Gender Inequality in Cybersecurity
Exploring the Opportunities and Progression in Albania

Klorenta Pashaj

National Cyber Security Authority, Tirana, Albania
E-mail address:Klorenta.pashaj@gmail.com

Eralda Gjika

Department of Applied Mathematics, Faculty of Natural Science, University of Tirana
eralda.dhamo@fshn.edu.al

Abstract

This paper explores gender inequality in Albania's cybersecurity sector, focusing on the barriers and opportunities for women. Despite global demand, gender disparity persists, with women significantly underrepresented. The aim is to assess the perception of gender equality in Albania's cybersecurity workforce, examine career gaps, and identify factors hindering women's entry and progression. This research highlights the importance of addressing inclusivity in this critical sector. Building on global research regarding gender gaps in technology and cybersecurity, this paper offers a localized view of Albania. Prior studies have emphasized the broader issue of underrepresentation in ICT, and this research contributes by analyzing recent data on gender and career progression specifically in cybersecurity. A survey was conducted to gather perceptions of gender equality in Albania's cybersecurity field. Respondents shared insights on educational background, career breaks, and challenges in entering and progressing in cybersecurity roles. Both qualitative and quantitative analyses were employed to identify key issues. The findings indicate that although progress has been made, significant challenges remain. Gender biases, a lack of role models, and misconceptions about the field continue to discourage women. The study underscores the need for initiatives to close the gender gap. This research provides recommendations for policymakers, civil society, and industry leaders to address gender disparities. It offers insights for future academic research and highlights practical steps to align strategies with labor market needs. The paper contributes original insights into Albania's gender gap in cybersecurity and offers a foundation for future initiatives aimed at fostering inclusivity and gender equality in the field.

Keywords: cybersecurity, gender gap, inclusiveness, Albania.

1. Introduction

Threats to global cybersecurity have increased in recent years. As businesses shifted to remote working environment during the pandemic, cybercriminals took advantage from vulnerable networks. Cyber-attacks have increased by 125% through 2021 globally and this trend is expected to continue. The most expensive type of cybercrime as of November 2022 is investment fraud, with an average loss of $70,811 per victim [1]. One method of combating cybercrime is through prevention, which can be enhanced by strong and resilient cybersecurity; however, there is a significant skills shortage to address the cybersecurity requirements.

Women now make up approximately a quarter of the cybersecurity workforce. They serve as role models and set excellent examples in the workplace, acting as leaders in all areas. All of this would not have been possible without the support and open doors provided by today's male counterparts. To meet current global demand, the cybersecurity workforce must grow by 65%, and naturally more women in cybersecurity may fill that gap. That equates to over four million unfilled positions [2].

However, the problem is more than just a lack of skills, there is also a gender disparity. While initiatives from individuals, organizations, and even governments have made significant progress in closing the gender gap, there is still much work to be done. Official statements highlighting the gendered dimensions of cybersecurity have recently begun to appear in multilateral processes. Delegations at the United Nations Open Ended Working Group (OEWG) have called for gender mainstreaming into cyber norm implementation and gender-sensitive capacity building, as well as a better understanding of the links between cybersecurity and gender equality frameworks. The National Strategy for Cybersecurity in Albania addresses the shortfall in trained and certified cybersecurity personnel [3]. Gender equality is a core value of the European Union [4]. To ensure a qualified, diverse, and plentiful cybersecurity workforce in the future, women should be encouraged to enter the field and provide advancement opportunities for those who do. However, the problem is more than just a lack of skills, it is also about gender equality, inclusiveness and diversity.

Gender equality in technology is both an ethical and pragmatic issue. Inclusion of women and girls in Science, Technology, Engineering, and Mathematics (STEM) from elementary to higher education has been identified as "the best means of ensuring their ability to engage in and benefit from the growing demand for jobs with a high technological component" [5]. In 2017, Albania ranked fifth out of 114 economies, with nearly gender parity (49%) in the share of female STEM graduates [6]. However, there is still a significant engineering gap in Albania. Only 5% of girls have a degree in engineering, while the others choose to enter other domains of STEM. According to an Regional Cooperation Council (RCC) report from 2021, possible stereotypes of STEM as a masculine field incompatible with women's home responsibilities are highlighted [7]. According to national Institute of Statistics (INSTAT) [5], 3.4% of women graduated in Information and Communication Technology (ICT) during the academic year 2019-2020, compared to 9.3% of men. Based on to these statistics, women continue to be underrepresented in ICT education. While more research is needed to fully understand these statistics, there is a clear disparity between the number of female STEM graduates and women who pursue technology careers. Understanding the reasons of the existing gaps is critical to attracting more women to careers in technology. Despite the number of STEM graduates, women are less likely to pursue a technical career than men. When they do, they continue to be underrepresented in decision making positions in both public and private sectors. Women in ICT tend to work at lower levels and in junior and supporting roles rather than managerial positions.

Albania's ICT sector is still very small and suffers from a severe talent shortage. Albania lags in developing a modern and accessible IT infrastructure, and this area has historically received little attention. Furthermore, even for lower-level positions, there is a significant gap between the knowledge and skills of IT graduates and the needs of the industry. As a result, many businesses provide intensive (and expensive) in-house training to graduates that can last up to six months. IT companies are also challenged by a lack of specific management knowledge in areas such as decision-making, operational efficiency, quality control, and cost management [8]. While approximately half of all

female university students are enrolled in ICT-related faculties (figures range from 49% to 54%), there is no data on the number of women working in ICT, reflecting both the industry's small overall size and a lack of attention to gendered ICT-related employment outcomes. According to the same resource, more women than men graduate in business, administration, law, health and well-being, arts and humanities, whereas more men graduate in services, engineering, manufacturing, construction, and IT (56.3%).

Although Albania is one of eight countries that use both European and national key competence definitions, digital competence is not explicitly addressed in the national curriculum. Cybersecurity is still a new field that needs to be assessed in terms of gender impact, opportunities, and progress. Statistics on the job market provide an overview of the gender situation. This viewpoint is critical for a country's economic growth and productivity, as well as the lives of individuals and their families. According to INSTAT, men (72.4%) have greater access to the internet than women (66.9%). Women are less likely to participate in the job market [5]. In this survey it was evaluated that women's labor-force participation in the 15-64 age group has fallen to 61.2% in 2020, down from 61.6% in 2019. According to the causes of inactivity, women are primarily absent from the job workforce because they are engaged in unpaid work at home (18.8%) or are enrolled in school (20.9). In contrast, only 0.6% of men attribute their inactivity to homework, while 25.7% are students or people.

This research paper is relevant, because despite a recognized gender disparity in cybersecurity, the subject has received little attention in the academic literature. When considering the skills gap that the sector is attempting to bridge, the gender imbalance is of particular interest beyond its contribution to academic knowledge. It is also a matter of social justice for society to provide equal opportunities and advancement in the workplace.

2. Legal regulatory framework for gender equality in Albania
The recognition and respect of equal legal rights for men and women is emphasised in the Albanian Constitution, specifically in Article 18/2, which states that "everyone is equal before the law and no one can be discriminated against unfairly for reasons such as gender, race, religion, ethnicity, language, political, religious, or philosophical beliefs, economic, educational, or social status" [9]. The ongoing efforts to harmonise the national legal framework with the international legal framework have resulted in the highlighting of issues such as gender equality and the fight against gender discrimination, gender-based violence, and domestic violence, not only in special laws dedicated to these issues, but also in Albanian legislation as a whole. For many years, the Government of Albania has prioritised the strengthening of the legal and institutional frameworks in relation to gender equality, with the goal of harmonising national legal framework with the international framework, which is based, in particular, on the United Nations Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and its Additional Protocol, the Beijing Declaration and Platform for Action, the Sustainable Development Goals, The Convention of the Council of Europe on the Prevention and Combating of Violence against Women and Domestic Violence, the

Gender Equality Strategy 2020-2025 of the European Union and Action Plan for Gender Equality (GAP III) 2021-2025, etc.

The main instrument in the national level which addresses gender equality in ICT is the "National Strategy for Gender Equality 2021-2030" [10]. The strategy adheres to Sustainable Development Goal 5: "Gender Equality - Gender Equality for Women." Gender equality in ICT is addressed by one of the strategy's specific objectives, "Reducing barriers that keep women, young people, and girls out of the job market, and increasing access for women, young people, and girls from all groups, including rural areas, ethnic minorities, disabled, LBTI+, older, single mothers, abused/trafficked, mother daughters, migrants and asylum seekers, etc.", especially in STEM - science, technology, engineering, mathematics.

According to the job survey of INSTAT in 2021 , The employment rate in Albania for people aged 15 to 64 is 77.1% for men and 61.2% for women. According to the employee structure, 43.3% of women in the job workforce are employed in paid positions, while 22.8% work unpaid in the family business. These figures are 41.6% and 13.1% for employed men, respectively. However, a sizable proportion of men—33.3% of the job workforce—are self-employed, compared to 21.5% of women. In 2020, the average monthly gross wage per employee in Albania was 53,662 ALL. This wage is calculated using the payrolls declared to the General Directorate of Taxation for social security, health, and income tax contributions. The gender pay disparity is 6.6%. As a result, men earn 6.6% more than women on a monthly basis. In 2020, the gender pays gap narrows by 3.5 percentage points when compared to the previous year.

If the skills and gender gap is reduced and the number of women working in cybersecurity increases, consequently there will be an economic boost. And if women earned as much as their male colleagues, the chances would be high for them to encourage more girls and women into the unfilled roles. Statistics show a large percentage of men in high positions in public universities in 2020, for example, in the position of Rector, women occupy 18.2% and men 81.8%; in the position of Deputy Rector, women occupy 56.5% and men 43.5%; and 42.7% of women are Senators, compared to 57.3% of men. Women continue to be underrepresented in the positions of Dean (30.4% compared to 69.6% men), Deputy Dean (48.1% compared to 51.9% men), and Chef of Department (49.2% compared to 50.8% men) [5].

3. Methodology

The research uses a quantitative approach to examine the perception of gender inequality in the workplace in information communications technology (ICT) and cybersecurity, as well as the gender impact upon opportunities in cybersecurity job market in Albania. The survey was conducted using Microsoft Forms, ensuring complete anonymity for the respondents. Prior to participation, individuals provided their informed consent to complete the survey. The questionnaire was divided into sections, including demographics (covering variables such as gender, age, and location of residence or work), professional information (such as role, years of experience, and level of responsibility), and specific assessments related to the 14 criteria mentioned below. The

survey consisted of 14 questions and was disseminated online through the professional networks of individuals engaged within the sector, as well as through the network of points of contact for critical information infrastructure operators in Albania. The results are cross tabulated by gender for the purpose of considering the differences in responses relating to perceptions from male and female responders.

The data was collected using a survey, which has been distributed online through and was completed by professionals working in the cybersecurity labor market in Albania. There are 14 criteria to evaluate the perception of gender inequality in the workplace in ICT and cybersecurity, including gender balance of the workforce, high level decision makers, equal pay and parental leave. The methodology was developed inspired by UN's Women's Empowerment Principles which consist on high level corporate leadership, treat all women and men fairly at work without discrimination, employee health, well-being and safety, education and training for career advancement, enterprise development, supply chain and marketing practices, community initiatives and advocacy, measurement and reporting.

4. Findings

This study presents a dedicated survey (the first in Albania to the best of our knowledge) on perception of gender equality in the workplace in information communication technology and cyber security, as well as the gender impact upon opportunities in cybersecurity job market in Albania. According to the survey's findings, cybersecurity provides an interesting and challenging work environment, as well as excellent opportunities for advancement and development.

The survey was filled anonymously by 50 respondents from them 68% were female and 32% male.
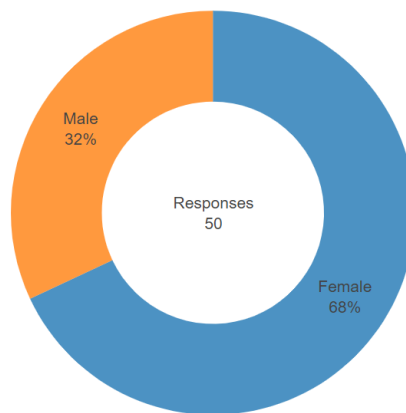

Fig. 1. Respondents' gender
Source: Authors

Highest percentage of respondents is working in private organization (66%), 26% of respondents work in public institutions, 4% of them work in academia and non-governmental organizations.
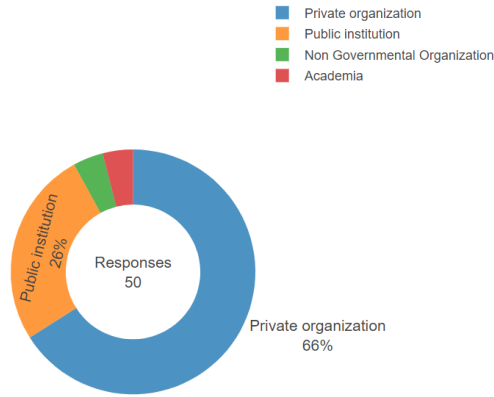

Fig. 2. Respondents' organization type
Source: Authors

Cybersecurity in Albania has a gender bias problem. 64% of respondents admitted this statement, moreover 60% of them have answered that women are most likely to be negatively impacted from it.
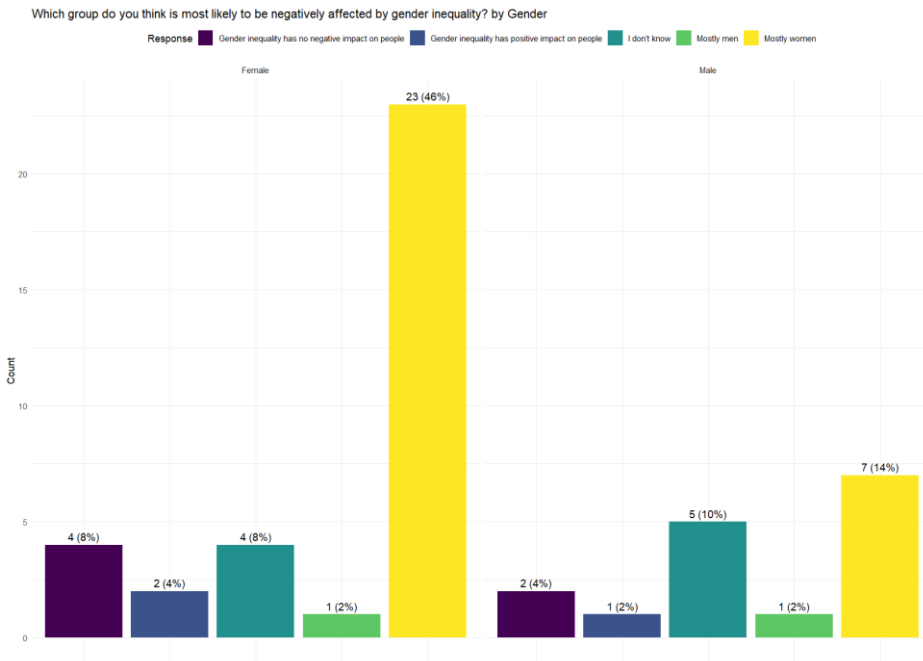

Fig. 3. Gender inequality impact
Source: Authors

Gender equality is not a priority for respondents' organizations and 44% of them declared that it does not impact the recruitment process. Still, 46% of respondents working in private organizations declared that their cybersecurity department have more man than women. There was a small percentage of organizations with no women in their cybersecurity department.

	Academia	Non Governmental Organization	Private organization	Public institution	**Total**
Gender equality has been achieved	0%	4%	14%	6%	24%
There are more men than women	2%	0%	30%	8%	40%
There are more women than men	2%	0%	18%	12%	32%
There are no women at all	0%	0%	4%	0%	4%
Total	**4%**	**4%**	**66%**	**26%**	**100%**

Tab. 1. Gender ratio of cybersecurity department
Source: Authors

50% of female and male respondents agree that maternal/parental leave impacts carrier developments. Still, only 29% of female respondents have the perception that maternal leave does not impact carrier development. Lack of role models is one of the main challenges that young women are facing when entering cybersecurity job market. In order to bridge the gender and skills gap in cybersecurity, it is important not only to promote mentorship opportunities, but also to promote female role models who outsmart their work-life balance, by inviting them in awareness raising events.
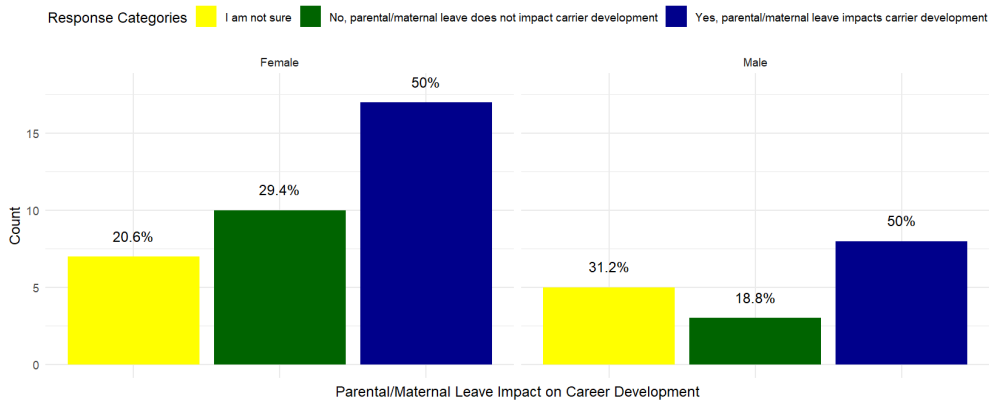

Fig. 4. Maternal/parental leave impact on carrier development
Source: Authors

Respondents were asked on the areas of cybersecurity that women are generally better than men. Only 15% of male respondents agree that there is no difference on roles between women and men, comparing to 85% of female respondents.

46% of respondents agreed that men are paid more than women, while 30% of them have responded that men and women are paid equally for the same working position, even though this perception is higher in public organizations where the salaries are regulated with Decision of Council of Ministers comparing to private organizations, where salaries are defined in individual contracts.

Respondents said that there are no dedicated gender equality policies for recruitment, promotion and pay equity.
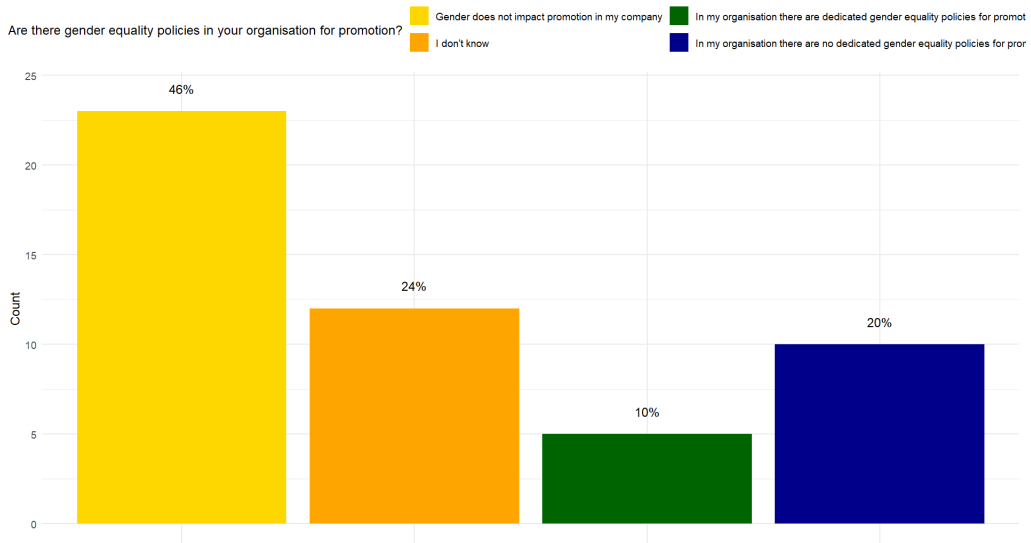

Fig. 5. Gender equity policies
Source: Authors

Women have a lack of awareness and career path knowledge of cybersecurity industry, which are the biggest challenges they need to overcome at the start of their careers. To encourage new professionals to join the market, cybersecurity industry must be demystified.

68% of female respondents declared that they were encouraged by their family to enter cybersecurity market and only 16% of males were encouraged by their family. One of the respondents commented that "women are not encouraged or inspired to enter cybersecurity industry". The higher level of perceived familial encouragement among females must be considered within the context of the study; these are participants who have entered the industry. The higher perceived level of encouragement may thus indicate that females require more encouragement than males to enter the industry, rather than that females are actually encouraged more.
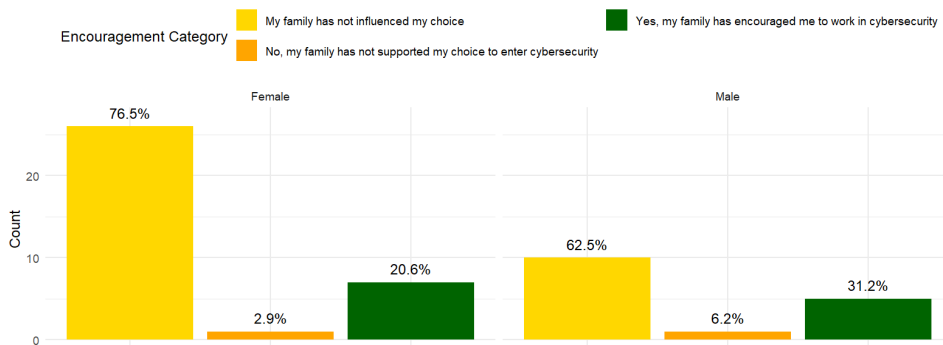
Fig. 6. Family encouragement in cybersecurity
Source: Authors

False perceptions are becoming the biggest barrier for younger generation to enter cybersecurity job market in Albania. When the respondents were asked about the reasons of existing unfilled cybersecurity positions, 75% of 25-34 year-old female respondents selected the option "industry isn't considered exciting". Only 2 female respondents of age 35-45 years old agreed. This finding highlight the importance of changing the perception of young generation in order to inspire next generation of cybersecurity professionals.

24% of female respondents, comparing to 36% of male respondents, say that there is a skills gap in the industry because threats are evolving quickly. Cybersecurity landscape is evolving fast; this is a good reason to constantly learn new things. **The ability to effectively gain knowledge or access into the cybersecurity industry is crucial to career guidance.** 82% of female respondents reported that they were able to effectively gain knowledge about the industry, comparing to 87% of male respondents. Relevant information through mentorship programs is important to be available to girls who perceived more difficulty in this area. Mentorship has been perceived as important factor for career development by both female and male respondents (72%).

Even though gender equality is not achieved completely, it is improved, but still there is a long way to go. 26% of respondents said that last year women and men were promoted equally to senior positions.

Cybersecurity industry requires diversity and inclusiveness to defend against an ever-changing threat landscape. Different ideas and approaches to problem solving are required. And we're not just talking about gender equality. Better promotion of cybersecurity opportunities and encouraging greater innovation in the industry create environments where women can thrive, correcting false perceptions of the industry, and making career paths more clear.

5. Recommendations

Women's equality and empowerment is one of the United Nations' 17 Sustainable Development Goals, which grant them a fundamental right to control over their lives in order to have an impact and influence on society. Diversity and inclusiveness of human capital is regarded as a critical pillar in any society's prosperity and competitiveness. It is critical to dispel the myth that cybersecurity is a purely male-dominated field.

To work on overcoming the gender disparity in cybersecurity there are listed some evidence-based recommendations:

1. Develop short term training and educational programs for women

Women4Cyber Albania is one of the initiatives, which aims to empower and encourage women and girls to join cybersecurity job market, through mentorships and tailored trainings. Women4Cyber Albania is one of the local chapters of Women4Cyber Foundation, of European Cyber Security Organization and is actively promoting successful role models to younger generation.

2. Launch a national campaign on raising awareness for women and girls in cybersecurity

A national campaign comprised of female cyber professionals who regularly connect to support one another in career development, celebrate accomplishments, share professional experiences, and attract and retain more women into the industry would inevitably lead to the gender and skills gap in cybersecurity being bridged.

3. Integrate career counseling in secondary schools for young generation, as a best practice from successful models worldwide

Survey findings revealed that family does not have significant role in encouraging professionals to enter the cybersecurity job market. To ensure a continuous flow of female participants in cybersecurity, it is necessary to encourage females in schools to study computing disciplines, as well as to provide additional opportunities to focus on cybersecurity. It is also clear that the industry must work to reduce the impact of, and percept ion of, a "sticky floor" and a "glass ceiling" in terms of opportunities for advancement and pay in order to increase the likelihood that women will enter, and those who do enter, will choose to stay.

6. Conclusions

There has been progress in Albania towards gender equality, but there is still a long way to go. By improving the representation of women in cybersecurity, the number of unfilled positions in the field will be reduced. With cybercrime on the rise, it is critical for the industry and society to close the gender and skills gap. For social justice to be achieved, a well-paid, intellectually stimulating workplace is needed that is both well-paid and intellectually stimulating.

As it is revealed from the survey of this paper, cybersecurity in Albania has a gender bias problem. The roots of inequality can be found in gender social constructions, wider society, families, education, and the ICT, security, and cybersecurity industries. Any attempt to close the gender gap will take time, and any solution must address the issue from all of these perspectives. It is time to challenge the perception that cybersecurity is "for boys", so that the industry can fill its skills shortage, girls can access an exciting and stimulating career, and society is better prepared to deal with the growing threat posed by cybercrime.

In the modern world, talent is considered the new capital, and empowering women in all professions is imperative to driving innovation and leveraging their untapped talent.

References

[1] A. IT, "The Latest 2022 Cyber Crime Statistics," December 2022. [Online]. Available: https://aag-it.com/the-latest-cyber-crime-statistics/. [Accessed 15 November 2024].

[2] ISC2, "Cybersecurity Workforce Study: Looking Deeper into the Workforce Gap," ISC2, 2023.

[3] N. C. S. A. o. Albania, "www.aksk.gov.al," December 2020. [Online]. Available: https://aksk.gov.al/wp content/uploads/2020/07/strategjia_kombetare_sigurise_kibernetike-2.pdf.. [Accessed 15 November 2024].

[4] European Parliament, "https://www.europarl.europa.eu," [Online]. Available: https://www.europarl.europa.eu/about-parliament/en/in-the-past/the-parliament-and-the-treaties/treaty-of-lisbon..

[5] Institute of Statistics (INSTAT), "http://www.instat.gov.al," 2021. [Online]. Available: http://www.instat.gov.al/media/8696/grate-dhe-burrat-ne-shqiperi-2021.pdf.. [Accessed 10 November 2024].

[6] W. Bank, "www.worldbank.org," [Online]. Available: https://documents1.worldbank.org/curated/en/202821582701027262/pdf/Partnering-For-Gender-Equality-Umbrella-Facility-for-Gender-Equality.pdf.. [Accessed 12 November 2024].

[7] R. C. C. (RCC), "Economic Benefits of Gender Equality," RCC, 2021.

[8] I. T. U. (ITU), "Measuring digital development: Facts and figures," 2021.

[9] K. i. L. i. P. (KLP), "https://klp.al/," [Online]. Available: https://klp.al/wp-content/uploads/2020/02/Kushtetuta-2017.pdf. [Accessed 13 November 2024].

[10 U. W. Albania, "https://albania.unwomen.org," [Online]. Available: https://albania.unwomen.org/sites/default/files/2022-02/WEB_Strategjia%20Kombetare-AL.pdf. [Accessed 12 November 2024].