Results of the surveys and focus group

Case study

Recommendations for government, business and non-governmental institutions

POLKA XXI
RAPORT

Challenges women face in terms of digitization and digital security in their everyday work

AGENDA

INTRODUCTION

We live in a world that has moved a significant part of communication and a huge number of processes into the so-called 'digital world'. This has allowed for an incredible acceleration of decision-making, precision and professionalisation of working life, which has led to changes not only economically but also socially. However, every major change brings with it not only benefits for everyone, but also challenges, especially if it happens as quickly as it did with the information and digital revolution

For this reason, a study was commissioned by the Project PL Foundation and conducted by the Institute of Digital Affairs and CyberClue, which analyses how these changes affect the working lives of women in Poland. The conclusions of this research, in the form of this report, make extremely interesting reading. There is no reason why Polish women should not participate less in the ICT industry than they do in other areas of economic life. It turns out, however, that this is hindered not only by similar barriers as in other sectors, but also by the still strong male IT stereotype.

I am convinced that the report's key findings and recommendations will provide an indispensable source of inspiration and ideas for both public and private institutions that have an impact on economic life.

ABOUT THE POLK XI CENTURY PROGRAMME

The idea of the 21st Century Polish Woman initiative was born out of the need to create a place for the exchange of diverse views and ideas on the place and role of women in the modern world. It is a platform for debate on the issues most important to women and Polish women in the economy, politics, family, innovation and new technologies, local government, health and education.

We encourage you to visit our www: https://projektpl.org/polka-xxi-wieku/ and follow social media #Polka2

For the past 3 years, the Project PL Foundation has been tackling topics related to digitization, digital security and the role of women in the modern world with projects such as:

- POLKA 21st Century Conference held on March 8 on Women's Day.

- The POLKA of the 21st Century competition, the grand finale of which takes place during the POLKA of the 21st Century conference held on March 8. It awards female leaders active in entrepreneurship, local government, education, health, social projects, innovation and new technologies and culture.

- Inspiration and mentoring program for the winners and finalists of the POLKA XXI Century competition.

- POLKA 21st Century conferences held throughout the year in regional cities.

- Social research.

- Expert meetings and roundtable discussions.

RESEARCH OBJECTIVE, THESIS AND RESEARCH

Introduction

The modern world is increasingly dependent on rapidly developing digital technologies. More and more governments and societies are becoming aware of the importance that a successful digital transformation can have for their future. They are therefore inclined to allocate increasing amounts of their budgets to support digitisation processes. Recognising the importance of digitisation, the EU has allocated between 2021 and 2026 to support digital transformation EUR 127 billion. The aim of the measures taken is to support digital reforms and investment in national recovery and resilience plans. In doing so, they are opening up new opportunities to accelerate digitisation processes in countries European community. States Member States have earmarked an average of 26% of the Reconstruction and Resilience Facility (RRF) for digital transformation, significantly more than the a mandatory threshold of 20 %. These include countries such as Austria, Germany, Luxembourg, Ireland and Lithuania, which will invest more than 30% of their Recovery and Resilience Facility (RRF) allocation in digital technologies between 2021 and 2026
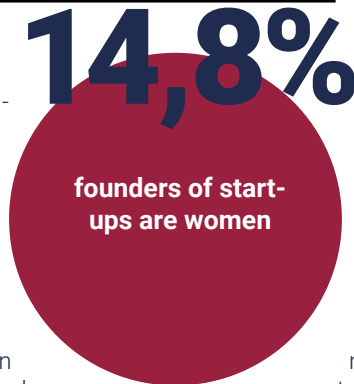
Poland, like the rest of the EU, is undergoing a digital transformation of society and the economy. Both pre-businesses and public sector entities are subject to digital transformation. For

19%

in 2021 were women in the ITC industry

for many, digital transformation is becoming a strategic goal to find new ways of using technology to address digital challenges and meet the new and changing demands of the digital economy and digital society. The ever-increasing pervasiveness of digital technologies in society, i.e. the digitisation of society and the economy, is triggering an increasing demand for information technology and digital security professionals. It is estimated that there is currently a shortage of around 1 million digital tech- niologists in the EU. Encouraging more women to enter the ICT sector will help meet Europe's growing demand for on digital experts. Reducing these gaps is one of the objectives of the uni- versity Digital Decade programme.[1] Increasing the participation of women is also among the objectives of this programme, as in 2021, women in the ICT industry accounted for only 19.1 per cent of specialised professionals. In Poland, the share of women working in the ICT sector is lower than the European average.[2] An increase in the number of women in the technology ('tech- nology') sector may be of key importance for closing the gap of professionals in this field. The 2022 Digital Economy and Society Index (DESI) shows a low proportion of women with degrees in key digital areas. Only one in five ICT professionals and one in three science, technology, engineering and/or mathematics (STEM) graduates are women. The dropout rate from digital careers among women working in the digital sector is higher than among men. This is particularly true of-

14,8%

founders of start-ups are women
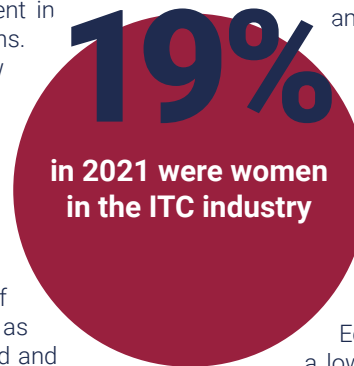
not to those aged between 30 and 44 - is EUR is the most important working age in career development and the period in life when many European women give birth to their first child and/or care for young children. Child-care and household duties mean that around 7% of women in the EU are not in employment, compared to only 0.5% of men. In terms of careers, few women occupy management positions and only 14.8% of start-up founders.

Challenges

There are numerous challenges facing all EU countries, including Poland, in the area of female employment in the ICT sector. There are still few girls and women studying science, technology, engineering and mathematics (STEM), which is often the start of a career in the digital sector. Many of them, despite the education they have received, choose a different career. One reason for this is the large gender pay gap - women employed in the same jobs are paid 20 % less than men. [3] It is also more difficult for women to reach leadership and decision-making positions in the digital sector. There is a shortage of around a million digital experts in Europe, and 53% of companies trying to recruit ICT professionals report difficulties in attracting qualified employees. To address this challenge, it is essential to encourage more women to participate in the digital economy. This could be key to eliminating the shortage of professionals in this field. According to a McKinsey analysis, if Europe were to increase the proportion of women in the technology workforce to around 45% by 2027, it could not only close the shortage of professionals, but also benefit from GDP growth of as much as 260-600

The Gender Equality tutor stresses that eliminating the gender gap in careers in STEM fields would help increase EU GDP per capita by 2.2-3.0% by 2050[4]. Another challenge is to combat gender stereotypes. Specialists in technology and digital are often fore aved exclusively as men. There is also a lack of role models to inspire girls and women to study STEM and sub- ject jobs in the ICT sector.

The EU strategy for women in the digital environment focuses on encouraging and empowering women to play a more active role in the digital age, in three areas[5]:

> **Promoting digital literacy and education**

> **Challenging digital gender stereotypes**

> **Promoting more women entrepreneurs**

Challenges

Improved elas- siveness at work, allowing reconciliation of work and home responsibilities, can be an important incentive to enter the ICT sector. Almost one in four women cite a lack of work-life balance as a key reason for giving up a career in technology. Providing employment flexibility for women

working in the digital sector would also reduce the economic costs for society: The EU would gain around €16 billion a year if women with an ICT background stayed in their jobs.[6]

Essence of the research project

As part of the POLKA XXI Century Programme and expert roundtable discussions, an initiative was born to carry out a study on the challenges faced by Polish women in the areas of digital transformation and digital security. The cognitive aim of the study is the digital challenges faced by women who would like to work in the ICT sector. Specifically, the research objective was to broaden and deepen the knowledge of women's challenges in the following areas:

> **digital transformation of the organisations in which they work**

> **creation of new digital products**

> **providing protection against cyber security incidents,**

> **the development of competences that will enable women to return from maternity leave**

13%

This is the wage gap in the IT industry in

[1] Shaping Europe's digital future. Europe's Digital Decade, https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade

[2] Poland in the Digital Economy and Society Index, https://digital-strategy.ec.europa.eu/en/policies/desi-poland

[3] Women in the digital sector, European Parliament, https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/739380/EPRS_ATA(2023)739380_EN.pdf

[4] Women in the digital sector, European Parliament, https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/739380/EPRS_ATA(2023)739380_EN.pdf

[5] Shaping Europe's digital future. Europe's Digital Decade, https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade

[6] Ibidem

> Additional objectives included, but were not limited to:

> > a diagnosis of the sophistication (public, private, JST, NGO) in the areas of digital transformation and cyber security,

> identifying the position women occupy in this area,

> an analysis of the challenges faced by the above-mentioned organisations and women in IT.

> The utilitarian objective of the research project is to try to formulate recommendations for governmental and non-governmental institutions and organisations to improve the current situation of women in the ICT sector.

> Building on previous academic and research work related to digitisation, digital transformation and the role and place of women in the ICT sector, the following theses were formulated:

> Women in leadership roles in the IT and security team/department of the digital units surveyed are minority.

> There is a lack of support initiatives in the surveyed units to develop women's digital competences.

Four research methods were used to achieve the adopted research objectives.

To prepare the project for implementation, a review of scientific publications and reports containing research results related to digitisation, digital transformation and the role and position of women in the ICT sector was carried out. The second method was to interview a sample of 200 women on the basis of a prepared questionnaire containing 8 metric questions and 26 research questions. Purposive random sampling was used. The survey was open to women working in state-owned companies, private companies, JST and NGOs. The survey was conducted using the CAWI (Computer Assisted Web Interview) method. Another method used was a focus group interview, the purpose of which was to deepen the research issues. The fourth method used in the project was a case study, the aim of which was to complement the results of the previously mentioned methods by describing real cases concerning the research issues.

In choosing such a set of methods, an attempt was made to ensure that the research objectives could be comprehensively approached.

KEY
CONCLUSIONS

RESEARCH MEGATRENDS

The results of the 2023 study point to 4 current megatrends that provide a broader perspective on the challenges women face in the area of digitalisation and digital security and the context of the changes taking place. These include:

MORE DIVERSITY = Need for more diversity

. 40% of respondents said that women are not employed in IT departments at all in their organisations. This demonstrates the still-present need to work on increasing the proportion of women working in the field of digitisation and digital security.

NOT ENOUGH WOMEN BOSS=Too few women in management positions

. Only 15.5 per cent of respondents indicated that women hold leadership or management positions in the IT department or teams responsible for implementing digital security solutions, indicating the low representation of women in senior positions in these areas and the huge disparity in the most important functions related towith areas of digital development for companies, organisations and the economy as a whole.

TRAINING AWARENESS = Growing awareness of the need for training

. The results show that only some workplaces have initiatives to improve women's digital competence. Only 20.4% confirmed such activities, which shows a very low awareness of the need for such training and the benefits that a company or organisation can achieve through it. At the same time, according to 75 per cent of the women surveyed, access to funding sources for training and certification and mentoring from experienced women in the IT/digital security sector (69.2 per cent), and internships and apprenticeships in IT and digital security (64.9 per cent), on the other hand, are essential to activate them in the IT and cyber security sector

E-LEARNING AGE = E-learning age .

The majority of the women surveyed, as many as 70%, declared that they were improving their digital competences through online training. This suggests that e-learning is a popular, accessible and more affordable professional development tool for women in the area of digitisation and digital security.

14,8%

women are the founders of start-ups

THE CONTEMPORARY POLISH WOMAN IN THE GYM

Our study identified 7 archetypal profiles of women who identified with the following models:

FLEX MAMA

These are women, mothers who are returning to the labour market after maternity leave or who are economically active and want to make changes in their working life to spend more time with their children. In the implementation of digital projects, female respondents see the possibility to have a better work-life balance and therefore to organise their professional life in such a way that it is compatible with their activity in family life. At the same time, they see professional development in the area of digitisation and cyber security as an opportunity for stable employment. They estimate that the labour market in this area is large enough that they do not have to fear redundancies, in contrast to the uncertainty through which they view other industries.

WOMAN 4.0.

These are women who are comfortable in the world of digital technologies, know them, understand them, see their potential, and want to develop the expert compe- tition they already have. They are encountering a glass ceiling in their career, they are starting to think about setting up their own business in the field of digital products and projects, but they have a lot of fears in this regard. They don't quite believe in their own strengths or don't have enough funds to do so.

BUDDING ENTHUSIAST

These are mature women who are aware that digital competences are important and future-proof. They see their growing presence in their professional and private lives. They have never developed these competences in themselves. They do not know how to do it and where to look for help in this area.

DIGITAL LEADER

They are women experienced in the field of digitisation or digital security. They see and understand their power and impact on the world around them. They themselves lead companies, teams implementing projects with a digital component, create new services and digital products. Their scale of operation often goes beyond Poland. They are well-known experts on the national and international arena. They follow legal regulations and market trends. They are not afraid of challenges in this area and see them as an opportunity for themselves and society. They have built their position on the basis of com- petence and great determination. The road they have travelled in their careers has been bumpy - they have thrived in a digital world dominated by men, often being pioneers. They want to share their experience and knowledge and help other women develop STEM (Science, Technology, Engineering, Mathematics) competences. They are involved in NGOs in the field of women's education.

PIONEER OF DIGITAL SELF-GOVERNMENT

These are women working in local government who see that digitalisation has huge potential to create public services that will be more accessible to the citizen and make sure that the citizen has everything they need at their fingertips. They see that they also have the potential to build an efficient local government as a organisations. They are interested

in new technologies. They actively seek new digital solutions and inspire colleagues in this area.

DIGITAL FARMER

These are the women who run the family agricultural holdings included in the succession. The onus is on them to ensure the sustainability of the (often large-scale) farmstead and, on the other hand, to improve processes through the digital revolution. In their management approach, they combine tradition with modernity. On the one hand, they know, understand and care about the basic production processes on the farm, and their aim, apart from profit maximisation, is the sustainability of the family farm. On the other hand, they see the changes taking place in the macro- environment and try to meet the challenges of the modern world, seeing the opportunity for development in digital solutions, i.e. automation, robotics, data analytics and artificial intelligence. They strive to acquire the latest knowledge, train, observe trends and implement the latest digital solutions.

CYFROWA BUNTOWNICZKA

These are women specialists in cybersecurity, digital transformation and IT, who find in these fields freedom and the opportunity to influence reality independently of traditional stereotypes or the constraints of patriarchal insti- tutions. They are strong-willed individuals, full of determination, ready for challenges and uncompromising in their pursuit of goals in the cyberspace area. They do not give up easily and are prepared to operate in an environment that can be difficult and demanding. They are often people who do not seek the approval of others. They value the freedom to express themselves in the digital world, where competencies and skills are key and traditional gender roles do not apply. They are strong women who are prepared to stand up for their values even when alone.

DIGITISATION AND DIGITAL SECURITY 360° THROUGH THE EYES OF WOMEN

In the opinion of the overwhelming majority of female respondents in the various workplaces, digital transformation is important or very important. In particular, approx. In particular, this is the opinion of approx. 80-90% of female respondents working at non-governmental organisations (NGOs), public institutions and state administrations and enterprises. Also according to a high percentage of the women surveyed, digital security ranks high or even very high in the hierarchy of importance of issues related to their functioning in the workplace.

The study found that the biggest barrier to implementing solutions that foster digital security is high costs - this was the opinion of more than 50% of respondents. Another significant barrier to cyber-security, in the opinion of respondents, is low awareness of digital threats and digital competence among employees and insufficient IT infrastructure - such was the opinion of 37.7% of female respondents. Accordingly, the most important factor for the implementation of cyber security solutions is the awareness and involvement of the top management of organisations and companies.

Also disappointing is the opinion of the women surveyed that there are relatively few initiatives aimed at women in respondent organisations and companies to improve digital or cyber-security competencies.

Interesting findings also emerged from the collection of opinions among female respondents on the key skills for doing digitisation and cyber security work. The highest percentage of female respondents identified the ability to analyse data, information and digital content and reporting, understanding the nature of digitisation and digital security, as well as communication and collaboration through digital technologies, management of data, information and digital content, and knowledge of business processes as key to doing digitisation and cyber security work.

According to the women surveyed, apart from attractive salaries, which were indicated by the highest percentage of respondents (71.4%), important factors motivating women to work in this sector of the economy include the possibility of personal development (63% of respondents) and the acquisition of new digital skills (41.2%), flexible working hours (62.2%), as well as the desire to return to work after maternity leave in a modified form in order to have more time to care for the child (32.8%).

KEY
RECOMMENDATIONS

RECOMMENDATIONS TO THE GOVERNMENT

the so-called ‚old' Union, but also the ‚new Union', which shows that other communities are developing faster in this respect.

1.1. DIGITAL COMPETITION

apidly evolving digital technologies are present in all aspects of daily life. Digital literacy has a strong impact on progress in areas such as the economy, healthcare, education, science, security, agriculture, culture and entertainment. It is therefore crucial to continuously monitor the progress of technologies and to provide society with adequate support in the development of digital competences. Digital competence is a set of fundamental skills of modern man that enable him/her to live, learn and work in a digital society, i.e. a society that uses digital technologies in everyday life and work. Within digital competences we distinguish: digital competences, information and communication competences and functional competences. As part of the activities carried out by the Ministry of Digitization, the Pro-Digital Competence Development Programme, which aims to steadily increase the

. The programme assumes, inter alia, that by 2030 29% of ICT specialists will be women. The programme assumes, among other things, that by 2030 29% of ICT specialists will be women.

Based on Eurostat data, it is possible to conclude that women in Poland have a lower level of digital competence. Refers to is to make comparisons not only with female peers from countries

It is necessary to periodically diagnose the needs of society and update the assessments, taking into account the latest technological and economic trends. It is necessary to ensure that these needs are reflected in the current training offer in the field of digital competences (in the area of IT, ICT, functional areas). The scope, delivery and conditions of participation should be adapted to the situation of women. Suitable training courses can be provided e.g. from public funds such as the Labour Fund, the PARP Academy and others without restrictions on the age or employment status of the participants.

SOFT COMPETITION WITH A TOOL FOR THE DEVELOPMENT OF DIGITAL COMPETENCE

40%

respondents said that women are not employed at all in IT departments in their organisations

In the context of the need not only to develop digital competences, but also to promote equal access for women and men, an important question emerges stia on deepening other types of competences in professionals in the field of digitisation and digital security. This concerns soft skills and competences, such as the ability to work as a team, to interact and to develop skills pro-social. There are several reasons for this. Working on IT projects also in the context of cyber security often requires

collaboration with other professionals, both the technical team and people from other disciplines. The ability to work effectively as a team and to support other team members is crucial to project success. IT professionals often work on complex issues that require different perspectives and skills, so it is important to be able to communicate and collaborate effectively with others.

At the same time, pro-social skills are important in the context of an organisational culture conducive to greater participation of women not only in specialised positions related to new technologies, but also in management. rotection and mana-   gement. IT professionals often work in dynamic and rapidly changing environment, where collaboration, ela- tivity and openness to cooperation are key. Working together and being able to

sharing of knowledge and experience allows

for mutual support and the development of a

the development of entire teams, which the female respondents expected to be more gender-diverse.

Moreover, pro-social skills play an important role in building lasting relationships with customers. IT professionals are often responsible for solving problems and providing sales services to customers. Therefore, soft, pro-social skills, including those embedded in empathy, interper- sonal communication and listening skills, are key to understanding customer needs and building trust.

70%

female respondents declared that they were improving their digital competences through online training.

1.2. PROGRAMMES TO IMPROVE DIGITAL QUALIFICATION AND SECURITY

The study presented showed that there is a need to take action to build women's digital competences related to analysing and managing data, information and digital content, understanding the nature of digitalisation and digital security, using artificial intelligence to improve processes in the context of professional and nonprofessional activities.

The recommended actions in this regard are:

> Organisation of educational programmes (training courses, workshops, seminars) aimed at: (a) increasing awareness of the use of digitalisation in daily life and resilience to cyber threats and attacks, as well as skills appropriate response in the event of such an attack (b) education on the acquisition, structuring, processing and presentation of data and the possibility of further processing it using AI (artificial intelligence) tools .

> the creation of dedicated funds and scholarships to support women in gaining qualifications in the area of data analytics and security digital through, among other things, mentoring programmes

> programmes to support organisations/ companies in the creative use of digital technologies to create knowledge, innovate processes/products/ services and understand digital security regulations

> creation of a unit responsible for the cyclical evaluation, recommendations and training of administrative representatives public in a forward--looking perspective, i.e. opportunities and threats in a 4-year horizon, e.g. building security awareness in the context of quantum cryptography

1.3. RESKILLING THROUGH PROFESSIONAL TRAINING PROGRAMMES

Zaprezentowane badanie wykazało, że istnieje The IT industry in Poland is still male-dominated, and the share of women in the sector is, according to Eurostat, around 15%.1 Many women are now showing an interest in a career change into IT. According to a study2 , as many as 55 per cent of female IT professionals have taken up a job in the sector after a redeployment, and more than 70 per cent feel fulfilled at work. One in four Polish women working in the technology sector has a non-directive education (e.g.dową.

psychology, sociology, foreign philologies). These figures exceed the results of men surveyed in the same professional categories. This means that women are more willing to embrace change in their professional lives and are open to working for technology companies.

The findings presented in the report show that the main motives behind women's decision to move into new tech- niologies include the security associated with stable employment, flexible working hours allowing a work-life balance and the opportunity to devote more time to family and raising children.

This points to the need to organise information campaigns and re-training programmes for women in this field (lifelong learning, reskilling) and to involve government institutions together with NGOs in their implementation.

....

1.4. EDUCATION AS A FORCE FOR CHANGE - NEW POSTGRADUATE COURSES

According to the Software Development Association Poland, the personnel gap in the technology industry in Poland alone is already as high as 300,000-350,000 people and is growing. As the survey shows, women recognise the need to develop digital competences and want to develop professionally in this direction.

Great support for the development of women's professional digital competence would be the creation of institutional support for

the development of postgraduate courses in IT and cyber-security not only in full-time form, but also online. Such a diversified form of training and training in post-graduate education will increase the availability of such knowledge, reduce the costs of such education and support women in creating a better balance between their careers and family life. Support should also be given to various types of courses and training provided by both universities and other educational institutions with relevant digital and cyber competences.

1.5. FUNDS FOR THE DEVELOPMENT OF DIGITAL COMPETENCE - TRAINING VOUCHERS

One of the limitations to the development of digital competences cited by the participants of the study is the high cost of expert training. Therefore, there is a need to provide financial support to public institutions in this area, which will be based on training cycles/programmes dedicated to specific expert profiles, which are included in the Digital Competence Development Programme of the state and correlated with the labour market needs for specific specialists such as[3]. Software Engineer, DevOps Engineer, Data Scientis, Cyber Security Specialist.

According to the IT Market Snapshot Q2 2023 Report, the most sought-after roles in IT are: Backend Developer, DevOps Engineer, Frontend Developer, Testers, Project Managers, Fullstack Devel- opers, Security Engineers and Mobile Developers.

1.6. 1.6. ACKGROUND - INTRODUCTION OF CYBERSECURITY ACCESS COURSES

Cyber-security competencies are currently the most sought-after tech- nological skills, especially in the CEE region. East, and the skills gap in this area has further widened following Russia's aggression against Ukraine, as indicated by data from a report published by the Polish Chamber of Information Technology and Telecommunications. It results more than 10,000 cyber security specialists. In the near future, the demand for them will grow rapidly, inter alia due to the implementation of the NIS Directive2.[4]. It is therefore important to develop a fast-track approach to the development of digital competences, which would enable the creation of specialists in this field within two years. This is a huge potential to be exploited by women who would like to develop their digital skills. Start your career in this area as specialists in regarding the protection of personal data or digital security. The programme of such a course should include theoretical and practical aspects. The scope should be condensed so that the learner acquires the necessary knowledge to carry out the tasks of a specific position, in a junior position, together with practical skills. Such a course should be very inten- sive and should last between 2 and 5 months. Individuals,

who undertake such a path could receive institutio-

nal support from the state in the form of such as the extension of unemployment benefits, the possibility of obtaining funding for such training for working people or special paid study leave for this purpose.

1.7. IMPROVING EQUAL OPPOR-TUNITIES - DISPELLING STE-REOTYPES

Short of that young girls, often during or even before they enter secondary school, form precon-ceived ideas about their place in the world. They often succumb to ste-reotypes social, as well as influ-ence- to their parents and cho-ose professions far removed from the technical field. A study conducted by the Ame- rican Psychological Association found that men and women have equal innate mathema-tical and ad-rodic (as well as verbal skills) and if women think they can't cope with work related to the social, as well as influ-ence- to their parents and choose professions far removed from the technical field. A study conducted by the Ame- rican Psycho-logical Association found that men and women have equal innate mathematical and ad-rodic (as well as verbal skills) and if women think they can't cope with work related to the related to cyber security, it is purely a matter of stereotypes and not based on in reality. Efforts should therefore be made to make women aware of the new personal and career oppor-tunities facing them related to working in the field of cyber security. (Think again: Men and women share

75%

of the women surveyed stressed that it is crucial for them to have access to sources of funding: training, certification, mentoring in the process of building digital competences

cognitive skills, American Psychological Asso- ciation 2014, https://www.apa.org/topics/neuropsy- cho-logy/men-women-cognitive-skills)

There is a need:

> develop policies that actively promote gen-der equality in the recruitment and promotion of employees in technology companies.

> to take action in secondary education by launching an information campaign and a pro-gramme of activities that would contribute to shaping girls' positive attitudes towards digital technologies, including cyber security.

> implementing mentoring programmes aimed at women, enabling them to develop professio-nally and receive support in the area of technology.

> conducting social campaigns aimed at changing stereotypes

and beliefs that maintain that the technology industry is mainly reserved for men.

> promoting successful female figures in the field of

technologies as inspiring role models

1.8. CARING FOR DIGITAL NATIONAL SECURITY - WOMEN NOT ONLY IN THE RESERVES

The classic study linking women's participation in the public sphere to national security is the seminal work 'The Second Sex' by Simone de Beauvoir. „The Second Sex" by Simone de Beauvoir (French: „Le Deuxième Sexe") from 1949. This study analyses the social changes that took place immediately after the Second World War. tion. Factors influencing the increase of women's participation in public life appear each time following men's involvement in defence activities, mobilisation and dislocation outside their place of residence, and as a result of the increased demand for specific work during conflict and reconstruction. As indicated above, the opportunity to engage women in digital transformation and cyber security represents a significant reserve and staff potential. One model for generating and maintaining capabilities in this area is the Israeli model. It involves the establishment of public-private partnerships to exchange information and cooperate in the area of cyber security, with an emphasis on strengthening defence capabilities to counter advanced threats. Commercial entities in this model, properly supervised, partly deliver services and supplies to the commercial market (e.g. cyber security for the financial industry) and partly to public institutions. The mixed operating model provides a number of advantages, including enabling the state to benefit from a poten- tial that is partly financed on the private market. It is also an attractive model for per- sonnel exchange and competence building. In such a model, the state is better placed to

20%

women employed on the same positions are paid 20% less than men

women who identify themselves, for example, with the flex mum profile in the study presented in this paper. Realising the potential of deep tech innovation requires diversity and a combination of scientists, innovators and start-ups working on new breakthrough solutions with defence sector entities. The role of women here is clear. It is not only about cyber-security and the digital area - the application of technologies such as artificial intelligence, big data processing, quantum computers and auto mics - but also biotechnology and modern materials.[5]

The research carried out within the framework of this report indicates in all-he potential and preference of female scientists to engage in the field of national security on a per-project basis. This type of engagement (per project) is seen by many women as more aligned with their choices than service in a particular formation

In terms of the real strategic risks in the area of digital security, it is already necessary to provide personnel for ongoing monitoring of the cyber security situation and to modernise national defence sys- tems, with a particular focus on the protection of critical infrastructure. Strengthening international co-operation in the field of cyber security, including active information exchange with allies, is the basis for effective care of digital national security. Harnessing the human resource potential of women, in a manner tailored to the profiles described in this report, is an urgent need.

1.9. AGRICULTURAL DIGITAL ADVICENOT ONLY IN THE RESERVES

Research by the UN Food and Agriculture Organisation shows that women, despite making up more than 40% of the agricultural workforce and running about 30% of all farms, often lack ownership of the land they work on, financing of the production processes they carry out, markets, access to training and equal treatment with men. Polish female farmers, despite being fully involved in farm activities and often performing the same duties as men, need institutional and financial support. This would maximise their labour productivity and thus their income and equalise their opportunities for advancement in agriculture to the same extent as men. [6]

260-600mld

This is how much Europe's GDP could increase by by 2027 if the share of women in the technology sector increases by around 45%.

Institutional support is needed in terms of:

> > increase the transparency of the whole system of implementing modern technologies so that it is clear and comprehensible to the end user, i.e. the farmer

> > create or extend the competences of existing agricultural advisory centres (ODR) in terms of digital solutions, i.e. identify on-farm processes, analyse the activities performed and resources available, and review and propose solutions

> and improvements using digital technologies, i.e. available methods and tools

> > interdisciplinarity of science - enriching the curricula of agricultural and similar technical degree courses

> o subjects related to computer science, automation, robotics, data analytics as a source of knowledge for Agriculture 4.0.

> > creating and funding programmes to support digital competences for women in agriculture

>

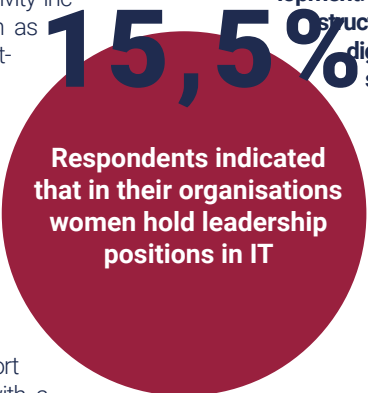# RECOMMENDATIONS FOR NON-GOVERNMENTAL

2.1. MAP OF NGO ACTIVITIES

The experience of many economically developed countries (e.g., Sweden, Norway, Germany, the United Kingdom) shows that NGOs have an important role to play in the process of supporting women's careers in the areas of digitization and cyber security. Their area of activity includes: conducting inspirational programs (such as MeetUp), innovative programming courses (Bootcamp), recommendations on the subject area of digital competence training to government administrations, which then take them into account in the discussion of educational programs financed from the state budget. An important area of their work is networking for women experts in STEM and those who want to start their careers in the field, and connecting them through mentoring programs.

Special programs of institutional financial support for such organizations are needed, coupled with a strategy for building the country's digital competence.

2.2. MAP OF NGO SOCIAL NETWORKS WHERE NEWCOMERS MEET EXPERTS SUPPORT FOR THE CREATION OF A WOMEN'S DIGITAL COMMUNITY

Programs to support initiatives to create and develop social networks, bringing together women who work in this field and those who are starting, or want to start, their careers in IT, can be helpful in advancing women's careers in the world of digital technology and cyber security. Today's women are very active in social networks. Thanks to new networks (communities) of women interested in developing digital competence, they can receive strong support from other women in the industry, seek professional advice, ask what they should focus on when planning their choice of majors or expert courses.

There is a need to create a map of NGO social networks that will help women access mentors, expert professional consultations, coaching and information on activities carried out in the field of digital competence development. To date, these activities are not structured, do not respond to the state's digital competence development strategy.

15,5 %

Respondents indicated that in their organisations women hold leadership positions in IT

2.3. DIGITAL PLATFORMS CONNECTING ENTREPRENEURS WITH WOMEN WHO WANT TO START A CAREER IN THE DIGITAL WORLD

As the results of the survey, focus group and case study show, an important role in increasing the participation of women in digital projects can be played by programs that connect women who want to develop their digital competencies with companies, given the insufficient number of experts in the areas of cyber security and digital competencies. According to a report prepared by PIIT, in Poland the shortage of all IT experts reaches 50,000, and among them up to 20 percent may be cyber security professionals.

These programmes can be implemented in two areas:

> attracting new employees combined with programmes to develop their digital competences in terms of educating the employee for the employer's needs,

> promote the building of a community of women in the field of digital competence and cyber security by creating a communication forum that brings together female specialists and experts (with several years of experience professional) with an ecosystem consisting of: entrepreneurs, start-ups, VC funds, education representatives higher.

Women joining the network will be able to build trusting relationships with professionals at all levels, gaining or expanding knowledge of educational opportunities, career development and building their personal brand and reputation in the industry.

2.4. THE WORKING AND MAKING EDUCATIONAL PROGRAMME AVAILABLE

NGOs can be actively involved in the discussion and implementation regarding educational programmes for women, which should include all forms of education in Poland:

> school and non-school education

> programming corses

> workshops related to with presentations of new digital technologies with a focus on for their practical use

> mentoring support

> scholarships for girls and women wishing to develop   in the field of digital competence

It is estimated that there is currently a shortage of around 1 million professionals in the EU

Digital

It is important to create a library/map of online training courses available to women interested in developing skills in the area of digitization and cybersecurity, which will allow them to access these resources from anywhere at any time.

2.5. SOCIAL CAMPAIGNS - WOMEN IN STEM

NGOs are an excellent platform for implementing social campaigns to promote awareness of gender equality in the digital area.

Outreach and education efforts should focus on organizing campaigns to raise awareness of available career opportunities for women in the digital technology industry, presenting a variety of career paths, showcasing examples of best practices and success stories of female leaders in the field.

2.6. MENTORING NETWORKS FROM NOVICE TO EXPERT

In the survey we conducted, one of the important areas identified by women as important in developing their digital competencies is mentoring programs.

Mentoring programs should be directed not only to women taking their first steps in digitization, but also to experienced experts who want to develop their competencies. In this regard, already-built local community networks such as moms' clubs and others should be taken into account.

2.7. NETWORKING OF START-UPS ESTABLISHED BY WOMEN WITH VC (VENTURE CAPITAL) AND PE (PRIVATE EQUITY) INVESTMENT FUNDS

The business world is increasingly opening up to women and their ingenuity. Creativity, a broad view of reality, courage and willingness to break stereotypes make women's initiatives not only surprising, but also awe-inspiring. According to a report by SISTA and BCG, in 2022 in 5 selected EU countries, 10 percent of start-ups were founded by teams consisting of women alone. Women also continue to be a minority in private equity and venture capital funds - they account for 16 percent of employees of private equity firms operating in Poland and 23 percent of employees of venture capital funds operating in our country, according to a survey conducted by the Polish Private Equity Investors Association (PSIK), the Level20 organization and the Abris investment fund. [7]

Participants in the survey conducted indicated the need to actively provide support to women who want to start or have started their business as startups. This support would focus on several levels:

These programs can be implemented in two areas:

> Business mentoring that prepares them for speaking engagements in the financial rounds of investment funds.

> Implementation of accelerator programs dedicated to women, start ups. The initiation of financing activities with investment funds to create favorable conditions for the development of women's entrepreneurship in the field of digital technologies is a task worth pursuing together at the interface of public institutions - NGOs and private entities.

127mld

EU earmarked to support digital transformation

[1] https://kobieta.rp.pl/rozwoj/art39282931-katarzyna-blachowicz-reskilling-to-klucz-do-sukcesu-kobiet-w-branzy-it

[2] Kobiety w IT 2022, Raport No Fluff Jobs

[3] https://itwiz.pl/najbardziej-poszukiwani-specjalisci-it-na-swiecie/

[4]https://www.stockwatch.pl/wiadomosci/w-polsce-brakuje-juz-kilkunastu-tysiecy-specjalistow-od-cyberbezpieczenstwa-zapotrzebowanie-na-ich-kompetencje-bedzie-skokowo-roslo,sektor-informatyka,312254

[5] Dobrym przykładem pomysłu w tym obszarze jest akcelerator innowacji obronnych DIANA https://pfrsa.pl/technologiedlaobronnosci.html

[6] raport "Rolnictwo 4.0. Identyfikacja trendów technologicznych", Narodowe

RECOMMENDATIONS FOR COMPANIES

3.1. DEVELOPMENT OF CYBER SECURITY ORIENTED BUSINESS STRATEGY.

In a dynamic business environment, where cyber threats are evolving as technology advances, developing an effective business strategy that addresses cyber security issues is a key element in ensuring an organization's success. Important elements of this strategy include investment in data protection, employee training, a gradual increase in investment in information security as the business grows, and the development of contingency plans and procedures for restoring systems in the event of major incidents. Organizations that focus on protecting data, educating employees, gradually increasing investments in line with economic progress and developing contingency plans are better prepared to meet the changing challenges of information security in today's business environment.

It is recommended that enterprises' business strategies include measures that will ensure digital security for the enterprise in accordance with the provisions of directives and laws.

3.2. EMPLOEE EDUCATION

In the face of rapidly evolving digital technologies and growing cyber threats, employee education on digital competence and cyber security is becoming a key component of an organization's successful development and security strategy. In order to increase employee awareness and skills in the area of cyber threats, organizations can benefit from a variety of educational activities.Employee education on digital competence and cyber security should be a comprehensive process that includes raising awareness of the organization and its employees. The activities identified by the survey participants in this regard are:

> **Training for top management.**

> **Campaigns to raise awareness of digital opportunities and risks.**

3.3. PARTNERSHIP PROGRAMS

The development of digital competence requires cooperation with experts in the field. Responding to this need can be non-profit organizations that promote women's interest in digital technologies and cybersecurity, and universities, among others, which are increasingly actively soliciting female experts to organize classes with them for students.

3.4. EQUAL PAY, PROMOTIONS, DEVELOPMENT PATHS AND EQUAL TREATMENT DURING RECRUITMENT

According to the Women's Congress Association's report "Women, the Labor Market and Wage Equality," the feminization of certain professions one of the key aspects on which to focus your optics is the wage gap. Approx. 24% of the total wage gap between men and women is accounted for by the overrepresenta-

tion of women in sectors with relatively low wages, such as the care sector, health care or education. The study shows that 40% of women are studying at technical universities, but the rate of their advancement is not proportional to their qualifications. The above statistics show that despite legislative efforts to date, the current legal framework has not yet produced significant results for equalizing the position of men and women in the labor market. However, further initiatives are being taken at the European level, which, provided they are properly implemented in the Polish legal system, may bring visible results in the coming years.

As highlighted in a study by the Office of the Ombudsman, "Protection from Discrimination in Poland. Legal Status and Public Awareness. Conclusions and Recommendations of the Ombudsman" (BIULETYN RZECZNIKI PRAW OBYWATELSKICH 2020, No. 3 The Principle of Equal Treatment. Law and Practice, No. 30, Warsaw 2020),[10] Polish regulations in the field of anti-discrimination law are scattered - they are scattered in various legal acts, which makes it difficult to build public awareness and use the powers granted.

A significant part of anti-discrimination provisions are introduced into the Polish legal system as part of the implementation of EU directives. Particularly interesting solutions, aimed at effectively combating the gender pay gap, were included in the Directive on strengthening the application of the principle of equal pay for men and women for equal work or work of equal value through pay transparency mechanisms and enforcement mechanisms, adopted by the European Parliament in May 2023.

The implementation period for the Member States will end on 7 June 2026. The implementation period for the Member States will end on 7 June 2026. The Pay Equity and Transparency Directive will include, among other things, obligations for businesses to report on the pay gap between female and male employees. It will also give candidates the right to be informed about their starting salary or a range of salaries, and prohibit employers from asking about a candidate's salary level in their current position. In addition, employees are to have the right to be informed about average pay levels by gender.s,

Undoubtedly, the positive direction of legal changes does not dispense with the need to look for solutions to address the causes of women's low participation in professional life and in particular industries. Even favourable legal solutions need to be complemented by programmes aimed at building social awareness of anti-discrimination solutions and professional activation of women.

3.4. AGRICULTURE 4.0

The directions of change for Agriculture 4.0 are set by strategic inter- national documents. The most important of these, resulting from participation in the European Union, include: Stra- tegic Plan for the Common Agricultural Policy 2023- 2027 and European Green Deal strategies, and national documents, including the Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2030, the National Strategic Plan for the Common Agricultural Policy 2023-2027 and the Productivity Strategy 2020. However, little space in the above documents is devoted to digitalisation and digital security.

It is necessary in the future, at the stage of consultation of strategic documents with representatives of entrepreneurs operating in agriculture, to indicate the necessity of obtaining support for the innovative activity of farms and financing both replacement and breakthrough technologies.

In Poland, the share of women working in the ICT sector is lower than the European ave

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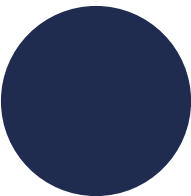
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