Studia ad Didacticam Scientiarum Socialium Pertinentia 13 (2023)
ISSN 2083-7276
DOI 10.24917/20837276.13.1

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Social Policies for the Strengthening of Women's Contribution in Science, Technology, Engineering, and Mathematics (STEM): The Case of Albania

1. On the relevance of women's participation in STEM

Women represent 28% of engineering graduates and 40% of computer science and informatics in the fourth Industrial Revolution. Other data shows that women in ICT careers are four times less than men. Also, men are more financed for research projects than women (European Union, 2020).

It is scientifically proven that the gap has nothing to do with brain structure, genetics, and hormones. Indeed, the statistics show that women exceeded men in the programs for bachelor's and master's degrees, but in doctorate studies, the contrary happens (Exter University, 2019). In addition, although 33% of researchers are women, only 12% of national science academies are women. Another study conducted in 180 countries concluded that girls and boys are equally interested in science up to 11 years old, but it drops at 18 years old for girls (UNESCO, 2017). Social and cultural stereotypes are strongly believed to keep women and girls from STEM (UNESCO, 2017). Therefore, UN and the international community are committed to discovering what keeps women and girls away from STEM and combating this phenomenon. For instance, to increase awareness of women's participation in science, the UN celebrates the International Day of Women in Science every year on February 11th (UN, 2020).

It is evident that it is a question of stereotypes keeping women away from STEM. Sometimes, the idea of women's participation in STEM careers is politically used, as happened with the declaration of Hungary's prime minister, who declared that the more women are educated, the more the economy is threatened because instead of giving birth to babies, they run after a career (Simon, 2022).

The low participation of women in science is not exclusively a question of gender equality, but it is also strongly connected with science and economic development. From the higher rate of women's participation in science would benefit science itself, as the diversity of groups of researchers in STEM increases the points of view, the variety of the research questions raised, and the areas of exploration, which permits better performance and discoveries (SWHR, 2020). In addition, the higher the participation of women in STEM, the higher the probability of economic prosperity.

Hence, the experts value that the GDP of 144 developing countries will increase from 13-19 billion USD if 600 million women engage in science and technology (Aldent University, 2018).

From the gender equality point of view, the salaries of jobs in STEM are about 40% higher compared with other fields. Therefore, encouraging women to work in STEM will automatically reduce the pay gap between women and men in the future perspective (Maryville University, 2019). On the contrary, if women continue to be unrepresented in STEM, the payment gap will persist over the years. Moreover, advanced study in science and technology prepares women to take an active role in their countries' technological and industrial development, thus necessitating a diverse approach to vocational and technical training (Beijing Declaration, 1995). Probably, there are gender stereotypes that are limiting the participation of women in science and engineering careers and discourage men from engaging in care sectors.

2. International awareness of women in STEM

The international community addressed for the first time the equality of women and men in 1948 with the Universal Declaration of Human Rights, wherein the first article states, "*All human beings are born free and equal in dignity and rights*" (UN, 1948), sealing in this way the belief that equal rights between men and women would determine the progress of humanity. The efforts continued in 1975 with the Mexico conference dedicated to women, which declared the UN Decade of Women and were marked in 1979 with the Convention for the Elimination of all Forms of Discrimination Against Women CEDAW. Even though this document does not pay attention to the contribution of women in science, its importance consists in opening the floor to equal education and the contribution of women to the economy. At the same time, CEDAW (1979) emphasises the necessity of the advancement of women at all educational levels and fighting the stereotypes with appropriate legislation, curricula, and review of textbooks (art.11). Such a mission was reinforced with the birth of the Global Movement for Equality between Women and Men which was followed by the World Conference to Review and Appraise the Achievements of the United Nations Decade for Women: Equality, Development, and Peace, held in 1985 in Nairobi, succeed by the Being Declaration and Platform for Action in 1995. Such events highlighted the importance of equal access for women at all levels of education and even in science and technology (art. 35).

The Beijing Declaration admits that science curricula are gender-biased for the first time, and the science textbooks do not refer to women and girls' experiences and contributions to science. Therefore, it strongly recommends the participation of women in design, application, and evaluation in science and innovation. The Beijing Declaration defines its strategic objective B3 to improve women's access to vocational training, science and technology, and continuing education (Beijing Declaration, 1995). Recently, the fifth goal of the Agenda 2030 for Sustainable Development is to achieve gender equality and empower women and girls by adopting sound policies and enforceable legislation to empower women and girls at all levels (UN, 2015).

On the other hand, the European Union is giving particular attention to gender equality in the EU Action Plan for Gender Equality 2020, which emphasises that research is vital for equality and women's improvement. Moreover, the EU program Horizon 2020 will financially support gender studies and women's access to research (EU, 2020). Further, the EU is committed to increasing the investments for access to girls since their early education in science, engineering, and technology.

3. Methodology

This paper aims to show how Albania is approaching the problem of women's underrepresentation in STEM. In order to have a general panorama of the situation, we will use the qualitative methodology. Therefore, by interviewing one of the external experts and group members who developed the National Strategy for Gender Equality, we will understand the government's priorities and perspective. On the other hand, we will explore the situation of women who are actually developing their careers in STEM to find out the challenges they face today and what they would change in policies for a more consistent engagement of women in science. In addition, the research will explore some good practices and examples followed by states marking good records and improvements regarding the representation of women in STEM. Hence, we can answer our research question: is Albania on its way to improving women's representation in STEM?

4. On the situation of women in STEM in Albania

Article 15 of the Albanian Constitution (1998) defines that no one can be discriminated against because of gender. On this constitutional principle, the country ratified 1993 the CEDAW Convention, committing to eliminating discrimination between women and men, followed by amendments to the penal, labour and family codes as enforcements for equal rights for women (Picari, 2008). Moreover, in 2008, entered into force Law 9970, "For the Gender Equality in the Society", aiming to guarantee efficient protection against discrimination based on gender in every kind of behaviour, defining measurements to secure equal chances and to determine the state responsibilities in central and local level for the elaboration of acts and policies, for the improvement of gender equality in all the society (Law 9970, 2008).

Consequently, in 2009, the Council of Ministers founded the National Council for Gender Equality as a consulting body for elaborating policies in this field. The respective minister of gender equality heads such a council, which includes ten other deputy ministers and three representatives from civil society (Council of Ministers, 2009). However, the activity of such an essential consultative national body is not transparent because there is not enough information published online or elsewhere.

However, with the assistance of the EU, the first gender index for Albania was published in January 2020, where the country is rated 7 points down (60.4) compared with the EU (67.4) average. The index shows that although more women than men have a higher education diploma, women's employment is 17% lower. For instance, in the academic year 2019-2020, of 33,000 graduates, 65.3% were girls

(Ministry of Economy, 2019). On the other hand, data published by UNESCO shows that girls' performance is higher than that of boys, based on the scores of the Pisa exam achievements among 15-year-old girls and boys in Albania (UNESCO, 2017). The same data, in general, on all the states shows that boys outperform girls in 60% of states.

However, in accordance with the national statistics, women are employed at 40.8%, men at 56.9%, and men are paid 10% more than women. On the other hand, women are engaged more in education, health, and social work, as 38% of employed women are involved in these sectors, compared with 8.3% of men (INSTAT, 2020).

The participation of women in STEM entered the governmental agenda through the National Strategy for Gender Equality 2021-2023, which contains objectives connected with GAP III of the European Union like: "*The promotion of economic and social rights for women's empowerment*". According to the strategy, there is an improvement in women's participation in science, but it has no consistency. Actually, there are 41.9% of females and 58.1% of males in STEM (Council of Ministers, 2021). Therefore, new measurements and facilitations are necessary. Concretely, objective one and sub-objective 1.3 aim to increase access to women in nontraditional jobs, especially in science, technology, engineering, and mathematics, but also production, construction, industry, energy, gas, etc., up to 2% every year, starting from 2023 (Council of Ministers, 2021). Such results will be obtained through 300 informal meetings in the 61 municipalities from 2022-2025, with teachers and educators of all levels targeting to motivate girls and women of different ages to enroll in scientific program studies.

On the other hand, the National Strategy for Education 2021-2026 puts education in STEM as a national priority but without paying attention to the equal participation of women in scientific fields (Council of Ministers, 2021). Nevertheless, the National Strategy for Scientific Research, Innovation and Technology includes the promotion of equal participation of women in STEM. Therefore, it aims to increase the number of women in leading research and educational institutions by 30% up to 2022 (Ministry of Education, 2021). For the moment, there is yet to be any data on achieving such an objective.

4.1. The policymaker's points of view

In order to find out why and how the government decided to intervene in the gap of women in STEM through the National Strategy for Gender Equality, we interviewed one of the three external experts who were part of the group development of the Strategy. She explained that the document's elaboration process was hurried, without a deep analysis. Nevertheless, the external experts suggested to include the topic in the document because the public administration in Albania needs more capacity and willingness to contribute thoughtfully to these processes. Consequently, the effects of the strategy will start to be evident after some years.

According to the expert, the government's attention on women in STEM needs to be more. At least – she explained – the government should exploit hundreds of Albanian women working abroad in STEM, who could contribute from wherever they live in terms of networking, mentoring and motivating other women in Albania.

On the other side, the government could offer scholarships to girls at all levels of education, from elementary to Ph.D...., in order to push them towards careers in STEM. In addition, she stated that the real problem is the cultural aspect because girls have to choose between families and careers. Therefore, more attention from the government would be necessary in offering extra services to mothers in raising their kids. This fact is evident because girls are showing higher results in school than boys, but in the labour market, the contrary is occurring. Nevertheless, she explained that the situation of women in STEM cannot be different from the general condition of women in Albania, where especially women in rural areas of the country live in difficult conditions without access to essential public services. Albania has taken huge steps regarding women's participation in political decision-making, but the effects of such progress are not translated into overall equality between genders (Plaku, 2022).

On the other hand, through an interview with women working in STEM from the urban area of Tirana, we could understand that the presence of women in STEM is highly appreciated. Women in this field are considered with high respect and have a satisfactory level of remuneration. In addition, she explained that in school, she had the support of the teachers and in higher education, she did not feel any discrimination because of her gender (Mersini, 2022). Nevertheless, we don't know how the situation can be in more peripheral zones other than Tirana.

5. Good practices of countries with attention to the women's representation in STEM

Many states have addressed the problem of the underrepresentation of women in STEM by developing programs and policies to support, motivate, and inspire women to invest in the future of their careers in STEM.

For instance, the Korean government is pushing women to undertake scientific careers. In 2004, the project WISE (Women into Science and Engineering) aimed to offer online mentoring to encourage girls to major in science and technology. The mentors were from academia, college students, and high school girls. At the same time, the government applied a recruitment target system for female professionals in scientific institutions all over the country. Moreover, another project dedicated to high school girls occurred in 2006, which consisted of involving the girls in scientific groups in laboratories at universities. In addition, the Ministry of Science and Technology built a children's care center at a research complex (Deadok) to facilitate women in science to accomplish their mother's duties while working. The children's nursery center, dedicated to kids from 0 to 64 months, could accommodate 300 kids from 8 a.m. to 10 p.m. (Lee, 2010).

A study conducted at the universities of Sweden, Norway, and Finland, distinguished countries for the high representation of women in STEM, shows that the measurement and policies can be at different levels, from individuals and structures. In other words, these measurements aim to change the behavior of actors like teachers, educators, and even parents. Another technique is the so-called targeted measurement, which seeks to influence the activity of the underrepresented category

by offering them motivational activities, like coaching and mentoring. Moreover, there are training measures which act on the organisational cultures to avoid bias and promote women in academia. Alongside, there are preferential treatments that push institutions to have unique structures to help women in STEM careers. The research shows that the universities with the best results in promoting women in STEM are the ones that have applied all kinds of measures, especially preferential treatment and targeted actions (Silander et.al, 2022).

Other effective practices are seen in well-known international companies committed to hiring more women in their technological departments. Companies like Airbnb, Google, Capital One, Freddie Mac, etc., have undertaken various initiatives to help hire more women within their community of employees. Some of these practices include a blind hiring process to give women the same opportunities to be engaged, mentorship for growth opportunities to women, pay equity practices by not asking about salary history, and annual conferences for women in technology to give women a chance once a year to share their experiences for growth (Baker, 2021). These companies have a clear vision of the importance of women in science and the benefits it brings.

Moreover, the USA approved in 2017 the so-called Inspire Women Act, which requires NASA to develop a plan to push young women to consider a career in NASA. Such a program is supposed to be fulfilled by the retired astronauts, scientists, and engineers to mentor and inspire young women through mentoring, summer institutes of science for middle school students and particularly for girls. The program aims to push the girls into a non-traditional career at NASA (UN, 2019). Likewise, the United Kingdom established the Athena Swan Charter to recognise the higher education institutions committed to addressing gender equity in general and the gap between women in STEM, especially in universities (ASW, 2005). Inspired by such an initiative, the government of Wels is also committed to increasing the number of STEM graduates, particularly women, by organising "Keeping in Touch Programs", dedicated to women who leave their careers for short periods to take care of their children. In this way, they will not feel left behind in their field. Such initiative is combined with the shared leave for parents once their baby is born. Moreover, the government is pushing universities to organise annual conferences for women in STEM to share their best personal practices, especially regarding balancing motherhood and academic careers (Wels Government, 2016).

Another effective policy to reduce the gap between women in science has been implemented in France since 2012, with the approval of the Sauvadent Law, which introduced equal access to women in senior positions in research but also 40% of the gender quota for juries acceding to academic assignments. Moreover, in 2013, the law on higher education determined gender equity for elected governing bodies of research organisations, and in 2011, the Ministry of Education established the Irene Joliot Curie Prize, dedicated to women's performance in science. Such a prize is awarded annually by women with distinguished contributions. In addition, networks for women in science have been created, and many activities, like parenting discussions, are organised to contribute to this mission (European Institute for Gender Equity, 2011). Also, France is well known for its commitment to putting

gender equity in science even on the international policies agenda of G7 G20, and its contribution has been valuable in the summits of Schloss Emau, Taormina, Hamburg, etc (FMEI, 2020). Similarly, Germany is pushing universities for gender equality in science by financing the universities that have achieved parity in governing bodies by public funding.

6. Conclusion and recommendations

Through this research, we concluded that women are underrepresented in STEM worldwide, except in a few specific countries like Bolivia. For this reason, the international community is paying more and more attention to women's greater involvement in science careers. Increasing the number of women in STEM would be a benefit not only for gender equality as a whole but also for the development of science and the economy. In scientific research, more women would increase the diversity in research questions and perspectives, contributing to better results. In addition, regarding economic development, the experts claim that greater involvement of women would bring more incomes and a general increase in GDP, especially in developing countries.

The case of Albania showed that the country has more girls than men in the total number of graduates in bachelor and master studies. Even concerning lifelong learning, women are more engaged, but men are a few points higher in employment and in terms of wages. At the same time, the difference between women and men in STEM is not high, but the difference is notable regarding the leading positions in universities, research institutions, or the Academy of Science. In addition, the results of the Pisa competition show that girls have better results than boys, but after university studies, their interest in STEM careers drops. Women are obligated to choose between a job or a family.

Furthermore, Albania's case represents a contradiction because the country is showing some excellent results regarding the representation of women in political decision-making. The majority of the government comprises women, and more than 33% of parliament members are women. In addition, at the municipality councils, thanks to the rose quotas, about 30% of members are women. With these outstanding achievements, it was supposed to have policies supporting the involvement of women in different sectors of the economy.

Indeed, the country has marked progress by approving special laws to promote and ensure gender equity in several aspects, but equality in STEM has not been its priority. Among national strategic documents, only the National Strategy on Gender Equality treats the issue of women's representation in STEM. Nevertheless, the action plan for the fulfilment of objectives needs more clarity. While other countries offer motivation, mentoring and support for women in scientific careers, the Albanian strategy plans to organise meetings to motivate girls in different educational levels to undertake STEM jobs. Moreover, the strategy needs more information on the number of sessions, methodology of motivation, or any other relevant information.

From the interview with one of the experts who elaborated on the National Strategy, we found out that the document was developed quickly and without paying

attention to the details. Moreover, the government is paying enough attention to gender equality. Still, a higher consideration is needed for the participation of women in STEM, especially in promoting women's leadership in scientific research institutions. Indeed, the country has some good chances to succeed in engaging more women in scientific fields because the number of graduated women is almost the same as men, but more support for family and child care is needed. On the other hand, Albania has a considerable number of women in science from the diaspora who would contribute to the country where they live by mentoring, networking and motivating other women living in the country.

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Social Policies for the Strengthening of Women's Contribution in Science, Technology, Engineering, and Mathematics (STEM): The Case of Albania

Abstract

The world will only progress partially if half its population performs at total capacity. That means that women and men should contribute equally to every aspect of life, including science and innovation. Only 30% of females who finish higher education choose Science, Technology, Engineering and Mathematics (STEM) fields worldwide. Likewise, women exceed men in the programs of bachelor's and master's degrees, still in doctorate studies, which are the initial bases for a career in science and innovation; the contrary happens. The Albanian Gender Index 2020 showed that the country is rated 7 points down (60.4) compared with the EU (67.4) average. This paper is about the underrepresentation of women in STEM in Albania and aims to bring an overall perspective to the problem, from the policymakers to the women involved in science and innovation. Therefore, after reviewing international awareness, national policies and strategies, we will explore the policymaker's and scientific women's perspectives through the qualitative method. The discussion will follow with cases of good practices in other countries in order to answer the research question: is Albania improving the representation of women in STEM?

Keywords: Women, STEM, Albania, policy-making

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