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THE DIGITAL GENDER DIVIDE: AN OVERVIEW

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Abstract. *It has been observed that women, especially in developing countries, have significantly lower technology participation rates than men. This is generally considered to be the result of socio-cultural attitudes related to the expected role of women in society. The consequence is the low percentage of women working in the high-tech industry. However, nowadays, women make ample use of internet technology and access social media just as much as men.*

This article will explore the issue of the digital gender divide, focusing on which factors can impede and/or facilitate access to and use of digital technologies. It represents the preliminary results of an ongoing research conducted within a bilateral project entitled "Gender aspects of digital readiness and development of human capital" that involves the Latgalian region in Latvia and the Ternopil region in Ukraine, two regions that share similar socio-economic problems.

The aim of the research is to increase the level of women's inclusion in the labor market of the future, which itappears will be increasingly dominated by digital technologies. From this perspective, reducing the digital divide is crucial, but alternative forms of digital education will need to be introducedin order to facilitate the acquisition of digital competences.

Keywords: *gender occupations, digital gender divide, women's inclusion, women's empowerment, digital education.*

Introduction

In the early 2000s, girls and young women showed little interest in higher level computer classes as a consequence of the problems/issues initiated right from the early stages ofthe schoolingsystem (Verbick, 2002). Over the last decade, the number of women in science and engineering has been growing, but men continue to vastly outnumber women in these fields. Indeed, although girls and boys attend the same math and science programs at school, the family and school environment didn'ttend to encourage young girls into technology-related areas.

A report by Hill, Corbett, & St. Rose (2010) confirmed the effects of societal beliefs as well as the influence of the learning environment on girls' achievements and interest in science and math. The report shows that if teachers and parents

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encourage girls in learning math, theyperformmuch better in math tests and are more likely to say thatthey want to continue to study math in the future. The authors of the report argue that implicit biases against women in science may prevent girls and women from pursuing science from the beginning. Parents can encourage or discourage their daughters from pursuing science and engineering careers bytheir socio-cultural context and relatedopinionsregarding the role of women.

Figure 1showshow biases regarding girls' ability in science, technology, engineering, or math (STEM) influence their low achievements, and how these low achievements are, in turn, interpreted as the result of their low ability in STEM.

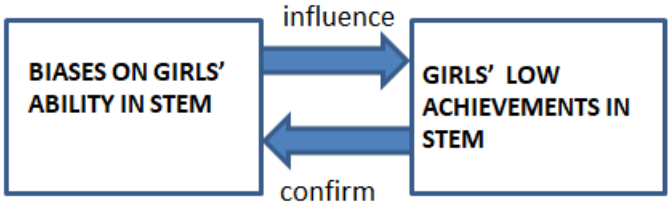

Figure 1 ***The effect of biases on girls' ability in STEM***

Socio-cultural biases negatively affect women's empowerment and their career development. For example, one of the most important skills in the future job market, creative thinking, tends to be associatedwith qualities more typically ascribed tomen than to women. Creative thinking is stereotypically considered to be amasculine trait, whilst social harmony and interconnectedness are seen as being feminine (Baer & Kaufman, 2008). Men are judged to be more creative than women, although in acontext in which collaboration and integration of perspectives as well as feminine attributes such as refinement and elegance are emphasized, women can emerge as more creative than men(Proudfoot, Kay, & Koval, 2015; Abraham, 2016).

This article focuses on the factors that hinderwomen'saccess to and use of digital technologies, highlighting the situation in Latvia. It represents the preliminary results of ongoing research conducted within a bilateral project entitled "Gender aspects of digital readiness and development of human capital". The project involves the Latgalian region in Latvia and the Ternopil region in Ukraine, two regions that share similar socio-economic problems.

Research methodology and objective

In our study, we adopted a desk research methodology to obtain a general overview of the factors that can influence the low percentage of women working

in the high-tech industry, as well as the barriers that hinder their career advancement in high-tech companies. Data was collected from literature and official statistics. Articles and reports on feminine and masculine occupations were gathered and analyzed, taking into account their period of reference. We attempted to identify the changes in the female working culture and isolate the elements that seem to be persisting.

The primary objective of our research is to establish an interregional network between the Latvian Latgalian region and the Ukrainian Ternopil region in order to increase women's participation in STEM. Accordingly, we are concentrating on an interdisciplinary effort to identify and formulate a common strategyto ensure the equal participation of women in the labor market of the future, whichwill increasingly be characterized by technology.

In the following paragraphs, we present the principal results of our research, such as gender stereotypes in the current working culture and the relationship of womenwith digital technology.

Feminine and masculine occupations

A recent ILO report, *Women at work* (2016), reveals that occupations are still considered to be either "feminine" or "masculine" according to the skills that a job entails, as well ason the working culture that exists in that field.

Jobs that require interpersonal skills or involve caregiving are classified as "feminine", since they are seen as being typically feminine and fitting with the stereotyped familial division of labor (Bettio & Veraschcagina, 2009). In contrast, jobs that are associated with the use of physical strength, risk-taking, or decision-making are considered "masculine".

Research confirms that very often, women are associated with caregiving roles and the family, whilst men are generally associated with the role of "breadwinner" and career building (Sinno, Schuette, & Killen, 2014). It has been observed that these stereotypes are "data-driven representations of social reality that become consensual gender roles and, in turn, influence gender-stereotypic behavior" (Wood & Eagly, 2012, 91).

From the literature, it emerges that such gender stereotypes are acquired and consolidated during childhood. For example, research at the end of the 1990s showed the girls are typically collaborative in their conversations whereas boys are frequently assertive (Leaper, 1998). It has also been observed that, between the ages of 1 and 3, girls are significantly moretalkative than boys, and this suggests that they develop language more quickly (Tenembaum, Aznar, & Leman, 2014).

In Europe, despite the fact that, in the last decades, women have been excelling in higher education, they represent only a third of researchers. The

number of female heads of higher education institutions rose from 15.5% in 2010 to 20% in 2014, but there is still a long way to go before we reach a position of gender equality in European research and innovation professions (European Commission, 2015).

Recent data shows that, globally, occupational segregation has actually increased over the last two decades with skill-biased technological change, notably in developed and emerging countries (ILO, 2016).

Women and digital literacy

Nowadays, digital literacy is a fundamental ability in every sector.However, a comparison of the digital inclusion of women and men (namely, access to mobile phones and the internet) shows that women, onaverage, enjoy only 84 percent of men's access (McKinsey Global Institute, 2015).

Statistics reveal that women have made notable progress within the categories of science and engineering, where the number of women has grown by an average of 11.1% per year, but women employed in these fields remains 6% below average (European Commission, 2015). Figure 2 shows the proportion of women working as scientists and engineers.

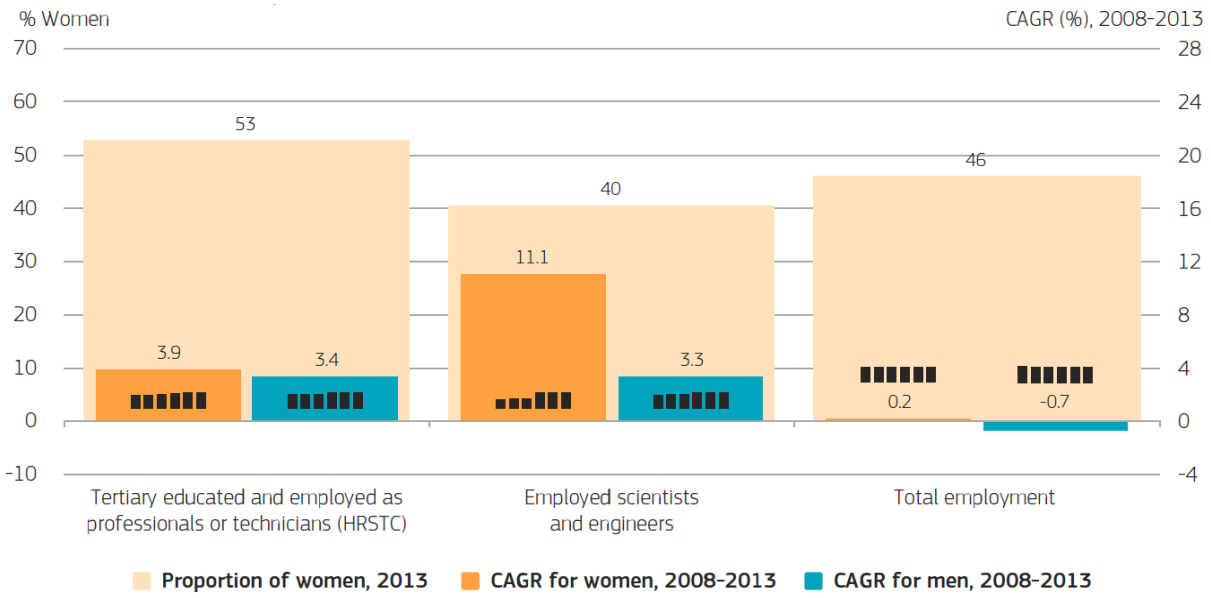

Figure 2 ***Proportion of women in the EU-28 compared to total employment, the population of tertiary educated professionals and technicians, and the population of scientists and engineers, in 2013, and compound annual growth rate (CAGR) for women and men 2008–2013*** *(Source: European Commission, 2015, 43)*

Social care and health care policies influence women in a STEM career. Most women take a break to raise and look after their families, and it'stough to maintain

a successful career in academia and also worry about a family (Mavriplis et al., 2010). Furthermore, women with a STEM degree are less likely than their male counterparts to work in a STEM occupation; they are more likely to work in education or healthcare (Beede, Julian, et al., 2011).

A few years ago, negative stereotypes about women's math abilities were reviewed. Such stereotypesare transmitted to girls by their parents and teachers at preschool and primary school, undermining their performance and interest in STEM (Shapiro & Williams, 2012).

Strengthening gender equality in Latvia

At the beginning of the 2000s, the role and status of women in ex-soviet countries were varied and rife with contradictions (Lafont, 2001) since the advent of democracy, economic liberalization, and the competitive market system have led to a widening of the gender gap and have increased women's unemployment and underemployment.

Recently, the situation has been changing, and theincreasing interest in the condition of womensuggests a more optimistic outlook for the future. In particular, Baltic countries manifestfewer restrictions and appear more "job-friendly" for women than other ex-soviet states. However, from research conducted in Baltic countries, it appears that women scientists may still not be seeking leading positions. Thisfact emerges from the results of the EC FP6 project, *Baltic States Network: Women in Sciences and High Technology* (BASNET), developed in 2007-2008, which suggests thatwomen seem not to havea high level of confidence in their abilities to be a "good leader" and to perform the administrative and managerial tasks involved. Table 1 reports the positive and negative trendsof women in leadership roles that emanate from the project (BASNET project, 2007).

Table 1 ***Women's leadership: positive and negative traits*** *(source: BASNET project, 68)*

Positive traits	Negative traits
Precision	Emotionality
Sensitiveness, taking care of others, which helps to keep warm	Difficulties in winning respect
relations with subordinates	Sensitiveness, inability to apply sanctions for subordinates
Disposition towards compromises, avoidance of conflicts	Finicky
More efficient organization of work, ability to save time	Family responsibilities

In 2015 the Latvian Presidency of the Council of the European Union made gender equality as well as the need for more women in politicsone of its main priorities (Women Political Leaders Global Forum, 2015). Thanks to the governmental efforts in favor of gender equality, Latvia achieved a Gender Equality Index score, based on data from Eurostat, of 57.9 out of 100, increasing by 4.5 points (EIGE, 2018) andmoving up one position to 17th place in the index ranking. This progress is in line with the EU-28 average. Nevertheless, although Latvia progressed in all domains, generally at a faster pace than other EU-28 member states (Figure 3), the occupation of women in STEM continues to be critical. Five times more men (30%) than women (6%) work in the STEM sphere.

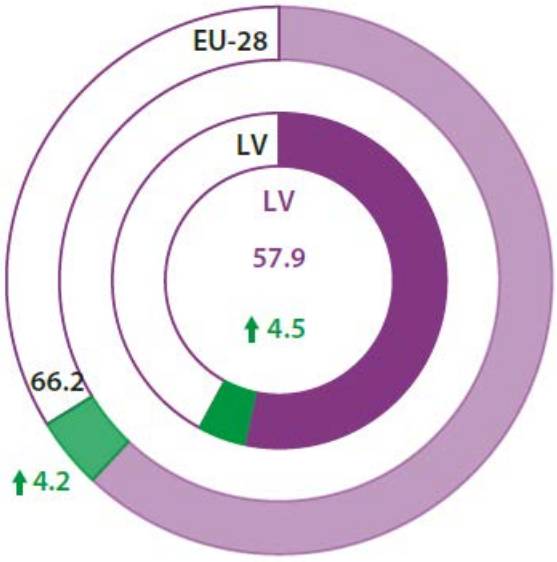

Figure 3 ***Occupation of women in STEM: change in score from 2005 to 2015*** *(source: EIGE 2018)*

Educational challenges in Latvia

It has been argued that tackling gender equality is a complex task requiring various interventions, including developing future women leaders and overcoming cultural biases (Grimson & Grimson, 2019).

In Latvia, the specific situation in education heightens this problem. The *Education and Training Monitor 2018* preparedby the European Commission shows that the Latvian education system is making many signs of progress butthat critical issues remain (European Commission, 2018). The student populationis shrinking, the teaching corps is old, the school network is not effective, and higher education institutions are fragmented meaning that the study programs, consequently, are also fragmentary. Furthermore, although the proportion of graduates is high and growing, the share of STEM graduates is one of the lowest in the EU. Nevertheless, the chief problem is the fact that, although Latvia invests

a comparatively high share of its GDP in education, expenditure per student is, in absolute terms, actually quite low.

The application of quality standards and the internationalization of higher educationare, however, increasing the general quality of the education system. In the last few years, the Ministry of education has standardized the acquisition of competences and hasincentivized applied research that focuses on the social use of technology. A national science program demonstrates the recent interest in social issues and in the modernization of social service provision through social telerehabilitation (Marzano, 2017). This three-year multidisciplinary program (2015-2018), entitled VPP INOSOCTEREHI ("Innovative solutions in social rehabilitation in Latvian schools in the context of inclusive education") was conducted by four Latvian Universities (Rezekne Technology Academy, Latvia University, Riga Technical University, and Liepaja University).In this framework, the contribution of women in social innovation can be strategic due to their specific sensitivity towards social and family needs.

We are persuaded that educational women's empowerment represents the best means to allow them to participate as protagonists in social development process. According to Hillary Clinton's speech at the third annual Women in the World summit held at the Lincoln Center in New York on March 10th:

Nations that invest in women's employment, health, and education are just more likely to have better outcomes. Their children will be healthier and better educated. […] so, this is not just the right thing to do for us to hold up these women, to support them, to encourage their involvement; this is a strategic imperative (Wordpress.org, 2012).

Unfortunately, a recent research found that many barriers hinder social innovation in Latvia: a lack of openness towards other countries' experiences, a low collaborative capacity of the people, an absence of legal frameworks, little support from stakeholders, a lack of knowledge in realizing social innovative projects, and a lack of access to information (Oganisjana, Eremina, Gvatua, Kabwende, & Chukwu, 2017).

Conclusion

The preliminary research results have revealed that gender equality can have an impact on the development of technology, since women can contribute to bringing a new viewpoint to meeting the needs and demands of society. However, achieving gender balance, especially in the technology sector, will not be automatic. Gender inequalities can only be eliminated by neutralizing the cultural biases regarding women. This requires policy interventionsthat will influence the existing societal discrimination against women.

From our analysis, cultural factors appear to be the primary cause influencing the low percentage of women working in the high-tech industry, as well as the barriers that hinder their career advancement in high-tech companies. Indeed, negative stereotypic attributions generate serious setbacks for women's in STEM field

Furthermore, from the Latvian situation and the results of our preliminary investigation, we have identified a set of priorities that we will analyze in the following steps of our research:

- Improving the digital competences of social educators;
- Investing in the digital media literacy of teachers, especially those who are working inpreschools and primary schools.

Two facts suggest this strategy:

- The greatest proportion of women are involved in teaching activities and social services.
- Digital social innovation can benefit from the contribution of women's sensitivity and competence.

The sustainability of such investments should be assured through the economic gains made by social businesses that, in Latvia, could be significant, due to increasing reductions in levels of public intervention in the health and welfare sectors. Digital social innovation could reduce the social burden considerably, both for local public administrationsand for social services.

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