How to improve the research cultural environment

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Findings

Gender inequality and gender discrimination is encountered in all areas of social life, including labour market and employment. Within labour market, sex disproportions in science - and specifically in STEM disciplines[1)] - are pervasive. The case of physics is indicative, as there is a significant under-representation of female scientists at universities and research institutions in this field (Elsevier 2017). Additionally, female physicists, in comparison to their male peers, seldom reach top positions but often leave the academic research environment. It is true in case of Europe, where “women do not move up through the echelons of scientific careers in the same way as their male peers and the gender imbalance exists, in varying degrees” (Hasse, Trentemøller 2008: 189). At the same time, however, it has been noticed that the representation of female physicists in universities is geographically uneven, as there is a higher representation of them in the Southern Europe and Central and Eastern Europe and low representation in the North (Hasse, Trentemøller 2008: 188)[2)].

The cause of the gender inequality in physics - and in science in general - is a complex issue and cannot be based on a single factor. In a growing number of analyses of impediments to female scientific career, it has been demonstrated that gender imbalance in science results from an interplay of many institutional, social, cultural and individual factors. They include - but are not limited to - gender stereotypes and implicit biases, traditional image of an ideal scientist connected with the masculine nature of science, gendered understandings about 'appropriate' and 'natural' male and female interests introduced at the early age and continuing throughout adolescence and adulthood, unfavourable academic climate for female scientists (commonly referred to as a 'chilly climate'), sex segregation of occupations, social norms of burdening women with excessive family responsibility for childcare, elderly care and household management, demands of full work-devotion within academia and STEM in particular, covert discrimination in the form of old boys' networks, biased hiring practices, unfair distribution of resources, cultural perceptions of femininity and masculinity, bullying and harassment, as well as career preferences and lifestyle choices (Rosser, Lane 2002; Callister 2006; Committee on Science, Engineering, Medicine, and Public Policy 2006a, 2006b; Settles, Cortina, Malley, Stewart. 2006; Hasse, Trentemøller 2008, 2011; Hill, Corbett, Rose 2010; Hirshfield 2010; Kelly 2016; Maranto, Griffin 2011; McCullough 2011; Pettersson 2011; Ryan 2012; Hughes 2014; Alegria, Branch 2015; Corbett, Hill 2015; Lucht 2016; Sax, et.al. 2016).

Similarly, the differences in the scope of gender imbalance in science throughout Europe may be attributed to various factors, including perception of education in a society, the level of the economic development of the country and the shape of the labour market, perception of class in relation to gender, the prestige of science, the impact of religion on gender role attitudes and child care policies. It has been observed that there is more women in physics education and research in these countries where same-sex secondary schools are popular, teaching physics in secondary schools is compulsory, economies are developing (and not already highly developed), science has not had a long tradition of male dominance, the importance of class overrules gender, the level of prestige of science is lower and Catholicism predominates over Protestantism (cit. after Hasse, Trentemøller 2008: 13-18). However the impact of these characteristics is not unexceptional, it does not explain all the

differences between the European countries in the scope of gender inequality in physics. It is therefore argued, that - apart from the above mentioned mechanisms that operate outside physics - it is necessary to analyse the impact of the cultural patterns within the activity of physics (within organisations), which “function as different frames within which the inclusion and exclusion of scientists take place” (Hasse, Trentemøller 2008: 22).

The following literature review traces the relevant areas of gender equality in science and tie them to the existing GENERA Fields of Action framework. Therefore, it identifies the existing research findings across six broad areas of gender-relevant issues, examining them in the world of physics and beyond. These areas include: 1. Structural Integration and Policy, 2. Engaging Leadership, 3. Flexibility, Time and Work Life, 4. Presence and Visibility, 5. Gender-inclusive / Gender-sensitive Organizational Culture, and 6. Gender Dimension in Research and Education. When considerable overlap occurs, some dimensions are linked together in the analyses.

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1)
STEM stands for science, technology, engineering and math.

2)
However, it is argued that this stronghold of women in physics in the eastern European countries might gradually lessen, as “the period of transition from the old, centralist system to the modern, market driven economies seems to have affected female scientists’ careers negatively” (Hasse, Trentemøller 2008: 189).