

# BRIDGING THE DIGITAL GENDER DIVIDE

INCLUDE, UPSKILL,  
INNOVATE

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*This brochure presents the key messages of a report produced by staff in the OECD Directorate for Science, Technology and Innovation (STI), with contributions from the Directorate for Education and Skills (EDU) and the Directorate for Employment, Labour and Social Affairs (ELS) of the OECD.*

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## Background

This brochure is based on a report produced at the request of the Australian Government contributing to the advancement of the 2017 G20 Roadmap for Digitalisation: Policies for a Digital Future, in particular its dimension on supporting the equitable participation of women in the digital economy. It was presented at the G20 Digital Economy Task Force meeting in Buenos Aires in July 2018 and the G20 Digital Economy Ministerial in Salta in August 2018.

The OECD report aimed to provide policy directions for consideration by all governments, including G20 economies' governments through identifying, discussing and analysing a range of drivers at the root of the digital gender divide. The report supported the G20 Presidency to bolster the evidence base and draw attention to critical areas for policy action.

Under the Argentine Presidency, G20 countries shared information about policies, actions, and national practices that help to bridge the digital gender divide. The analysis of those policies, combined with the OECD's report "Bridging the Digital Gender Divide: Include, Upskill, Innovate", reflect that gender-based digital exclusion is complex, requiring different interventions depending on the specific barriers to women's and girls' lack of access to, and use of, digital technology.

## Breaking the vicious circle through co-ordinated actions

While G20 economies have already put in place a number of important actions aimed at narrowing the gender gap, more needs to be done in light of the many worrying signs of a widening digital gender divide and the compounded effect that its different components may have in the future. Hurdles to access, affordability, lack of education as well as inherent biases and socio-cultural norms curtail women and girls' ability to benefit from the opportunities offered by the digital transformation. In addition, girls' relatively lower educational enrolment in those disciplines that would allow them to perform well in a digital world (e.g. science, technology, engineering and mathematics [STEM] and information and communication technologies [ICTs]), coupled with women's and girls' limited use of digital tools and relatively scarcer presence or activity on platforms – e.g. for business purposes – suggest a potential scenario of widening gaps and greater inequality, especially in disadvantaged areas. If one adds to this the fact that women receive comparatively less financing for their innovative endeavours and are often confronted with “glass ceilings” curbing their professional ambitions (especially so in tech industries), the picture that emerges is far from positive and points to a vicious circle that could lead to a widening of digital gender divides.

Policy, especially in the form of co-ordinated and complementary actions, may reverse these trends and trigger a more inclusive path, based on narrowing digital and gender gaps. Addressing the digital gender divide requires raising awareness and tackling gender stereotypes, while at the same time enabling enhanced, safer and more affordable access to digital tools and fostering strong co-operation across stakeholders to remove barriers to girls and women's full participation in the digital world. Digital technologies may provide new opportunities for making progress, underscoring the importance of broadening access. But “tech fixes” can do little to address the underlying structural problems driving the digital gender divide and gender biases. While the report discusses some of the ways in which women can be empowered, gaps narrowed and hurdles leapfrogged, narrowing the (digital) gender divide is not about “fixing women”, or perpetuating existing roles with the aid of technology. Rather, the focus needs to be on putting in place concrete policy actions fostering women's and girls' full participation and inclusion in the digital economy, while at the same time addressing ingrained stereotypes and social norms that lead to discrimination and even violence against women.

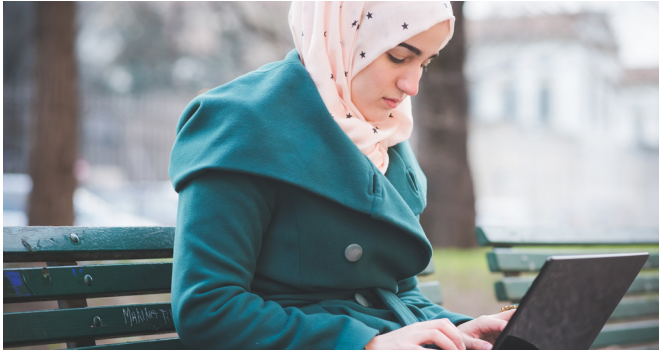
## Include

**Gender-based digital exclusion has many causes.** Hurdles to access, affordability, (lack of) education and skills and technological literacy, and inherent gender biases and socio-cultural norms, are at the root of gender-based digital exclusion. Enhanced, safer and more affordable access to digital tools is critical, as are policy interventions addressing long-term structural biases.

**Women in developing parts of the world need to be connected.** Worldwide roughly 327 million fewer women than men have a smartphone and can access mobile Internet. Women are on average 26% less likely than men to have a smartphone. In South Asia and Africa these proportions stand at 70% and 34%, respectively.

**The gender divide in Internet use is widening.** While the global digital gender divide in Internet usage remained almost unchanged between 2013 and 2017, at about 11%, the gap between developed and developing countries increased, driven by an increase in the gender Internet usage gap of by 3 percentage points in least developed countries and 4 percentage points in Africa.





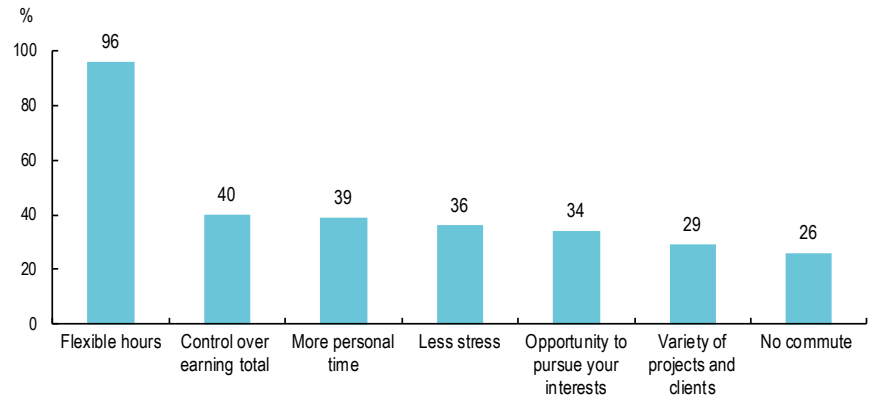
## Digital technologies offer leapfrog opportunities and help empower women.

The Internet, digital platforms, mobile phones, and digital financial services, offer “leapfrog” opportunities for all and can help bridge the divide by giving women the possibility to earn (additional) income, increase employment opportunities, and access knowledge and general information. This benefits women and their families, thus enhancing the lives and well-being of people and of society as a whole.

## Women have much to gain from boosting their use of digital tools.

While going digital can be enabling for all, the digital gender divide means there is important scope for women to extract more value from their use of digital tools. Female users currently tend to use fewer services than men and are less confident in using the Internet. For instance, while mobile money accounts offer an effective way to boost financial inclusion, it remains the case that fewer women are likely to own and use such an account. Online or video-based upskilling and tutorials may especially help women make better use of digital tools and extract more value from them.

## Benefits of working in the gig economy

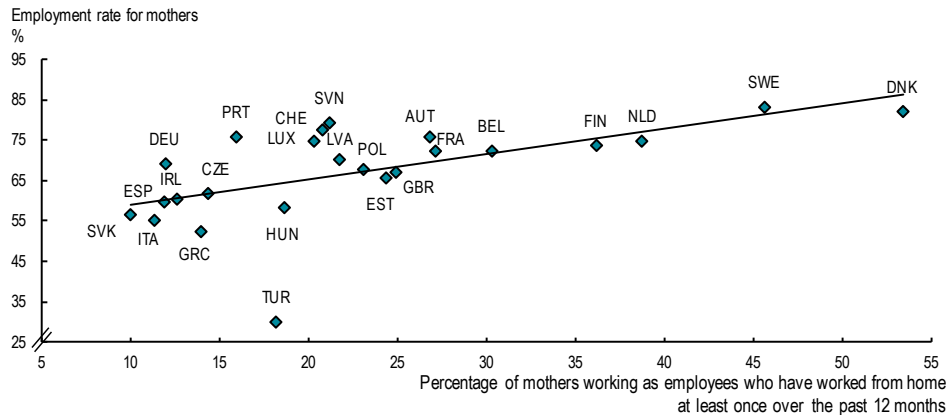


Source: OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.

**Increased participation in labour markets, including via digital platforms, needs to go hand in hand with job quality.** For women, and men, to benefit from the work opportunities offered by digital technologies, including platforms, efforts need to be made to ensure that flexibility does not occur at the cost of reduced job quality, in terms of e.g. pay, job security and social protection.

**A better redistribution of unpaid childcare and housework would help foster women's participation in (digital) labour markets.** Women spend 2.6 times more time than men on unpaid care and domestic work and this restricts the time they can spend in paid work or to upskill themselves. Actions aimed to raise awareness, challenge gender stereotypes and norms, coupled with measures fostering gender-neutral parental leave-taking and childcare services provision would help address norms, attitudes and behaviours around childcare and housework ingrained in society, and enable greater female participation in (digital) labour markets and training.

### Correlation between work flexibility and employment rates among mothers, 2014-15



Source: OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.



## Upskill

**Compulsory education helps to eliminate the digital gender divide.** Compulsory schooling is crucial to ensure that individuals gain the basic skills and competences needed for full participation in labour markets and society. At the age of 15, the gender gap in terms of skills for the digital area is not clear-cut: girls underperform boys in specific digital-related skills, but they outperform boys in collaborative problem solving skills, which are increasingly valued by employers. Although women display greater literacy and collaborative problem solving skills than men at the age of 15, this gap in literacy is bridged by the age 27 for the average man, while men's advantage in numeracy skills increases with age.



**Removing obstacles to adult education is important for all workers, and for women in particular.** This calls for more flexible opportunities for adults to upgrade their skills and for co-ordination across institutions and actors, including education and training institutions, employers, but also social policy institutions.



### Gender-specific expectations about the future need to change.

At 15 years of age, on average across OECD countries, only 0.5% of girls wish to become ICT professionals, compared to 5% of boys. Twice as many boys as girls expect to become engineers, scientists or architects. Changing gender-specific expectations about professions is key, including by fostering female role models in STEM.

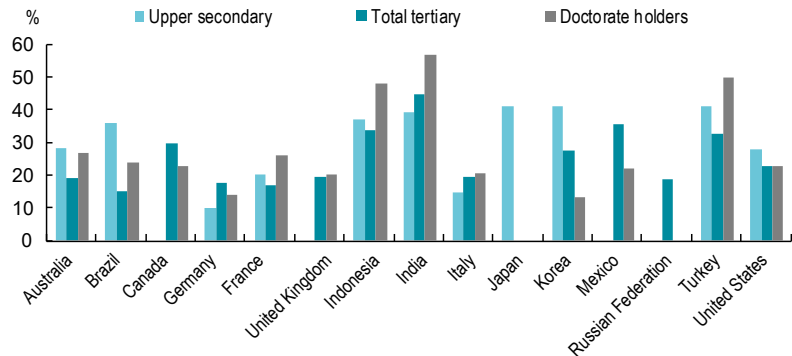
### Lower proportions of women graduate in engineering, manufacturing and construction, or ICTs.

While more women than men completed tertiary education in 2015, only 24% of graduates in engineering, manufacturing and construction were women; the share in ICTs was just 25%. Also, when women graduate in these fields and go on to the labour market, they display on average lower numeracy skills than male graduates.

### Raising awareness about education opportunities is key for women and girls.

Women are less likely than men to participate in massive open online courses (MOOCs), which can often be accessed for free and cover a range of topics. Informing workers, and women especially, about training opportunities can encourage participation.

### Share of women in graduates of ICT studies, by educational attainment, 2015

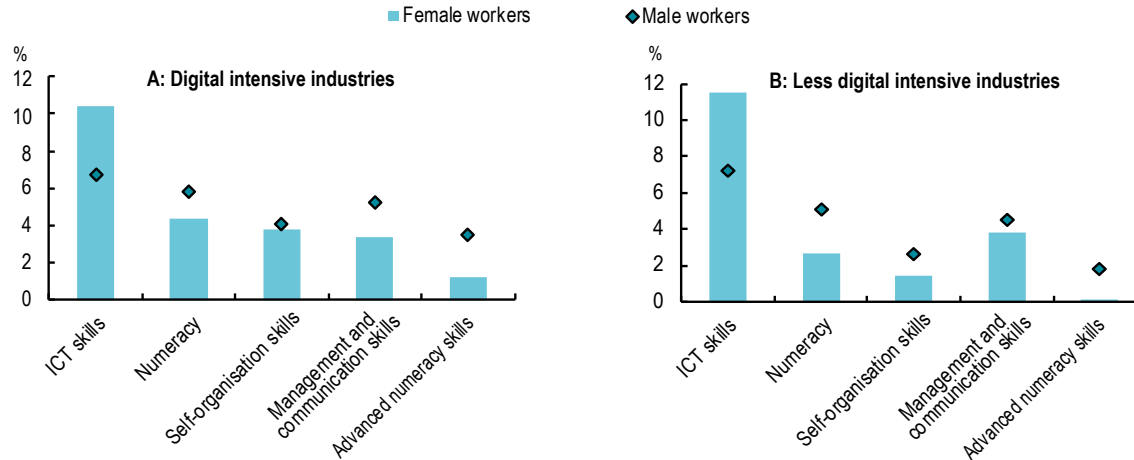


Source: OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.

**Skills in high demand in digital intensive sectors are more frequently displayed by men.** Narrowing the gender wage gap requires policies aimed to equip female workers with more self-organisation, management and communication, and advanced numerical skills; encouraging greater female enrolment in STEM-related studies and apprenticeships; and targeting existing gender biases in curricula and parental preferences.

**ICT skills can help narrow the gender wage gap.** Men and women differ in their endowment of the skills needed in the digital era. Women display a relative advantage in ICT task-based skills which can garner relatively higher rewards on labour markets, contributing to the reduction of the gender wage gap.

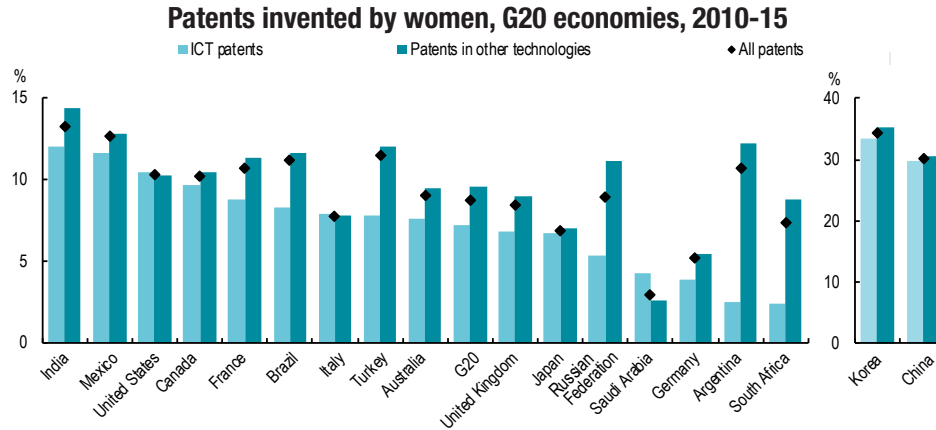
**Labour market returns to skills by gender  
across 31 OECD countries and partner economies, 2012 or 2015**



Source: OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.

## Innovate

**Women's participation in inventive activities has been increasing, but the pace is slow.** Lack of diversity in the composition of innovation teams across the world reflects widespread socio-cultural biases. To counter this, a greater diversity of inventors is needed. Female participation in patenting activities increased at a faster pace than the average rate at which all patent applications grew over the period 2004-15 – and in ICTs increased relatively more than in all other technological domains. But the low starting point coupled with the relatively slow progress means that, at the current pace, it will be 2080 before women are involved in half of all patented inventions within the five largest IP offices (IP5).



*Note:* As a percentage of total IP5 patent families invented in countries. The indicator is overestimated for China and Korea.  
*Source:* OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.

**Diversity brings value, both social and economic.** Greater inclusion of women in inventive activities is good not only for women themselves, but also for stronger economic growth and enhanced societal wellbeing. Inventions arising out of mixed teams, or women-only groups, appear to have wider technological breadth (and may therefore be more economically valuable) and higher impact from a technological viewpoint than those in which only men are involved.

## Co-authorship network graph of top R package authors, by gender

👤 Female : 78  
● Male : 922

### Software is a male-dominated world, especially in companies.

Analysis focusing on one well-known open-source software (R), shows that women are few and far between in the software world and play a relatively less important role, with many of them less connected to the network of software developers than their male colleagues. Especially in companies, very few (15%) female (R) software authors can be found.

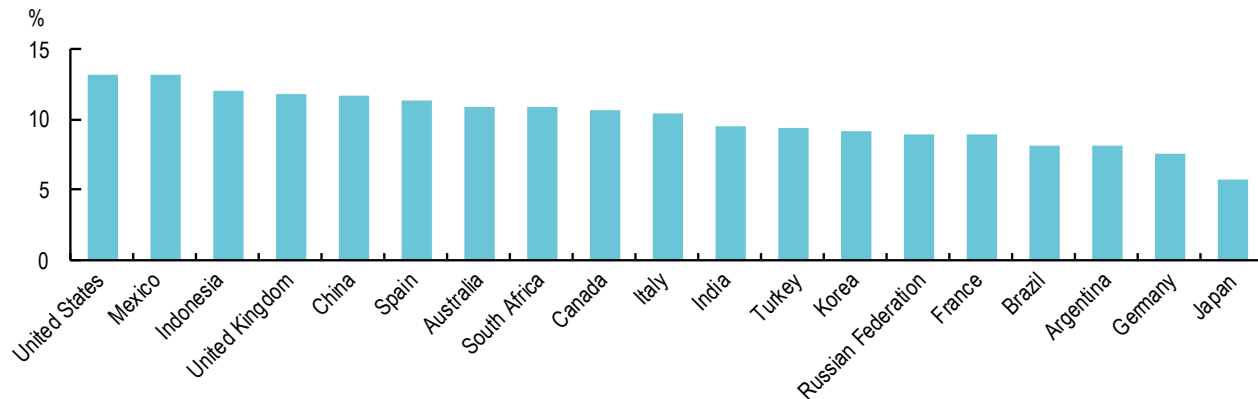


Source: OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.

## The gap in entrepreneurship and in start-ups and venture capital (VC) investment point to socio-cultural gender bias.

The gender gap in entrepreneurship is striking and persistent. Men are nearly twice as likely as women to be self-employed; they are three times more likely than women to own a business with employees across OECD countries; and 90% of innovative start-ups seeking VC investments have been founded by men. Women-owned start-ups receive 23% less funding and are 30% less likely to have a positive exit – i.e. be acquired or to issue an initial public offering – compared to men-owned businesses. Nevertheless, progress is possible: VC firms with at least one female partner are more than twice as likely to invest in a company with a woman in the management team, and three times as likely to invest in female chief executive officers (CEOs).

Share of females among start-up founders, by economy



Source: OECD (2018), Bridging the Digital Gender Divide: Include, Upskill, Innovate.

## Many gender equality initiatives are under way in G20 economies, but more needs to be done.

Coordination among different initiatives, scaling up, learning from successful and unsuccessful programmes and building on lessons learned may go a long way in improving the equitable sharing of the benefits of digitalisation. Narrowing the gender gap, also the digital one, calls for actions addressing the structural root causes of the divide. Success at increasing the number of girls and women studying STEM will do little to bridge gaps if these people confront unchanged biases in the workplace.



**Action requires measurement.** Evidence-based policy making requires the systematic collection of data, aimed at identifying priorities, and defining and monitoring key lines of actions. Fostering the addition of gender-related dimensions in official statistics is important in this respect.



## The role of policy

*Narrowing the digital gender divide  
through coordinated actions*



The analysis suggests there is strong **potential for positive policy action in at least six core areas**. Taken together, these could provide the basis for a shared G20 ambition to bridge the digital gender divide and build a more inclusive digital future. A possible agenda could include:

- The **design and implementation of national digital strategies** that actively aim to close the gender digital access, adoption and usage gaps, and improve the affordability of digital technologies while enhancing online safety.

National digital strategies should include targets (both numbers and dates) for closing the digital gender divide across at least four dimensions, namely:

- ⇒ extend networks and digital access (e.g. through satellite) to rural areas;
- ⇒ promote access to and affordability and use of connected digital devices (e.g. smart phones, tablets, laptops), especially for low-income individuals;
- ⇒ boost availability and promotion of e-banking and mobile money, especially to women and other disadvantaged categories;
- ⇒ increase online safety.



G20 digital

- **Adapt national and G20 Skills Strategies to increase awareness of the digital gender divide**, help address stereotypes, target existing gender biases in education curricula, encourage greater female enrolment in STEM studies and more generally, bridge the skills gender divide in the digital era.

Addressing the digital gender divide requires sufficient awareness and strong co-operation across stakeholders and tackling gender stereotypes is critical. In many G20 economies, the digital gender divide is particularly large in STEM education and in high-technology sectors that require STEM degrees.



G20 economies could consider making the following commitments:

- ⇒ agree to establish (time bound) targets for women in STEM;
- ⇒ create fund and grant schemes aimed at enhancing the enrolment of women in STEM education;
- ⇒ establish awards and prizes enhancing the visibility of women in STEM and in high-technology sectors;
- ⇒ implement awareness campaigns tackling socio-cultural norms and biases and stereotypes.

- **Facilitate the labour market participation of women**, at the same time as monitoring and ensuring job quality and the provision of support services aimed at allowing women to work and pursue a career while being mothers or having a family. It would also be important to pair labour market participation-related actions with actions fostering a better redistribution of unpaid childcare and housework and shaping investment for better targeted life-long training.

In 2016, the gap in labour market participation rate between men and women aged 15-64 was estimated to be around 26% for the G20 economies. OECD analysis has found that those countries with the highest shares of women working from home are also the ones that exhibit the highest employment rates and that greater work flexibility goes hand in hand with higher employment rates among mothers.



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- **Foster women's entrepreneurship and engagement in innovation**, through the promotion of diversity in entrepreneurship and within teams of researchers and inventors.

G20 economies could take action across a number of dimensions, including:

- ⇒ promote a more gender balanced composition of financing institutions especially those receiving public funds, including VC;
- ⇒ design prizes and incentive schemes for companies and organisations actively implementing gender-neutral policies linked to measurable targets;
- ⇒ foster networking and gender inclusion in entrepreneurial and innovative activities.



- **Foster evidence-based gender-related actions by collecting gender-disaggregated data.** To this end, it would be important to add a gender dimensions to data already collected by National Statistical Offices which at present are not declined by gender (e.g. related to entrepreneurship, innovation, etc.) and to design and implement the collection and publication in periodical reports (e.g. education and employment-related reports) of gender-related statistics, also linked to the targets mentioned above. Initiatives such as the OECD Gender Portal could further help collecting the evidence available in support of policy assessment and/or monitoring and benchmarking of progresses made.



- The **publication of an annual Digital Gender Equality Report** that is based on a common methodology and indicators and the periodical collection of data. The Measurement Toolkit for the Digital Economy being prepared for the G20 Digital Economy Task Force by the OECD in conjunction with the International Telecommunication Union (ITU) and other international organisations represents a solid starting point. Monitoring progress, benchmarking initiatives and identifying best practices and high-impact measures is critical for keeping the momentum behind efforts to close the digital gender divide.

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