

Women in the Digital Age

EXECUTIVE SUMMARY (EN)

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Abstract

This study aims to identify key factors and trends in the participation of women in ICT and its dynamics and analyses the practices enabling women's participation in the digital world.

57% of tertiary graduates in the EU are women, but only 24.9% of them graduate in ICT-related fields, and very few enter the sector. Women make up 13% of the graduates in ICT-related fields working in digital jobs compared to 15% in 2011. Globally, figures indicate that women's participation in the ICT and digital sector are not improving significantly.

Data trends and qualitative analysis suggest that gender inequality in the digital sphere is essentially a result of the persistence of strong unconscious biases about what is appropriate and what capacities each gender has, as well as about the technologies themselves. Therefore, to address this situation, cultural change and initiatives at micro level can help develop female digital entrepreneurship.

If existing biases are not addressed, rapid economic advances achieved by digital transformation will not take into account existing gender gap in the sector which will simply amplify and, possibly perpetuate gender stereotypes.

Executive Summary

Aim and methodology

This study aims to identify the key factors and trends regarding women's participation in ICT and its dynamics, as well as analysing the state-of-the-art practices enabling women's participation in the digital world. The objective of this study is to provide updated evidence for prognostics and policy making in the area of women in ICT in Europe.

The methodology combines qualitative and quantitative techniques to gather evidence in support of the main findings of this study. The qualitative analysis is based on: (1) desk research conducted by using different sources of information from the industry, public bodies and consultancy and research firms; (2) analysis of the contributions received through a public consultation; and (3) the elaboration of case studies. The quantitative analysis is based on the following datasets provided by European and international organizations and private associations: (1) yearly microdata of the Eurostat European Labour Force Survey (LFS) of 2011 and 2015 to describe the current status of the main trends analysed; (2) the European Survey on Working Conditions of 2015; (3) the European Institute for Gender Equality (EIGE) 2016 database; (4) the special Eurobarometer 88.2 of 2014 on cybersecurity; (5) the special Eurobarometer 460 of 2017 on attitudes towards the impact of digitisation and automation on daily life; (6) the Stack Overflow Developer Survey of 2016, a comprehensive survey of 45 questions given to 56.033 coders in 173 countries; and (7) the 2013 TALIS dataset from the OECD on the learning environment and working conditions of teachers in schools¹.

The following is a summary of the main evidence and findings made in the areas of (1) participation of women in the ICT and digital sector, (2) digital skills and gender, (3) female digital entrepreneurship, (4) female leadership, (5) gender differences in attitudes towards technology and digitalization (6) women's challenges in the digital age (7) the potential impact of gender gaps and biases in technology and (8) the main conclusions of the study.

Participation of women in the ICT and digital sector

Women and formal ICT education

In 2015, 2.7% of Europeans studied in ICT-related fields, 0.3 percentage points (pp.) less than in 2011. Among those with a tertiary ICT-related education, 5.4% had an ICT-related degree, 0.4 pp less than in 2011. The negative trend in the number of people with formal ICT-related education is observed for both genders, but the gap between men and women has increased a little. There are still practically four times more men with ICT-related studies than women in Europe.

Women in digital professions

In 2015, 5.8% of European workers were employed in digital jobs, compared to 5.4% in 2011. The slight growth is common for both men and women, but there was a higher growth for men, resulting in a wider gender gap (2011: 5.1 pp.; 2015: 5.8 pp.). The share of men working in the sector is a 313% greater than the share of women. Women represent only 21.5% of all workers in digital jobs.

¹ Please see the latest edition of the Gender Equality Index for data on specific countries.

The study shows that having a tertiary education increases employability for both men and women, regardless of the field; however, the effect of tertiary ICT-related studies on employability is **small and only positive for men, while showing slightly negative results for women**. Evidence suggests that, on average, and all other things being equal, having ICT-related studies increases the probability of employment for men between 2 and 3 percentage points. For women, the probability of being employed with ICT-related studies decreases between 1 and 2 percentage points, in comparison to women with other type of studies. Therefore women are not taking advantage of the opportunities created by ICT and digital sectors in the labour market. This is the case, for example, in artificial intelligence: 41% of women have heard, read or seen something about the topic in the last year compared to 53% of men. And similar differences also exist for other technological areas.

Despite the demand for ICT and digital professionals with technical backgrounds, as well as the positive growing trend of the sector as a whole, the share of technical employees in digital jobs does not increase to the same extent and the gender gap is growing.

For every 1,000 female tertiary graduates in the EU, only 24 are graduates in ICT-related fields. Of these 24 graduates, only 6 women end up working in digital jobs. On the other hand, out of every 1,000 male graduates, 92 studied in ICT-related fields of which 49 of end up working in digital jobs.

Women along the digital sector career path

Women who work in the digital sector tend to leave it at a greater rate than men. This is particularly clear with people who are between 30 to 44 years old, the prime working age and the stage in someone's professional development. This age range is also the period when most Europeans have their first child and/or have to take care of their small children. While around 1.2% of those male digital workers with tertiary education left their profession in 2015 for one of these reasons, that number almost quadruples for females at 8.7% in that same year, which is 1.5 pp. more than in 2011.

This "drop-out phenomenon" of women from digital jobs has an economic cost. The annual productivity loss for the European economy due to women leaving their digital jobs is 16.1 bln Euro.

Evolution of working conditions in the ICT sector from a gender perspective

When comparing working conditions of men and women in the ICT sector, women are more motivated than men to give their best job performance, but feel they don't have as much freedom to apply their own ideas as their male co-workers do. Women in the ICT sector have also experienced discrimination on the basis of their gender to a much greater extent than their male counterparts. When compared to other service sectors, it is observed that ICT workers, both men and women, received less training, but female ICT workers have much more flexibility than females in other sectors.

Comparison of data from 2010 and 2015, show that most of the gender gaps in the ICT sector are narrowing in the context of working conditions; however, there are two aspects in which the gap has widened: positively, women are significantly more motivated than men and, negatively, women experience discrimination to a greater extent than men.

Digital skills and gender

This research shows that there is a shortage of digital skills in the EU that affects the whole population, including the youngest generations, misnamed "digital natives", of which almost half don't have advanced digital skills.

When it comes to basic skills there is no gap among those under 55 years old. There is a 6 pp. difference between men and women over the age of 55. When considering advanced digital skills, girls under 24 surpass their male counterparts, while in the other age groups a gender gap negatively affecting women still persists. There are, though, relevant differences among the EU countries regarding the gender gap of digital skills.

Despite having similar levels of basic digital skills, women more often question their own skills than men do. These data are consistent with existing literature that shows that women tend to undermine their own capabilities and skills to a greater extent than men.

Greater gender differences arise when it comes to what is nowadays considered the "new literacy" and part of what should be basic eSkills: coding. A study recently published by Accenture found that 68% of female undergraduates have taken coding or computing classes, compared to 83% of male undergraduates.

Women represent around 10% of one of the biggest international online coding communities, Stack Overflow. A survey carried out by this community showed that women have, on average, less coding experience and, again, tend to underestimate their programming abilities compared to their male counterparts.

Female digital entrepreneurship

Data and trends

According to the 2nd European Start-up Monitor, only 14.8% of start-up founders are female. The Global Entrepreneurship Monitor in 2016 shows that Europe had the lowest female involvement in Early-stage Entrepreneurial Activity of every analysed region (6%) and the lowest gender parity. Furthermore, European women are half as likely to be engaged in early-stage activity as men are.

The percentage of female entrepreneurs within EU member states for all economic activities shows large disparities with percentages ranging from 19.4% in Malta to 39.5% in Lithuania, the member state with the highest rate of female entrepreneurs.

Women entrepreneurs in the ICT sector in Europe: characteristics and perceptions of their working conditions

In 2015, 23.4% of entrepreneurs in the ICT sector in Europe were women, around 4 pp. more than five years earlier. Despite the scarce percentage of women in entrepreneurship, research shows that female-owned digital startups are more likely to be successful than those of their male counterparts and that investment in female-founded startups performs 63% better than exclusively male-founded startups.

Female entrepreneurs in the ICT sector in Europe are overall satisfied with their work, have a greater sense of achievement and experience relatively low levels of stress. They are, however, less paid than their male counterparts.

Trends in female start-up investments

Start-ups with 100% female founders obtained 4.9% of all global venture capital deals in 2016, the highest percentage of deals in the past decade. However, average investments in female entrepreneurs have fallen 0.7 pp. since 2014.

The percentage of companies with at least one female founder that have reached venture capital (VC) deals in 2016 in Europe was 16.1%. In the U.K., for example, male entrepreneurs are 86% more likely to obtain VC funds than women.

Existing research shows evidences of the existence of stereotypes affecting investors, regardless of gender. During an experiment in which two entrepreneurial pitch videos with randomly assigned voices were watched, 68.3% of participants preferred to invest in ventures pitched by a male voice even though these voices presented identical pitches.

Female investors and female entrepreneurs

One of the problems that women face when starting a company, a tech company in particular, is the lack of access to capital in a scenario traditionally dominated by men. Only 7.4% of investors who have invested in one or more startups are women. When it concerns women angels, this percentage stand at 7.2%. Despite the increasing number of business angels worldwide, the representation of women is still scarce. As reported by the European Early Stage Market Statistics 2015, the percentage of female business angels has risen from 4% to 10% since 2013, even reaching 30% in some Business Angel Networks (BAN). Regardless, there is still a clear inequitable distribution of female business angels among the European BANs.

Female leadership in the digital era

The situation in the corporate world

Gender inequality in leadership positions is still almost twice that of inequality in the general labour force.

Women on European boards have risen from 13.9% in 2011 to 25% in 2015. Women represent 35% of all newly elected directors at STOXX 600 companies; however, most are independent non-executive seats. Additionally, the average tenure of service for women is 3.7 years in comparison with 6.4 of men, and their participation at board meetings is lower. By sector, the IT sector shows the third highest increase in female board members, a 102% since 2011, but it is also the sector with the highest percentage of all-male boards (17.2%). The Telecommunication Services sector shows the highest percentage of women on boards (27.1%), which represent a 46% increase between 2011 and 2015. This is also the only sector where all companies have at least one woman on their boards.

The representation of women in senior management positions reveals a positive trend in Europe, but we are still far from achieving remarkable goals towards parity. The percentages of female executives in publicly listed companies range from 5.4% in Austria to 34.8% in Estonia. The Information Technology sector is the only sector without women occupying CEO positions in any of the corporations in STOXX 600. In the Telecommunication Services sector, only 9.5% of CEO positions are occupied by women.

The percentage of workers in the ICT sector that have female bosses in Europe was 21.4% and 48.4% in other non-ICT service sectors in 2015. These figures represent an increase of approximately 2 pp. in both cases compared to 2010.

Female leadership in the public sphere

According to the Gender Statistics Database (GSD), the number of female members of parliament/assembly in EU28 in the first quarter of 2017 was 37.3%. In 2016, 18.8% of the leaders of the major political parties in EU countries were females. Currently 6 European Union countries have a woman as head of state or government. When looking at the ministers responsible for telecommunications and or the digital agenda the number of females in charge is reduced to 5 out of 28 member states.

In the European Commission, females were 29.6% of Commissioners in the first quarter of 2017. In the European Parliament, women represent 37.4% of MEPs and 5 out of 14 Vice-Presidents are women; however, only 6 of the recent top ten MEPs influencing European digital and telecommunication policy were identified as women.

e-Leadership and gender

It has been estimated that the demand for e-leadership, defined as “the accomplishment of a goal that relies on ICT through the direction of human resources and uses of ICT”, will keep increasing, implying a growing demand for talent. According to some studies, it is expected that the demand for new e-leadership professionals in Europe may rise up to 4.6% over the period spanning 2015-2020. In a conservative scenario, Europe will require 50,000 new high-tech leaders per year in the years up to 2025.

Corporate leadership diversity and its benefits

Organizations with significant female representation for decision-making positions have better governance styles, drive more creative and diverse innovation processes by promoting ideas that are more likely to meet customers’ needs and deliver considerable financial benefits, according to some studies.

If companies develop specific gender policies –e.g. hiring, promotion and turnover initiatives- to help break the glass ceiling, it has been estimated that the technology industry could reach 36% female representation at the executive level in 2020, compared to 33% in the “baseline scenario” where no changes to current trends are implemented.

Gender differences in attitudes towards technology and digitalization

Gender differences are not only visible in career options, but also in citizens' attitudes towards technology and innovation. Women have a more negative view on the impact of digital technologies than men in Europe. For example 70% of men vs. 63% of women think that the most recent digital technologies have a positive impact on their quality of life. They also tend to be less informed than men about new technologies, which may contribute to the greater mistrust they have towards digital technologies.

Women's challenges in the Digital Age

Despite increased awareness and numerous initiatives, women still face significant challenges in the sector that affect all stages of females' career paths and life courses in the digital sphere. These challenges include: (1) Unconscious biases, (2) Tokenism, (3)

problems relating to professional and personal life and (4) Low transparency and inclusiveness in business policies. Additionally, there are specific difficulties that women face when it comes to establishing and running a business like reduced access to financing. Women also face other barriers like: (1) the lack of role models, (2) entrenched stereotypes, (3) weaker business networks, (4) stronger perceived difficulties for reconciling business and personal life and (5) gender differences on the sector of activity.

The potential impact of gender gaps and biases in technology If equality in the digital sphere is not achieved we will miss talent, vision, resources and wealth. The lack of diversity, particularly of women, in teams developing technology has an impact on innovation too.

Direct evidence of this fact can be found in examples of failed, inadequate or unfortunate products and services. Indirect benefits of having diverse teams are more complex to prove, but there is evidence that diversity, particularly in intensively knowledge-based industries such as ICT, increases performance and innovation.

If no action is taken, the impact of the lack of diversity in technology can be extreme considering the growing importance of big data and algorithms in our lives. Technology reflects the values of its developers, and that of the information they draw from. It is clear that having more diverse teams working in the development of such technologies might help identifying biases and prevent them.

Approaches to enhancing diversity in the digital sphere

Most of the restraining factors preventing women from fully participating in the digital era are based on stereotypes and preconceptions. Policies and initiatives aimed at increasing gender equality in the digital sector should pay particular attention to the turning points that have the greatest influence on a women's life cycle: childhood, adolescence, entering the world of work, motherhood and returning to the labour market.

The most common prevention and mitigation measures implemented to overcome barriers for women in the digital sector are: (1) role models, (2) training, (3) digital literacy & exposure to tech, (4) reformed ICT formal education, (5) mentoring, (6) transparency and inclusiveness, (7) networking, (8) facilitating access to funding, (9) flexibility & conciliation measures, (10) quotas & targets, (11) sponsorship, (12) lifelong learning initiatives, (13) awareness of unconscious biases and (14) increased women's confidence in tech and digital innovation.

Conclusions and recommendations

Globally, the figures for participation of women in the ICT and digital sectors are not improving significantly. Only by looking at the micro-level initiatives and experiences that show the way to transformation are found. These initiatives have some features in common: they are based on collaboration and cooperation among diverse stakeholders, have a focus on raising awareness about the situation and clearly rely on education and skills as a driving force for change. These initiatives must be scaled up and implemented in innovative ways.

The analysis of cases, the results of the consultation and the desk research point out progress has been the result of **strategic changes that have permeated the entire**

organizational culture. Education and social awareness have been identified as the main tools to promote gender equality, and its execution requires **innovative and coordinated solutions** that can spread from **local implementation to global visibility and commitment**. Efforts have to be **constant and sustained** as results are only visible in the long-run.