

# Recruiting Women into Cybersecurity

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## ABSTRACT

Current jobs will change in the future and more technical skills will be needed in order to create new innovations. The field of cybersecurity is a priority of EU, but a lot of information technology companies cannot fill in their vacancies due to underqualified experts. This is why it is important that women are encouraged to enter the field of information technology and cybersecurity and that this field is already presented in early-on education to get more girls interested in information technology.

## KEYWORDS

Women, Informatics, Cybersecurity, Education, Gender balance

### ACM Reference format:

Lili Nemeč Zlatolas, Jorge Burmicky and Tatjana Welzer. 2023. Recruiting Women into Cybersecurity. In *Proceedings of ACM WomenEncourage conference (Trondheim '23)*. ACM, New York, NY, USA, 2 pages.

## 1 Introduction

The jobs today will change in the future and many of them do not exist yet. According to World Economic Forum, 65 % of jobs today's children will do, do not exist yet and many of them will be in the STEM (Science, technology, engineering, mathematics) field [1]. Currently, 19 % of ICT specialists in the EU are women, based on the statistics by European Commission's Women in Digital Scoreboard and there is a substantial gender gap in specialist digital skills which has not changed in the last years [2]. Further on, 55 % of enterprises employing ICT professionals, experienced difficulties in filling their vacancies [3]. This all shows that in the future, more children should be specialized in STEM fields and they should get to know different fields of STEM early on.

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*WomenEncourage, September 2023, Trondheim, Norway*  
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Encouraging girls to enter ICT should be done already from an early age. Based on current studies, girls are often influenced by teachers or parents and often do not take a path in learning informatics if they are not encouraged enough. In a large-scale study in Italy, the teachers' beliefs have changed through the years, which helped with the encouragement of girls and their interest in informatics [4]. A good example of improving girls entering ICT field is also Czechitas, where they have many ways of encouraging girls to enter and try the field [5]. Further on, role models are very important and if we establish more diverse teams in information technology, it will be easier to inspire young girls to enter ICT. If the teams in information technology are diverse, they are also better at problem-solving [6]. Diverse groups also generate more revenue and have higher levels of productivity. Girls are normally very interested in STEM at the age of 11 and lose interest by the time they are around 15 years old [7]. This also shows that it is very important that we do all possible measures to encourage younger women to take careers in informatics.

## 2 Cybersecurity

One of the growing fields of computer science is cybersecurity and it was one of the EU's priorities in the response to the COVID-19 pandemic [8]. Cybersecurity mesh and privacy-enhancing computation are also one of the top strategic technology trends for 2023 predicted by Gartner [9]. Cybersecurity is an interdisciplinary field where systems, networks and programs are protected from attacks. It also includes legislation and economics, and some cybersecurity specialists have to have knowledge also in psychology and sociology. Being such an interdisciplinary field, it requires a lot of experts. There are a few initiatives that are trying to bring the field of cybersecurity closer to women and younger generations. An H2020 project Cyber security competence for research and innovation has taken a few actions into inviting more women into the field of cybersecurity [10]. First, a manifesto was created with areas of education, entrepreneurship, industry, investment, strategy and research. Further on, testimonials by women working in cybersecurity were shared on the project's social media accounts. And one of the last actions were two calls for women's

award in cybersecurity for the fields of entrepreneurship, education and industry. These calls and publications bring higher awareness and interest in the field as well as create role models to whom newcomers can look up to. Similarly, also Minerva Informatics Equality Award is given every year and this brings a lot of awareness in role models where many ideas can arise in different institutes at the faculties where women are underrepresented [11].

There are also initiatives by ECSO, European Cyber Security Organization, among them is Women4Cyber with a goal to develop solutions and resources for women considering, entering, or re-entering a career in cybersecurity [12]. Another initiative, Youth4Cyber aims at educating and raising awareness of younger people from 6 to 26 years old on cybersecurity. A lot of local chapters have been created in the recent years and the chapters are working on raising awareness on cybersecurity in their own countries.

There are a few initiatives for women in cybersecurity, but women still represent a small amount of all experts so further measures should be accepted to recruit more women into cybersecurity.

### 3 Important measures for recruiting women

Different measures should be accepted in order to attract more female into such a career. In an initiative Ladies in Informatics, it was found that supportive environment is very important when recruiting new women into the research [13]. This can include also flexible schedule for a better work-life balance of women and it is easier to retain women in a cybersecurity field by offering flexibility and balance. A healthy and supportive work environment is very important when we are recruiting women into the field of ICT and cybersecurity and further on, this can be also a benefit which could be exposed when younger female are recruited into these fields. Support measures for women should constantly be updated to attract more women. Further on, at work places gender bias and stereotypes should be discussed and plans to include and respect women should be created.

Next, role models are very important as figures other women look up to. If there are no role models before entering the field, it is hard to even start a career path so it is important that women are encouraged to take part in different events where they can present their expertise in IT to younger generations. Further on, mentorship programs are a great way to recruit more women and make them feel more comfortable. Next, different events present great networking opportunities.

Programs, providing training that are tailored especially to women can promote development of skilled female workforce in cybersecurity fields. This could be for example organizing a course on a topic from cybersecurity that only women could attend. Previous research shows that female feel more comfortable when they attend a course of their interest which is usually visited by mostly men, with other female participants. It could also mean giving out scholarships for women only to boost the talent in the cybersecurity field.

Further research should be done to identify measures that would first attract girls into IT fields and also support female on their career rise to pursue a career in cybersecurity.

### 4 Conclusion

Based on the current statistics, there is a lack of expertise in information technologies and cybersecurity, which is one of the priorities of EU. Everyone should have access to informatics already in primary schools and this has been one of the priorities of the report Informatics Reference Framework for School where special emphasis was on the insufficient attention to education in informatics [14]. It is important that younger female see role models, successful in the field of cybersecurity and that they are encouraged by parents and teachers into the field of ICT. Further on, education should be adapted to attract more female and flexible schedules should be considered when employing women. There are different measures that can be implemented to recruit more women into cybersecurity and a combination of those usually helps bringing new workforce into cybersecurity.

### ACKNOWLEDGMENTS

The authors acknowledge the financial support from the Slovenian Research Agency (Research Core Funding No. P2-0057 and bilateral project BI-US/22-24-098).

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