

GENDER PARITY IN THE GEOSPATIAL WORKSPACE

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Gender, without a doubt, has a significant impact on an individual's role and visibility in society and workplaces. Women have long been underrepresented in a diverse array of scientific and technical professions around the world. The recent increase in the proportion of females entering and successfully contributing to these fields demonstrates that the disparity is due to societal differences rather than inherent competence discrepancy. While "men" versus "women" is not the issue, there is an absence of constructive participation of women in certain disciplines among most of the society worldwide. Geospatial is one such discipline.

Women have long collaborated with male cartographers in the creation of maps, often going unnoticed for their efforts. Women were not even a visible part of the map-making community until recently, let alone recognized as an integral part of the domain of geospatial science. Though more needs to be done, it appears that academic institutions, public organizations, and private entities are willing to change the geospatial professional landscape by providing opportunities for women to develop leadership skills worldwide.

Sweden is widely regarded as one of the world's most gender-equal countries. "Women and men must have equal influence in shaping society and their own lives", this is the overarching goal of Sweden's gender equality policy, as endorsed by the Swedish Parliament. Gender equality can only be achieved through a deep understanding of which gender inequalities to counteract. Thoroughly defined problems make it easier to implement appropriate measures and achieve results through a gender mainstreaming strategy. As a step in this direction, the Spatial Data Innovation (SDI) project (contract ID 20201871) group attempted to bring forth the status of gender parity in the geospatial sciences workspace. This initiative aims to make visible gender inequalities where they exist and raise awareness about these, particularly in the geospatial sciences field. Furthermore, this article demonstrates that gender does not have to impede a successful career in the geospatial field. Under this initiative, some eminent women leaders and professionals from the global geospatial community were interviewed (Details in Appendix 1). Interviews were carried out and analyzed between May 2021 and November 2021. These women shared anecdotal experiences in the geospatial profession, as well as their perspectives and suggestions for how the current situation could be improved.

WOMEN IN GEOSPATIAL, WHY SO FEW?

Women make up only 28% of the workforce in science, technology, engineering, and math (STEM), according to the American Association of University Women, and men vastly outnumber women majoring in most STEM fields in academics too. Is this the case in the geospatial domain as well? Inferences drawn from speaking to our respondents indicate that in general women are significantly underrepresented in the geospatial field. Most of these women also feel that there exists a definite glass ceiling in the geospatial workspace. According to **Agneta Engberg** (Chair ISO/TC 211 Geographic Information/ Geomatics), "It might be hard to assess how much more of a glass ceiling exists in this field than other fields of science and technology." Agneta went on to say that while the gender gap exists, it varies from organization to organization. She stated that, while it is not as noticeable at Lantmäteriet, Sweden, where there are many women in prominent positions, it is not the case at her international technical committee, where there is a significant underrepresentation of women, particularly in leadership roles. **Marie Haldorson** (Director at Statistics Sweden & Member of the Swedish Geospatial Data Advisory Board) feels that this gap seems to be more prominent in the technical geospatial areas than in the domain such as the likes of political science. She also cited the example from her experience of working at the United Nations, which has an equal representation of men and women in leading positions. Another interviewee, **Dr. Nadine Alameh** feels there's a lack of role models in this field. As the CEO of the Open Geospatial Consortium, Nadine frequently found herself as the only female in leadership meetings and believes that the glass ceiling becomes even more prominent in leadership positions, where the conversations are still "male-centric," as she put it. Besides that, marginalization appears to be even more prevalent in the field of land surveying. According to a November 2019 article published by The Royal Institution of Chartered Surveyors (RICS), the percentage of women entering the surveying profession was 31%. In her discussions with us, **Dr Blaženka Mičević**, founder of AGRODET Ltd, a land surveying and land management company in Croatia, and a member of the Council of European Geodetic Surveyors, stated that women are significantly under-represented in surveying in most countries. Dr Micevic also observed that there is a persistent wage disparity between men and women in jobs in geodesy, as well as an unequal starting position for male and female surveyors. She reflected similar thoughts as with Dr. Alameh that there aren't enough women in positions of power, particularly female surveyors who could serve as role models for young people.

WHAT ARE THE PRIMARY FACTORS THAT CONTRIBUTE TO GENDER GAPS IN THE GEOSPATIAL COMMUNITY?

So, why is there such a gender disparity in this field? Concerning the reasons for the current gender imbalance, the interviewees believe it stems primarily from one or more of the following: a natural inherent perception, innate gender differences, and a society that does not view geospatial sciences as an appropriate field of work for women, let alone positions of authority. **Barbara Ryan**, Executive Director of the World Geospatial Industry Council, believes that one of the reasons for the lack of enthusiasm for the geospatial field is a lack of awareness about the subject at the early education level. Barbara shared her thoughts on her overall career in the geospatial domain, particularly her time as Director of the GEO secretariat, and how she noticed a tendency among women to underestimate their abilities and treat well-deserved opportunities as if they were “a gift from the universe.” She believes that such mindsets often prove to impede women's advancement as they move up the professional ladder further. Dr. Mičević, speaking specifically about the field of geodesy and surveying also stated that fewer girls choose this occupation because it is perceived as a "male" occupation. She also mentioned that there is a widespread belief in society that working conditions in the field surveying profession are better suited to men than to women, which leads to fewer women pursuing geodesy or land surveying as a career. Another point raised by Dr. Nadine is that females are frequently viewed as a burden to organizations because of their family and reproductive roles as well as their primary caregiver responsibilities. However, this is not a problem that only affects women in the geospatial domain; it is a problem that affects women in almost all professions around the world.

On this subject, **Agneta Engberg** stated that even though she has never faced a personal or tangible disadvantage as a woman in her over 40 years of professional experience, she, however, has been repeatedly reminded that different personalities have different advantages. This becomes more apparent as one advances in their professional life. Of course, the diverse personality aspect and the female aspect may indeed be difficult to distinguish because females are generally thought to be less forward and pushy than men. She expresses her concern about this and believes that employers do not yet value diversity as a benefit.

CLOSING THE GAP! HOW?

“Achieving gender equality requires the engagement of women and men, girls and boys. It is everyone’s responsibility.” This famous quote by former United Nations Secretary-General Ban Ki-Moon holds true in the current situation as well. Similarly, the all-women stereotype is no longer viable when it comes to gender disparities; men's participation in achieving cultural change is critical. As eloquently expressed by Denise McKenzie, Chair of the Association for Geographic Information's Board

of Directors, "a gender-equal society workspace is one in which the concept of 'gender' does not exist: one in which everyone is free to be themselves." Also, most respondents agreed that mentoring is an important element in combating gender disparity in the workplace. It was their opinion that mentors play an important role in professional advancement and that organizations must understand how to effectively build mentorship programs while attempting to recruit and retain a diverse pool of employees. Identifying "role models," such as female experts or managers, and not being afraid to contact them for advice, or more formally asking for a mentor, according to Marie Haldorson is critical for women.

Another step required to close this gap, as mentioned by Dr. Mičević, is to highlight gender stereotypes and biases, such as the wage disparity between men and women, which affect early perceptions of professions and thus professional vocations. Our interviewees suggested several steps that could be taken to promote gender parity in the geospatial sector. Increased public awareness and enthusiasm for this field are required. Many women are unaware that geospatial careers can provide them with exactly the opportunities they're looking for in their lives! Following that, it is critical to reducing the socialization of girls and boys into traditional gender roles by their parents and other adults. Even today many young women and girls have a difficult time visualizing themselves in careers in the geospatial field particularly field jobs. As a result, it is critical to provide role models who will remind these women that they can have a career in these fields if they so choose. One way of accomplishing this is by establishing a mentoring network and a mentoring program. In addition, policy programs to promote gender diversity should be established in both the public and private sectors.

IN THE END, WHAT'S THE TAKEAWAY FROM ALL OF THIS?

Ensuing discussions with some of the most accomplished women in geospatial technology, it became clear that, while there is an evidential underrepresentation of women in geospatial, this may vary in specific segments and positions and particularly in leadership roles. Regarding the reasons for this gender disparity, four main patterns emerge from our conversations with some of the prominent women in the geospatial profession. First, there is a persistent belief that men are "technically" superior and innately better suited to such fields than women. A second theme concerns girls' lack of interest in geospatial jobs. The third theme is the general workplace, with issues ranging from work-life balance to bias. The fourth key dimension is stereotypes and educational differences, which contribute to the lack of women in this field.

Increased awareness that women are just as capable as men — when given the proper encouragement and opportunities — is one of the most effective ways to reduce the existing gender disparity. Expanding awareness of higher education and career options, as well as of pathway opportunities, role models, and mentoring programs in the geospatial field is also imperative. Finally, to achieve gender parity in the geospatial domain, accommodating work environments, versatility, strong family policies, diversity and inclusion policies, mentorship, and networking must all be emphasized and supported.

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