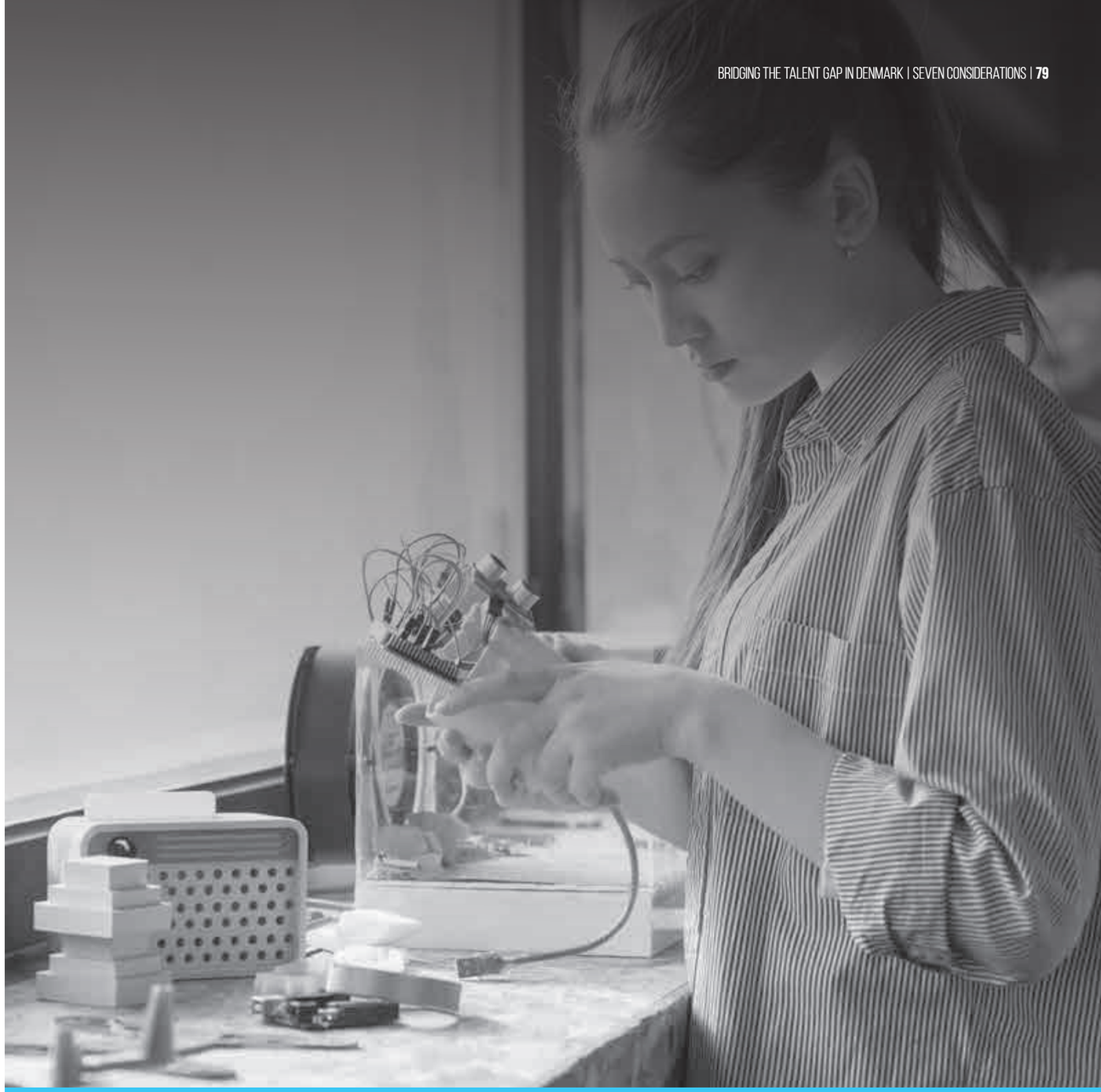
CONSIDERATION 6
ADVANCE FEMALE TALENT THROUGH MENTORSHIP AND SPONSORSHIP

ADVANCING women into management positions remains challenging in STEM and beyond. In our interviews, the transition from middle management to executive roles was cited as particularly challenging for women, due to a lack of strategic experience and influencing skills. Organizations are seeking to remedy these obstacles through mentorship, sponsorship and leadership training programs.

MENTORS are essentially career advisors. Through their own experience, they provide perspective on the mentee's role, strengths, and ambition, and how this can best be translated into professional success. Mentors need not be female, yet the tendency to relate more easily to people similar to ourselves does make a case for female mentors. An aspect of mentorship worth highlighting is the circumstance that a mentor does not have to work in the same organization as the mentee. Women can thus be paired up with women from an entirely different company, potentially even an alumnus of her current organization. An external mentor brings advantages including confidentiality and a nonevaluative relationship.

In the UK, the 100 largest publicly-listed companies have designed a cross-company mentoring program aimed at increasing the share of women in leadership (Mentoring Foundation, 2018). Mentees are nominated by the individual companies and subsequently paired with a senior leader (often the chair) of a different company from a different industry so as to avoid conflicts of interest. The mentoring pair meet at least once every three months, and each conversation lasts approximately an hour and a half. Since the program's inception in 2003, some 232 mentoring pairs have participated, with 91 of the 100 companies having placed at least one mentee.

SPONSORS should work in the same organizations as their (female) protégées. A sponsor should also be relatively senior. In practice this means that the active involvement of men is pivotal to success. Sponsors advocate for their protégées, making them visible within the organization and ensuring that they are considered for relevant promotions. As such, sponsors put their own reputations on the line. The engagement of sponsors promotes strong support for the protégée due to "cognitive resonance"; a belief on the part of the sponsor that anyone he or she supports must be deserving (Dobbin & Kalev, 2016). Moreover, the protégée experiences a strong signaling effect in being chosen and having a senior leader invest in their development, which may boost women's confidence in their capabilities and career prospects. Sponsorship is often less formalized than mentorship programs. However, companies such as AXA have chosen to institutionalize efforts. AXA's "Sponsorship Tandem" initiative seeks to identify the most talented women in each business unit and prepare them for senior management roles with the sponsorship of the local executive committee (AXA, 2018).



THE DANISH ENERGY COMPANY ØRSTED

The Danish energy company Ørsted has made strides to nurture female leadership talent. As part of its 'Female Spotlight' initiative, 15 high-potential women from across business units, roles, and organizational levels were selected to participate in assessment sessions and in workshops on the steps and skills required to advance into senior management positions. The four-month program included the identification of and feedback on leadership traits and development areas, exercises targeting these, career planning with specific goal setting, and continued support from line managers as well as follow-up and regular check-ins with company HR. The importance of cultivating professional networks was also emphasized as a key 'skill' to be developed early and honed throughout a woman's career journey. Moreover, gender diversity at Ørsted is anchored by senior management commitment, and the company CEO met with all Spotlight participants to gather feedback on the program and the company's broader diversity efforts.

CONSIDERATION 7
TAKE THE STRUCTURAL DEBATE – INSPIRED BY PEER EXPERIENCE

Several countries have instituted a range of legislative measures, which can have an effect across all four critical moments of a woman's career journey.

Below we present selected initiatives undertaken by European peers. The effectiveness of these interventions is still uncertain, and we make no explicit recommendations. Moreover, a political perspective goes beyond the economic scope of this report. However, the potential for bridging the talent gap through the better inclusion of women in high-productivity sectors such as STEM provide strong impetus for all stakeholder groups to engage, promote debate, and explore what could be relevant in a Danish context.

Pay gap legislation

A solid starting point for addressing gender diversity is generating transparency, laying the foundations for broadening public awareness, debate, and ensuing action. A recent approach to accomplishing this objective is the introduction of pay gap legislation in the UK. Enacted in 2017 after a 2010 measure encouraging voluntary reports failed, the law compels British employers with 250 or more employees to report differences between men and women in mean and median hourly earnings as well as bonus payments (Office for National Statistics, 2018). Although imperfect measures, due to a lack of data on pay gaps in similar jobs and the skew effect of there being more men in senior roles, the exercise has forced gender diversity onto corporate agendas. Moreover, the public availability of the information exposes employers to reputational risk and potential difficulties in attracting the best talent, which could serve as a catalyst towards promoting change. The legislation has received worldwide attention, and findings include the observation that all industries have a gap in favor of men and that men's bonuses are higher on average (Guibourg, 2018). This has generated transparency, awareness and debate, the merits of which should not be underestimated, yet it is too soon to estimate more tangible impact.

Earmarked paternity leave

The setbacks on pay and career prospects catalyzed by women's maternity leave have been addressed through the institution of earmarked paternity leave. Research shows a positive correlation between a larger share of parental leave taken by the father and the mother's labor market outcomes, as measured by factors including unemployment and income level (Andersen, 2018). One study of parental leave sharing among Danish parents facilitated causal inference by exploiting five legislative reforms of parental leave over the period from 1989 to 2002 (Andersen, 2018).

Insights on its potential impact are being recognized by the European Union, which earlier this year proposed to mandate two months of earmarked paternity leave in all member states (final adoption still pending). Some societies, however, have already taken independent and relatively extended measures, most notably Sweden. Swedish parents are entitled to 480 days of paid parental leave, out of which each parent has an exclusive right to 90 days under a "use it or lose it" system (Swedish Institute, 2018). Since the inception of the earmarked leave, with the first month safeguarded in 1995, the second in 2002, and the third in 2016, uptake of paternity leave has doubled. Nevertheless, women still take most of the remaining 300 sharable days, and Swedish men still earn more on average than women (Swedish Institute, 2018).

Paternal leave need not be a matter for legislation. Economic incentives such as tax breaks could work just as well. In addition, male managers can act as role models and take longer periods of paternity leave, making it a socially acceptable norm in the organization.

Mandating the share of women in leadership

Slow progress on increasing the share of women in leadership has seen several governments take action. As previously discussed, Denmark in 2012 introduced a requirement for companies to set targets and design policies for promoting female representation in board leadership. In the same year, the UK instituted a similar non-legally-binding approach, though unlike in Denmark this was accompanied by a recommended specific target of minimum 25 percent female board members. By 2015, the 100 largest publicly listed companies were compliant, and the UK government in 2016 raised the target figure to 33 percent women by 2020 – this time applicable to boards, executive committees, and their direct reports (Hampton-Alexander Review, 2017). Among government efforts to push this agenda is the rather novel use of behavioral insights to establishing gender diversity in leadership as a social norm, leveraging the fact that people are more likely to adopt certain behaviors if they see others doing it. In progress reports, the government no longer highlights the small fraction of female board members; rather it communicates the rising number of companies that have already achieved the recommended targets (Bohnet, 2016).

Norway was the first country to introduce legally binding quotas for women in leadership (Smith, 2014). In 2002, new regulations gave publicly-listed companies five years to raise the proportion of women on their boards to 40 percent, and by the time the quota became mandatory in 2008, this 40 percent goal had been reached (and has stayed relatively unchanged ever since) (Smith, 2014, EIGE, 2018). While this result is highly significant, research on the Norwegian case has not been able to establish unambiguously positive effects on firms' financial performance. Some studies have in fact found significant negative effects, with those most pronounced in companies with the fewest women on their boards before the law went into effect (Ahern and Dittmar, 2012; Matsa and Miller, 2013). These results speak to a particularly contentious issue related to quotas, namely the need for a sufficiently large pipeline of women with executive experience to fill board positions. Board quotas have proven largely ineffective in terms of spillover effects, with no notable change in female representation in executive committees since the inception of the legislation (Smith, 2014). It should, however, be noted that available empirical evidence concerns only short-term effects due to the quota's still recent introduction; long-term effects have yet to be studied.

To date ten European countries (Denmark not included due to the absence of a set target) have implemented quotas for the share of women on corporate boards, eight of them binding (European Commission, 2018; Smith, 2014).[1]

As the above review shows, structural interventions are not clear cut, neither in their design nor in their effects. In addition, governmental initiatives can never stand alone; action by the other stakeholder groups is imperative. Nevertheless, the power of legislation is notable, and peer inspiration ought to facilitate discussion as to what would be effective in the Danish context.

1. Binding: Norway, Iceland, France, Italy, Belgium, Germany, Austria, Portugal. Non-binding: The Netherlands, Spain

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