Current actions and opportunities emphasising gender equality in IT

Assist. prof. Lili Nemec Zlatolas, PhD

IE Gender Equality in Informatics webinar series

Scientific background

- Assistant professor and TA in Informatics at the Faculty of Electrical Engineering and Computer Science, University of Maribor in the courses:
  - Databases;
  - Fundamentals of information security;
  - Fundamentals of web programming….
- Main research topics:
  - User aspects on security and privacy;
  - Gender equality in informatics.

Scientific background

- Recent publications on privacy and security:

  - NEMEC ZLATOLAS, Lili, FEHER, Nataša, HÖLBL, Marko. **Security perception of IoT devices in smart homes**. Journal of cybersecurity and privacy, ISSN 2624-800X, 14 Feb. 2022, vol. 2, iss. 1, str. 65-73, ilustr., doi: 10.3390/jcp2010005.

  - NEMEC ZLATOLAS, Lili, HRGAREK, Luka, WELZER-DRUŽOVEC, Tatjana, HÖLBL, Marko. **Models of privacy and disclosure on social networking sites: a systematic literature review**. Mathematics, ISSN 2227-7390, 2022, vol. 10, no. 1, 37 str. https://www.mdpi.com/2227-7390/10/1/146, doi: 10.3390/math10010146.

  - NEMEC ZLATOLAS, Lili, WELZER-DRUŽOVEC, Tatjana, HÖLBL, Marko, HERIČKO, Marjan, KAMIŠALIĆ, Aida. **A model of perception of privacy, trust, and self-disclosure on online social networks**. Entropy, ISSN 1099-4300, 2019, vol. 21, no. 8, 18 str., doi: 10.3390/e21080772.

Scientific background

- Some publications on Gender equality in informatics:

  - NEMEC ZLATOLAS, Lili, PUŠNIK, Maja, BERANIČ, Tina, HERIČKO, Marjan. **Towards a strategic approach to attracting female students and researchers in the ICT field**. V: STRAHONJA, Vjeran (ur.), STEINGARTNER, William (ur.), KIRINIĆ, Valentina (ur.). *CECIIS : Central European Conference on Information and Intelligent Systems : proceedings : 31th international scientific conference, October 7-9, 2020, Varaždin, Croatia*, (Central European Conference on Information and Intelligent Systems (Online), ISSN 1848-2295). Varaždin: Faculty of Organization and Informatics. 2020, str. 283-288. http://archive.ceciis.foi.hr/app/public/conferences/2020/Proceedings/SPDM/SPDM2.pdf.

  - BREZOČNIK, Lucija, WELZER-DRUŽOVEC, Tatjana, NEMEC ZLATOLAS, Lili. **Analysis of guidelines for involving more female students and researchers in STEM fields (in Slovenian language)**. *Glasilo*, ISSN 2536-1856, maj 2021, št. 6, str. 26-34. https://zid-mb.si/wp-content/uploads/2021/05/GlasiloZID_2021_6_splet.pdf.

Scientific background

- Collaborating in projects:
  - COST action **EUGAIN** (European Network For Gender Balance in Informatics)
  - Working group **Diversity and Inclusion**, Informatics Europe
  - Horizon 2020 project **CONCORDIA** (Cyber security cOmpeteNCe fOr Resarh anD InnovAtion)
  - Erasmus+ **Co-created Interactive Courseware** and **Digital Technologies for Lecturing and Learning**
  - Target research program **Development of cyber security training programs**

- Organized a few conferences in Slovenia:
  - LTEC 2015 and KMO 2015,
  - EJC 2015,
  - ADBIS 2019,
  - IFIP SEC 2021 etc.

Information technology

- It is never too late to start learning and it is crucial we learn all the time proactively.

- Some parts include also other knowledge besides IT, for example, psychology, law etc. (UX, UI, Cybersecurity,…)

- Diversity will bring better problem-solving.

Top Strategic Technology Trends for 2022

Data Fabric
Composable Applications
Distributed Enterprise

Cybersecurity Mesh
Decision Intelligence
Total Experience

Privacy-Enhancing Computation
Hyperautomation
Autonomic Systems

Cloud-Native Platforms
AI Engineering
Generative AI

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HOW many women are in IT?

WHY do we need women in IT?

WHERE can we start?

WHICH actions can we take?

WHAT did we do?

HOW many women are in IT?

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Numbers

■ European Commission's Women in Digital Scoreboard:

- Only 19% of ICT specialists are female
- 33% of STEM graduates are female
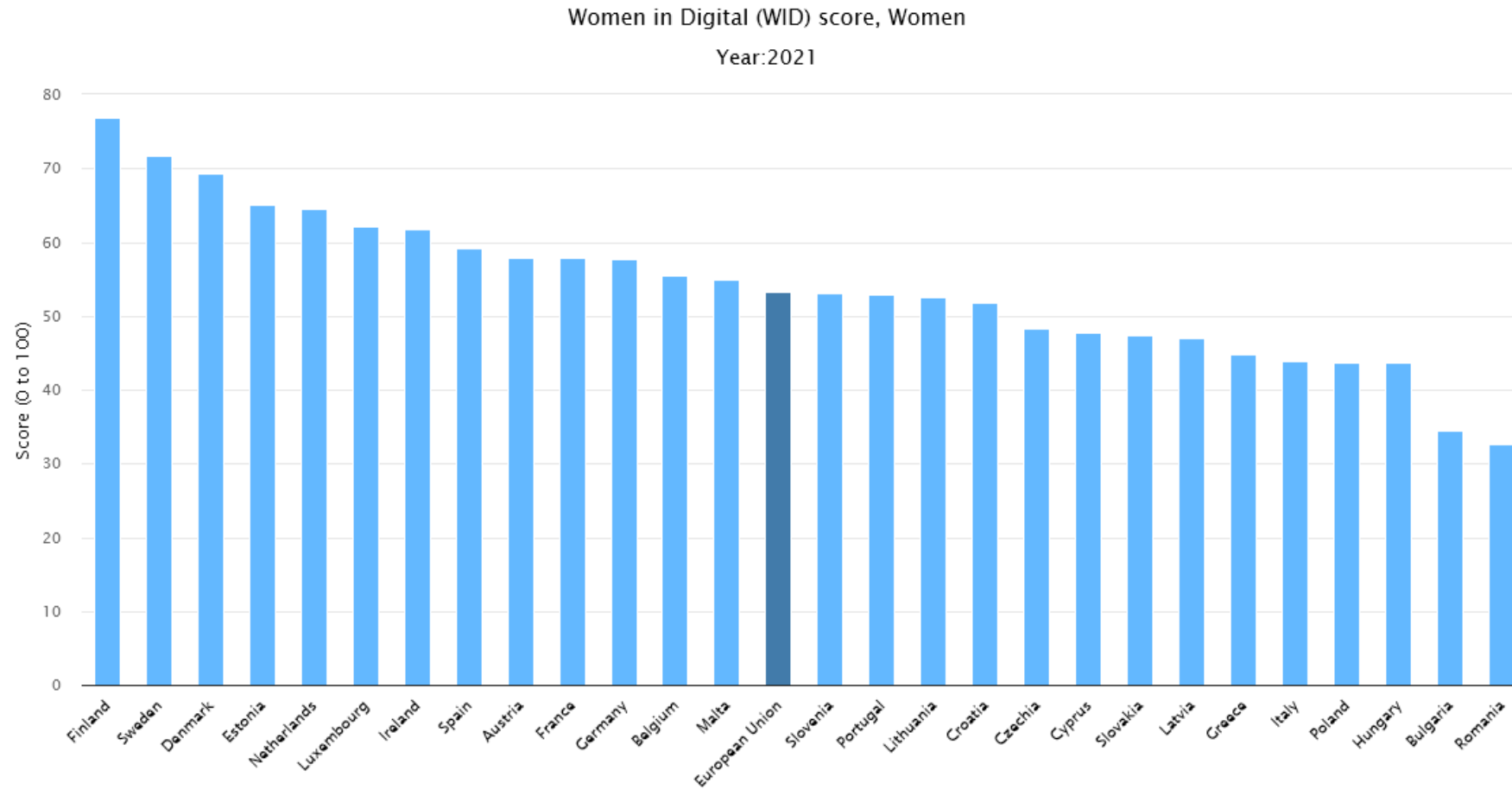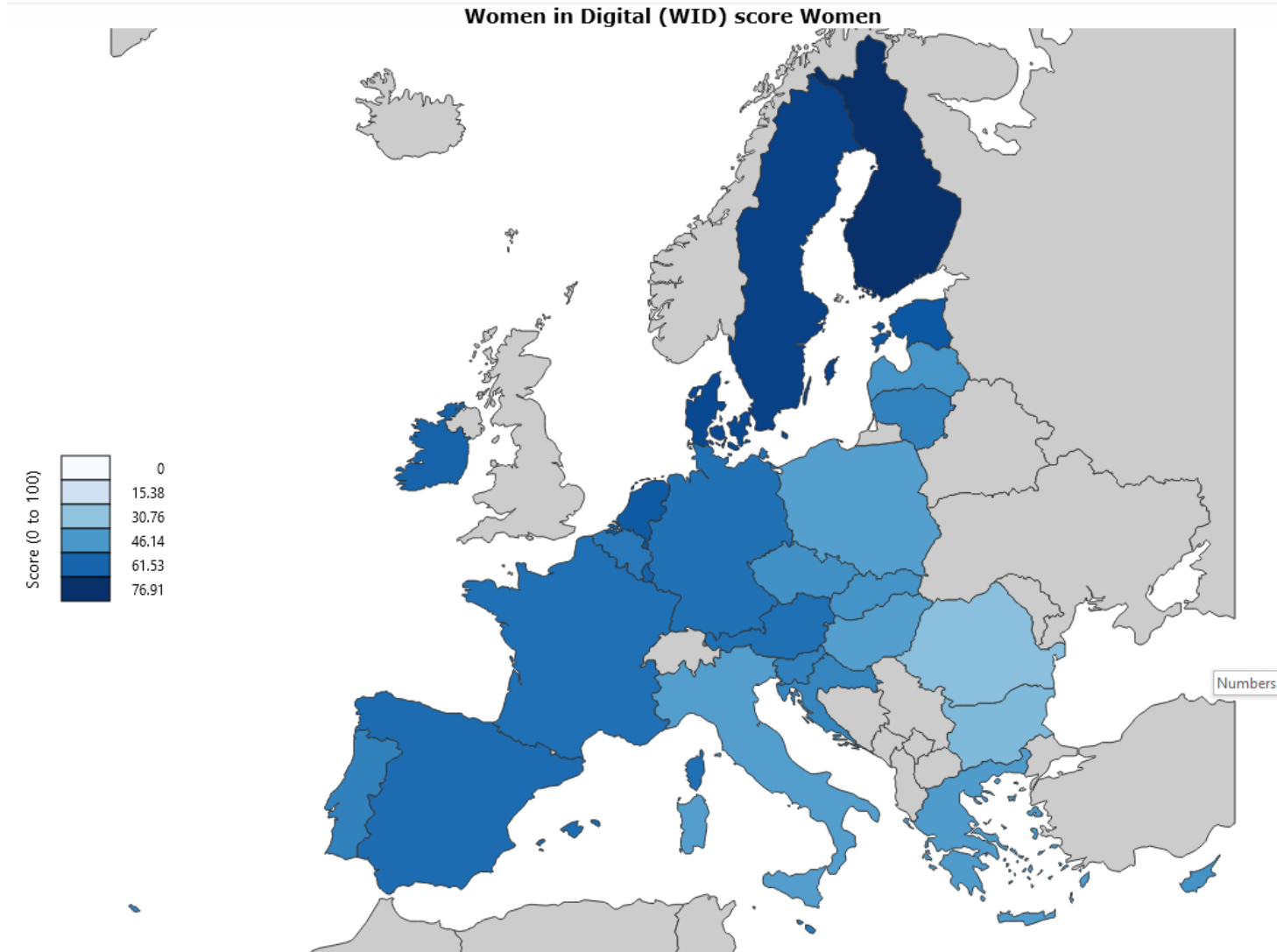- A substantial gender gap in specialist digital skills

Numbers

■ **Women in digital score's three sub-dimensions:**
- Use of internet
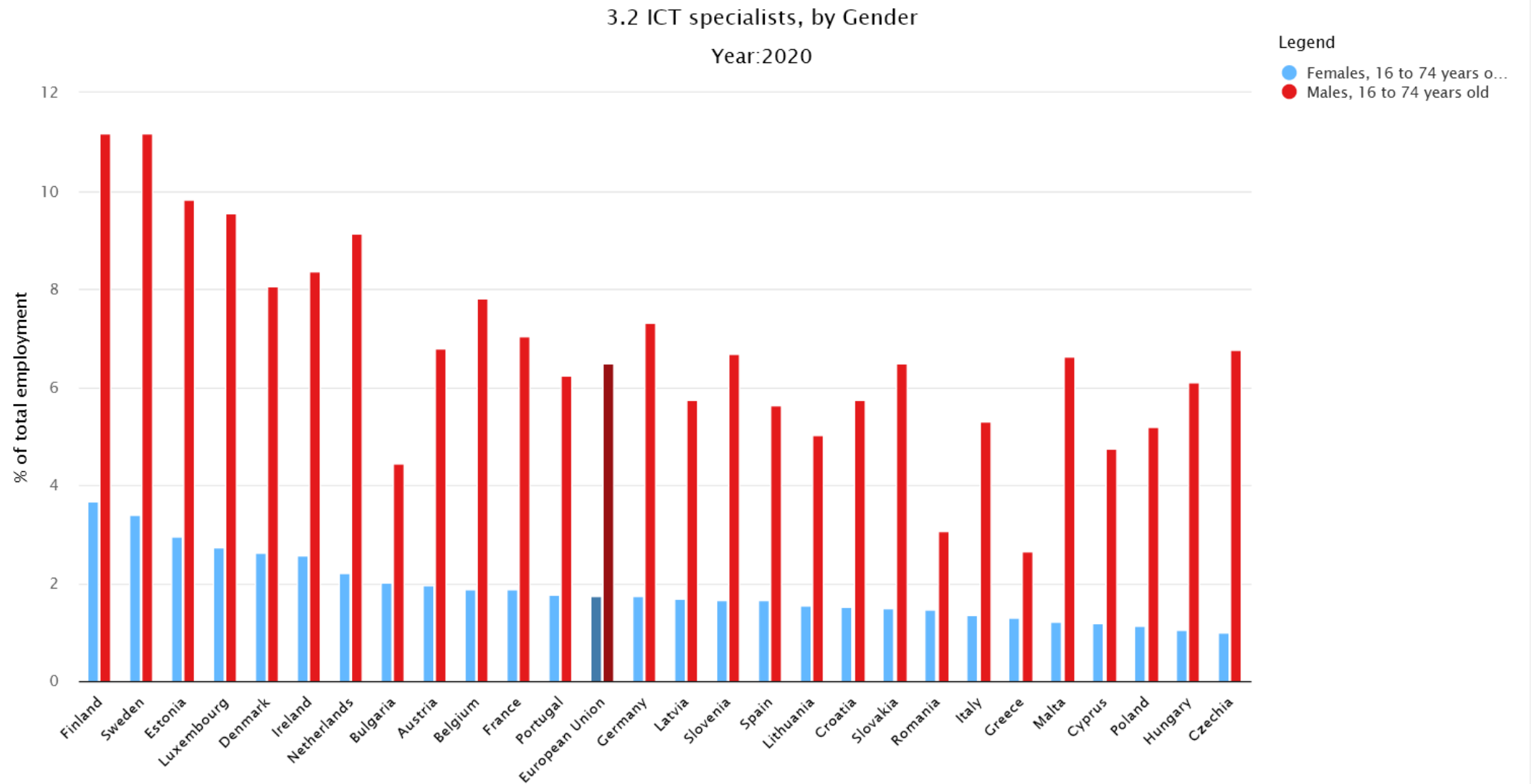- Internet users skills
- Specialist skills and employment

Women in Digital (WID) score, Women
Year:2021

European Commission, Digital Scoreboard

Numbers

Women in Digital (WID) score Women

Score (0 to 100)

- 0
- 15.38
- 30.76
- 46.14
- 61.53
- 76.91

- Women in digital score's three sub-dimensions:
  - Use of internet
  - Internet users skills
  - Specialist skills and employment

ICT specialists' score by gender (% of total employment)

3.2 ICT specialists, by Gender

Year:2020

Legend
- Females, 16 to 74 years o...
- Males, 16 to 74 years old

European Commission, Digital Scoreboard

EU numbers

- There are more women university graduates in Europe, but they remain underrepresented in higher paid professions.
    - Discriminatory social norms and stereotypes about skills are some of the contributing factors.
- 90% of jobs require basic digital skills due to rapid transformation and digitization of the economy.
- Girls outperform boys in digital literacy (paradox).

European Commision. 2020. A Union of Equality: Gender Equality Strategy 2020-2025

Numbers

Girls are interested in STEM at the age of 11 and loose interest by the time they are 15
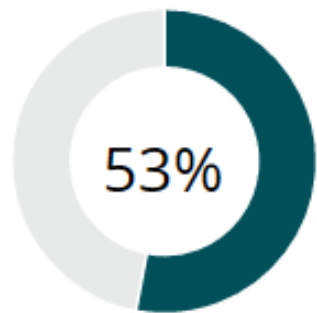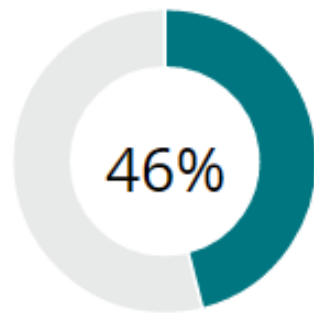
Women working in 2022

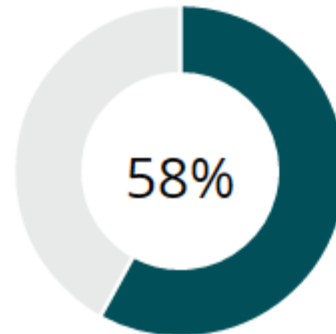■ Deloitte study with 5,000 women in the workplace across 10 countries

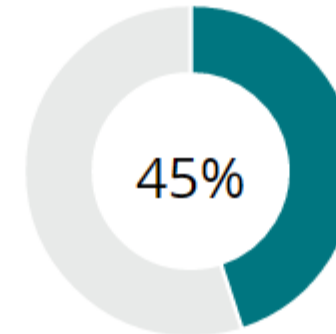For those working hybrid, which of these statements are true?

53% say their stress levels are higher than they were a year ago
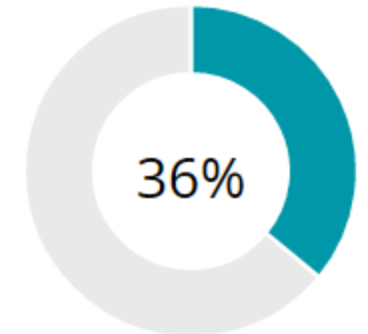
46% feel burned out

58% I feel excluded from meetings and interactions

45% I don't have enough exposure to leaders

36% I have clear expectations around where/how I work

Deloitte. 2022. Women @ Work 2022: A Global Outlook.

Remote & hybrid work

- Hybrid and remote work does not guarantee benefits to all employees.
- It can potentially worsen diversity, equity and inclusion (DEI).
- 76% of managers say on-site employees are more likely to be promoted than remote workers.
- Women are more likely to have flexible worktime.
- Important to mitigate bias in performance.
- **Support underrepresented talent**.

Gartner. 2022. 9 Future of Work Trends Post Covid-19.

HOW many women are in IT?

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Numbers

Enterprises employing, recruiting and having hard-to-fill vacancies for ICT specialists, by size class, EU, 2020 (% enterprises)

Source: Eurostat (online data codes: isoc_ske_itspen2 and isoc_ske_itrcrn2)
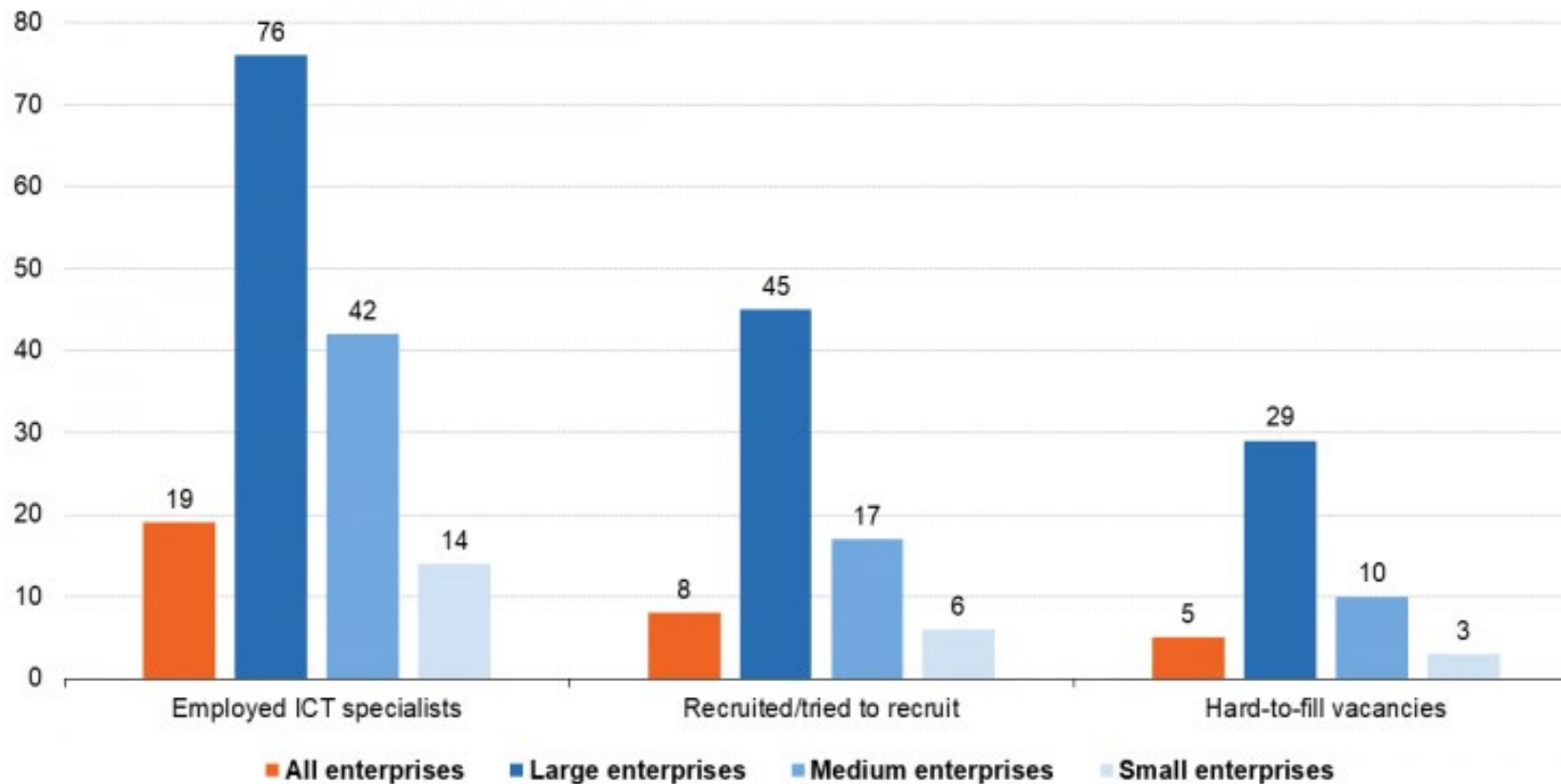
- 55% of companies experience difficulties in recruiting IT professionals
- lack of applications, lack of relevant qualifications and experience and high salary expectations

Why do we need women in STEM

- **65% of the jobs today's children will do, don't exist yet** and many of them will be in STEM.
- STEM jobs have the power to change the world.
- If STEM positions won't be possible to fill, we will be missing out on innovations.

Suzanne Choney, 2018. Why do girls lose interest in STEM? New research has some answers — and what we can do about it.

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Why do we need women in IT?

- We need everyone to fill in the available positions

- Products are used by everyone – so they should be developed by diverse groups.

- Diverse groups are:
  - better at solving problems than homogeneous groups
  - generate more revenue
  - inspire future generations to attract more females in IT
  - have higher levels of productivity
  - have better job satisfaction

What are the issues that women are facing in IT?

- Gender pay gap

- Stereotyping

- Unconscious bias

Gender bias in AI

- There should be enough diverse people contributing or the AI's knowledge is not good enough.

- Can occur during machine learning with a lack of information in the dataset or already biased information in the dataset.

- We need people from diverse backgrounds, but it is hard to recruit them because there are not that many. This can reinforce IT stereotypes and result in younger females not taking a career in IT. [1]

- When a man is successful, he is liked by both men and women. When a woman is successful, people of both genders like her less. [2]

[1] Laura Fogg-Rogers and Laura Hobbs. 2019. Catch 22 — improving visibility of women in science and engineering for both recruitment and retention.
[2] Thuy Sindell. This Is Why You Need Balance To Be An Effective Leader.

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Informatics Europe

- ◼ Working group Diversity and Inclusion
  - ▪ Improving gender balance and diversity in informatics
  - ▪ https://www.informatics-europe.org/society/diversity-and-inclusion.html

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European Network For Gender Balance in Informatics

EUGAIN
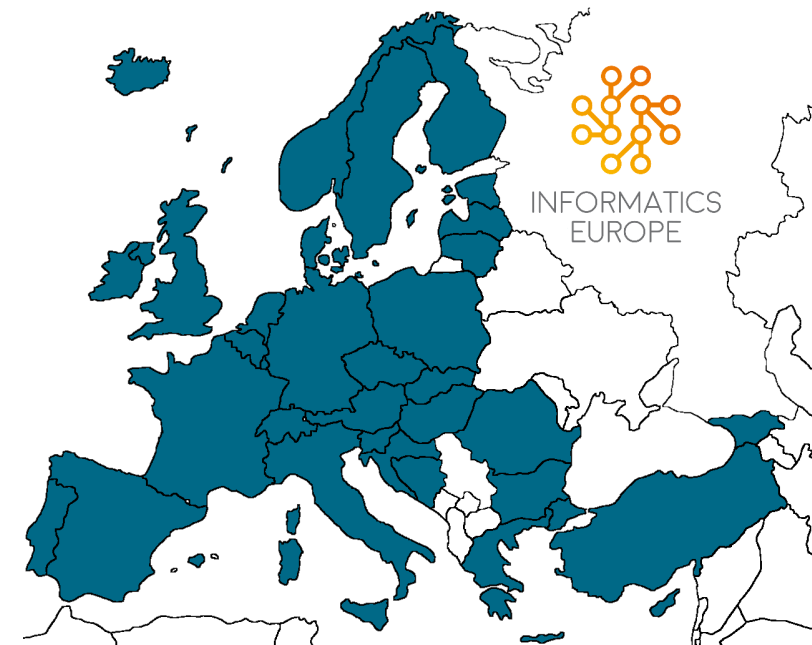
- **Working Group 3: From PhD to Professor**
  - A survey on Gender balance in Informatics
    - 10-15 minutes survey → collect best practices and develop a booklet
    - Looking for answers from members of STEM-related institutes or faculties, that have some knowledge of gender-equality practices inside the department
    - **https://www.surveymonkey.com/r/VHVLNF9**
  - Booklet Best practices from PhD to Professor: https://eugain.eu/wp-content/uploads/2022/05/EUGAIN_booklet_2022-05.pdf

CONCORDIA project

■ Women in Cybersecurity task

- Advocates for the involvement of more women in the field of cybersecurity

- Women in Cyber – Manifesto for today (https://www.concordia-h2020.eu/wp-content/uploads/2019/09/WomenInCyberMANIFESTO.pdf)

- CONCORDIA WOMEN's AWARDS: https://www.concordia-h2020.eu/concordia-womens-awards-2022/

  - Established to celebrate women in cybersecurity
  - Three categories: **ENTREPRENEURSHIP, EDUCATION and INDUSTRY**
  - Call open from **4th July 2022 to 9th September 2022**

Ladies in informatics

■ Faculty of Electrical Engineering
and Computer Science

▪ Co-founder

▪ https://ladiesininformatics.um.si/

UM LADIES IN INFORMATICS

ONA VE (She knows)

- Women represent only 24 % of media appearances even though they represent half the population.
- Slovenian association for connecting female expertise and promotion of knowledge.
- Established to increase the share of women appearing in Slovenian media and at public events.

Other initiatives

- Connecting women in STEM and promoting actions to improve gender balance:
  - IEEE WIE
  - ACM-W
  - ECSO Women4Cyber
  - Girls who Code
  - SheLeadsTech ISACA
  - Chechitas
- Join an initiative and help or get ideas on how to improve the status of your institution.

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EC priorities

- ◼ 5: Gender equality
- ◼ 10: Reduced inequalities

EU holistic approach to sustainable development: Implementation of the United Nations' 2030 Agenda

Gender Equality Strategy 2020-2025

- Ursula von der Leyen

"Gender equality is a core principle of the European Union, but it is not yet a reality. In business, politics and society as a whole, we can only reach our full potential if we use all of our talent and diversity. Using only half of the population, half of the ideas or half of the energy is not good enough. With the Gender Equality Strategy, we are pushing for more and faster progress to promote equality between men and women."

GENDER EQUALITY STRATEGY
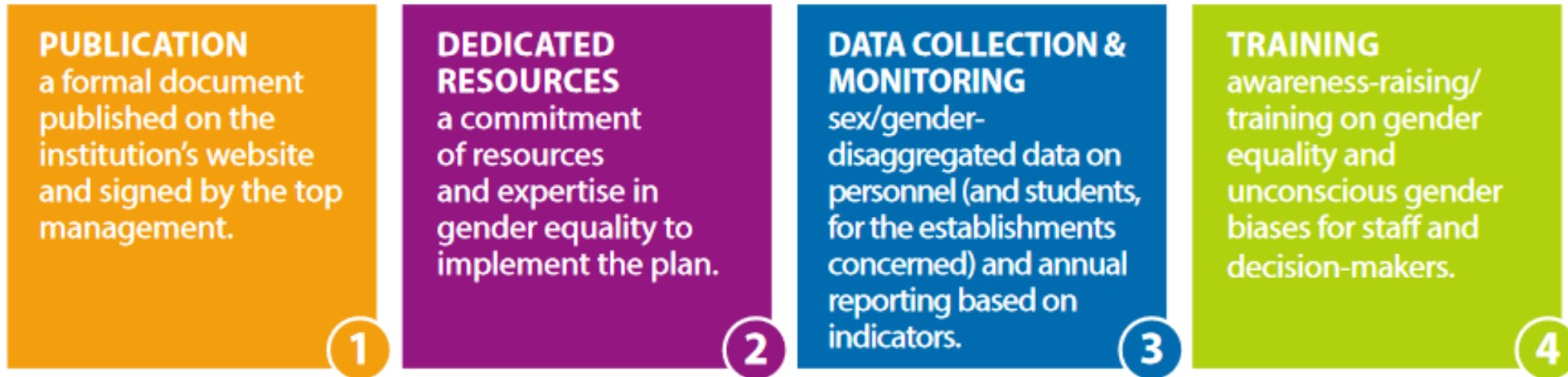2020-2025

Gender Equality Strategy 2020-2025

- All beneficiaries under Horizon Europe have to put in place the Gender Equality Plan (GEP)
  - A requirement for every organization interested in bidding for funding under Horizon Europe.
  - Following guidelines by EC, establishing a GEP has been a priority for many institutions in the last years.
  - Data collection and monitoring of progress.

Gender Equality Strategy 2020-2025

PUBLICATION
a formal document published on the institution's website and signed by the top management.
①

DEDICATED RESOURCES
a commitment of resources and expertise in gender equality to implement the plan.
②

DATA COLLECTION & MONITORING
sex/gender-disaggregated data on personnel (and students, for the establishments concerned) and annual reporting based on indicators.
③

TRAINING
awareness-raising/ training on gender equality and unconscious gender biases for staff and decision-makers.
④

In terms of the content, it is **recommended** that a GEP addresses the following **5 thematic areas**, using concrete measures and targets:

1. **Work-life balance** and **organisational culture**.
2. Gender balance in **leadership** and **decision-making**.
3. Gender equality in **recruitment** and **career progression**.
4. Integration of the gender dimension into **research** and **teaching content**.
5. Measures against **gender-based violence**, including sexual harassment.

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Gender Equality Plan @ University of Maribor

Objectives:

1. Education and awareness-raising on the importance of gender equality for the proper functioning of the university.

2. Improved gender balance in decision-making positions and in collegiate bodies of the University and the Faculties.

3. Gender equality in recruitment.

4. Zero tolerance in all forms of discrimination based on gender, sexual orientation, sexual violence and harassment.

5. Equal opportunities for career advancement and reconciliation of work and private life.

6. Introducing the gender-inclusive language use at all levels of UM operation.

7. Libraries shall be well-equipped with gender studies literature.

Gender Equality Plan @ University of Maribor

- Focus group interviews for different employee groups (pregnant, young mothers, disabled, women in STEM, fathers with paternity leave, LGBTIQ+).

- To be elected as an associate professor, a person needs to be abroad at one location for three consecutive months → challenging for young mothers and with no financial support offered.

- Covid-19 pandemic will be taken into account when being checked if the person had enough publications etc.

- Plan to include flexible working hours and afternoon child-care.

A PLAN WITHOUT ACTION IS NOT A PLAN. IT'S A SPEECH.

T. Boone Pickens

What action can we take?

- Follow plans and measure the goals (need to be measurable).
- Reflect on the indicators that organisations set.
- Founding of initiatives and establishing projects reducing gender gap.

How to get more girls in IT

- Parents (encouragement)
- Teachers (encouragement)
- Encourage girls good in maths into IT
- Female role models (snowball effect)

How to get more girls in IT

■Hands-on experiences (educational system, workshops).

■Use of STEM knowledge in everyday life (courses in primary school).

■Promote well-paid IT jobs.
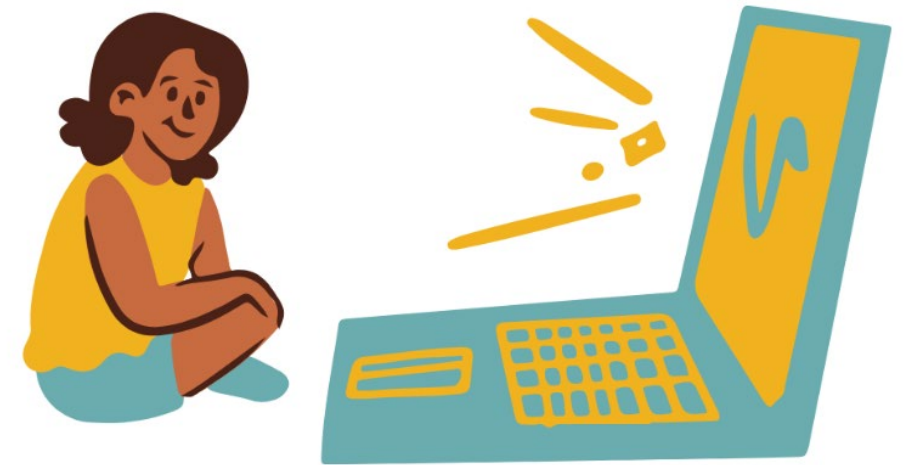
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Ladies in informatics

- ***Initiative Ladies in Informatics was founded in 2018***
- Unite female scientists with related research interests in the ICT domain.
- Welcoming new female researchers and student members.

Ladies in informatics

- Number of female employees has increased by 129% in the last ten years

- Careful career planning support

- Healthy and supportive work environment

- Creation of strong collaborations

- Actions to attract female researchers into IT

Good practices

■ Role models & success stories:

- Prestigious title of Female Engineer of the year 2019 in Slovenia

- IEEE Slovenia and IEEE Region-8 student paper contest award
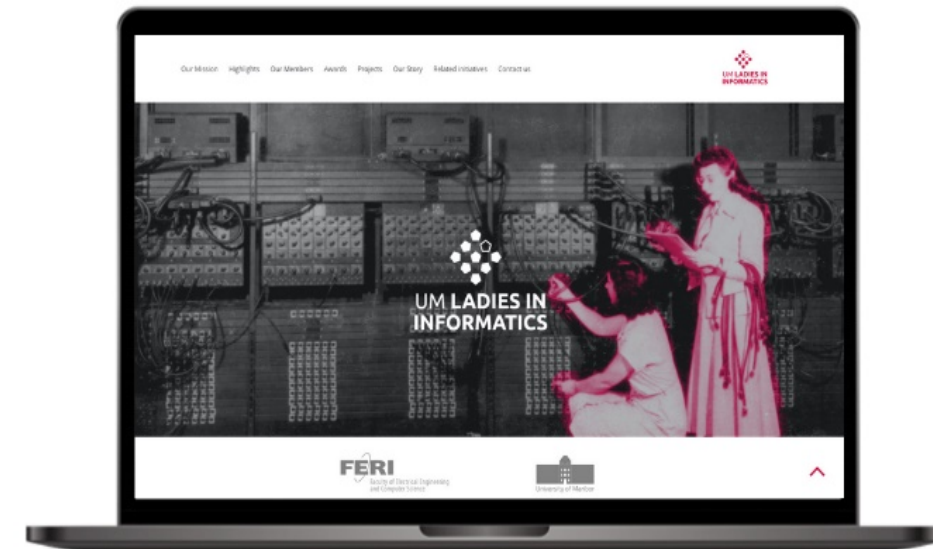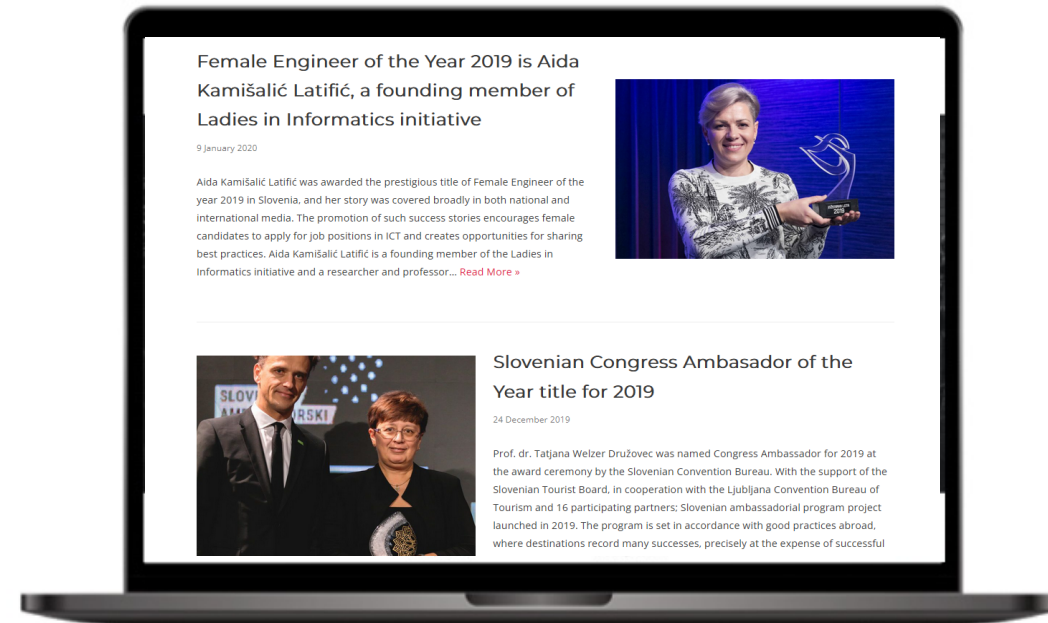
  - First-ever female contestant to win both competitions in over nearly thirty years of their existance.

Female Engineer of the Year 2019 is Aida Kamišalić Latifić, a founding member of Ladies in Informatics initiative

9 January 2020

Aida Kamišalić Latifić was awarded the prestigious title of Female Engineer of the year 2019 in Slovenia, and her story was covered broadly in both national and international media. The promotion of such success stories encourages female candidates to apply for job positions in ICT and creates opportunities for sharing best practices. Aida Kamišalić Latifić is a founding member of the Ladies in Informatics initiative and a researcher and professor... Read More »

Slovenian Congress Ambasador of the Year title for 2019

24 December 2019

Prof. dr. Tatjana Welzer Družovec was named Congress Ambassador for 2019 at the award ceremony by the Slovenian Convention Bureau. With the support of the Slovenian Tourist Board, in cooperation with the Ljubljana Convention Bureau of Tourism and 16 participating partners; Slovenian ambassadorial program project launched in 2019. The program is set in accordance with good practices abroad, where destinations record many successes, precisely at the expense of successful
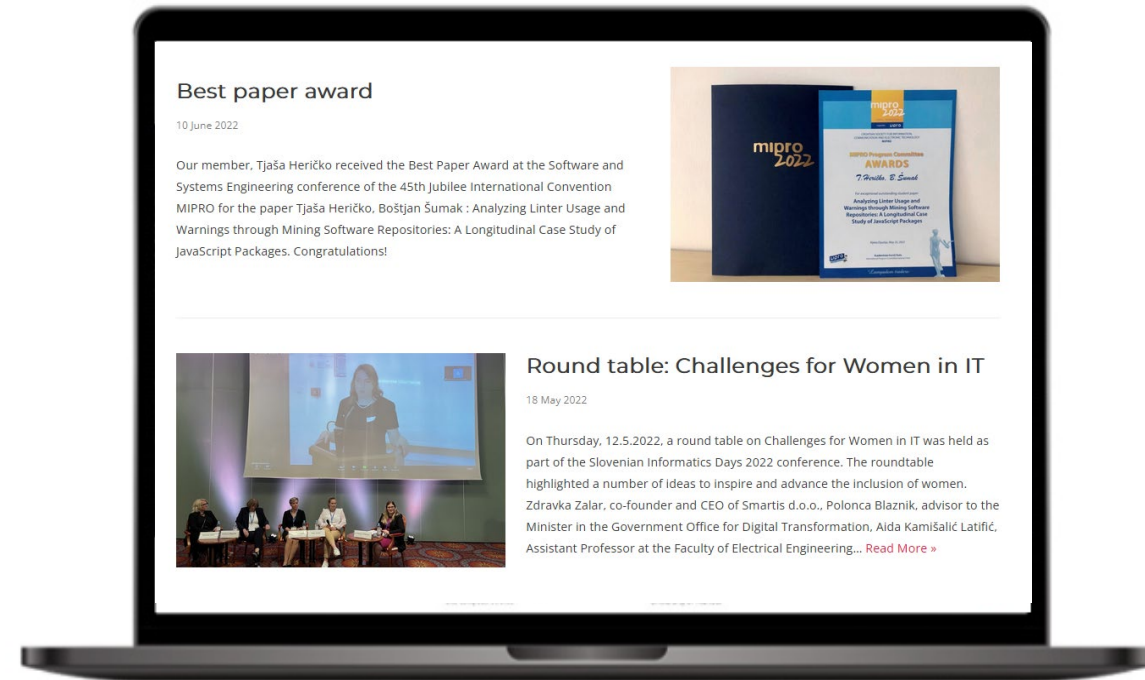
Good practices

UM LADIES IN INFORMATICS

- High success of researchers and professors holding a PhD, with numerous publications, excellent scores for pedagogical work from students and a high percentage of leading international projects at the Institute.

- Round tables on challenges and raising awareness.

- At the University of Maribor, maternity leave for women is always considered when candidates are being evaluated for success criteria.


Best paper award

10 June 2022

Our member, Tjaša Heričko received the Best Paper Award at the Software and Systems Engineering conference of the 45th Jubilee International Convention MIPRO for the paper Tjaša Heričko, Boštjan Šumak : Analyzing Linter Usage and Warnings through Mining Software Repositories: A Longitudinal Case Study of JavaScript Packages. Congratulations!

Round table: Challenges for Women in IT

18 May 2022

On Thursday, 12.5.2022, a round table on Challenges for Women in IT was held as part of the Slovenian Informatics Days 2022 conference. The roundtable highlighted a number of ideas to inspire and advance the inclusion of women. Zdravka Zalar, co-founder and CEO of Smartis d.o.o., Polonca Blaznik, advisor to the Minister in the Government Office for Digital Transformation, Aida Kamišalić Latifić, Assistant Professor at the Faculty of Electrical Engineering... Read More »

More Women in Informatics Research and Education

■ A checklist of actions from the Informatics Europe publication has been developed at the Institute of Informatics.

Bujdosó, Gyöngyi et al. (2016). *More women in informatics research and education*. Informatics Europe. https://www.informatics-europe.org/dl/more-women-in-informatics-research-and-education
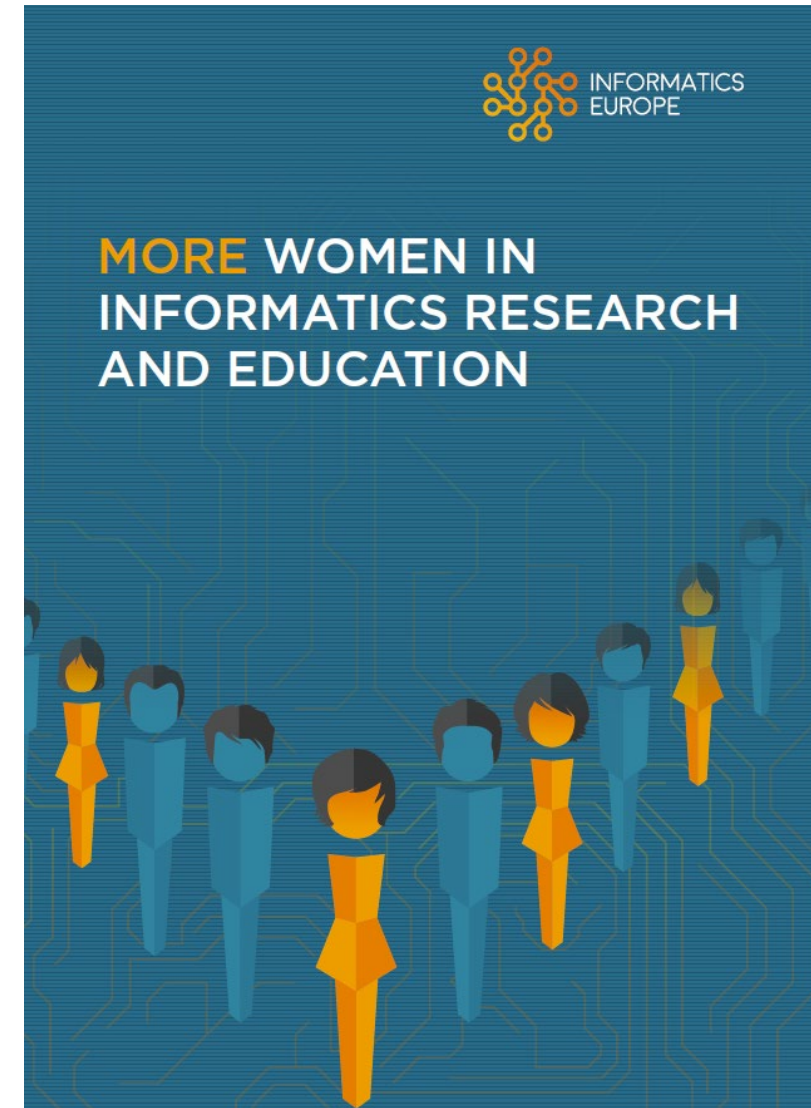
More Women in Informatics Research and Education

1. RECRUITING FEMALE STUDENTS

Use multiple social media channels to promote events and reach a high number of prospective students.

Work with undergraduate open-day coordinators to recruit female student ambassadors and speakers from the department and industry. While female faculty may choose to volunteer as role models, this costs women their study/research time.

Present **example stories about women with successful careers** in Informatics in recruitment materials and on the departmental website, encouraging female candidates to apply and reducing the stereo - type that Informatics related jobs are for "nerds".

Offer courses and guest lectures on topics that are popular with undergraduate and graduate students and present new opportunities for researchers, such as human-computer interaction, multimedia, lifestyle Informatics, health Informatics or computational linguistics.

Include in course descriptions aspects of creativity in tech education and work, such as information and communication design, user interface design or participatory design.

Emphasise good prospects for employment in the IT sector for skilled workers and that salaries are above average.

2. RECRUITING WOMEN

Advertise openly for all positions, stating that you are an equal opportunity employer.

Describe positions in a broad way. State job criteria objectively.

State in the recruiting materials and job descriptions that the university/department/institute is committed to facilitating the combination of work and childcare.

Emphasise that jobs in Informatics allow for more opportunities for tele-commuting and tele-working, compared to other fields.

State that **flexible terms of employment** are possible, such as working part-time and flexible working hours.

Distribute advertisements across a number of channels. For example, send them to women's networks' email lists, such as national women in tech networks or networks of female professors.

Approach candidates directly. For example, send the advertisement personally to (at least) three women you would like to see in the position. Ask them to apply, or ask them to send it to three other women who they think would be suitable.

Allow 3 months for applications to be submitted. Time is needed for the advertisement to reach the right women, and they need time to respond.

Take action if too few suitable women apply. For example, extend the deadline for applications and re-advertise the position (inter)nationally.

Re-examine the applications and consider re-advertising if the initial list of candidates selected for interview does not include any women.

3. INTERVIEWING WOMEN

Ensure that the composition of the hiring committee is as balanced as possible. For example, **ensure that at least 30% of the committee consists of women**, with a minimum of two female members.

Invite women to the interview not only to see whether they are best for the position, but also to give them experience of being interviewed and increase their status at their own institution.

Raise the issue of increasing the representation of women in the department when interviewing women and men and ask how they would approach it. This provides extra tips and also shows the department is serious about the issue.

Provide help with solving the "two body problem", that is helping to find a position for the applicant's partner.

Consider **18 months per child since PhD completion for mothers** when comparing candidates for any success criterion, thus reducing the time used to judge the achievements.

More Women in Informatics Research and Education

4. KEEPING WOMEN

Schedule meetings only between 09:30 and 16:30, so carers of young children are able to deal with commuting and childcare.

Overcompensate the imbalance of women in the institute by their overrepresentation at institute colloquia. For example, if 15% of the department is female, then make sure women give at least 25% of the talks. Invite external female speakers as well.

Organise a course for all senior staff members on unconscious bias. These can cover all diversity issues not just gender equality issues.

Provide support for the creation of a women's network within the department/institute, including secretarial support and a budget for holding events such as lunches.

Distribute welcome packages with a booklet that lists childcare options as well as other useful info provided by faculty/institute members.

Hold annual discussions with representatives of the women's network and the head of the HR department.

Encourage senior members of staff in the department to act as mentors. This will create a community where knowledge is passed on to new members, keeping women interested in the department/organisation and in the field.

Count the hours spent on female support and network issues in the same way as all other departmental commitments and duties. Do not assume that female employees can deal with this extra load in their "spare" time.

Fund childcare as part of conference travel expenses for participating faculty and researchers with young children.

Fund travel expenses for a partner to go to the conference location during the breastfeeding period.

Inquire if conference venues have childcare facilities and personnel, and request organisers to provide attendees with childcare and breastfeeding options. Ensure that conferences organised by your department provide such facilities.

Balance the didactic and scientific responsibilities of all staff and make explicit the priorities for evaluating an individual's performance (e.g., research excellence, students' satisfaction with courses, contribution to departmental duties).

Create an "ambassador" program, or a personal development plan for researchers with high potential. **Ensure that at least 30% are women.**

Upgrade a postdoc position to a tenure track position when there is an excellent female candidate and she meets the criteria specified. Include a mid-term review of progress against the criteria.

Provide visibility and self-promotion training for female researchers in temporary as well as permanent employment.

Provide coaching and mentoring to female researchers to make them more aware of their attitudes and concerns, for example, how to combine work and family demands and how to deal with the competition for permanent positions.

5. PROMOTING WOMEN

Ensure a reasonable representation of women in departmental or external committees, whilst also being careful not to unduly overload female members of staff with committee membership.

Look for and **propose suitable women when asked to nominate candidates for prizes, awards or prestigious tasks** (e.g. for reviewing, representing the department internally or externally). Strive for equal numbers of highly qualified women and men on the short list.

6.   SUPPORT MEASURES

Consult the women in your department. For example, organise lunch once a month with a different woman, at a different level, and ask her how she views the organisation, her role and her career ambitions and prospects.

Scout for and follow talented female researchers that could be called upon at some future point in time to complete diverse tasks.

Anticipate the retirement of (male) professors by making an inventory of, and initiate training of potential female successors.

Keep track of national and international networks for female researchers. Encourage women to take part in networks.

Find successful role models and create opportunities for both men and women to share best practices.

Monitor the percentage of women at all levels in the organisation. Create specific but realistic targets and action plans. Make the figures public in annual reports and departmental evaluations.

Assign gender representation as a responsibility to a member of the management team, as well as ensuring it is in the HR department's portfolio. Encourage gender diversity to be championed by both men and women in the whole organisation.
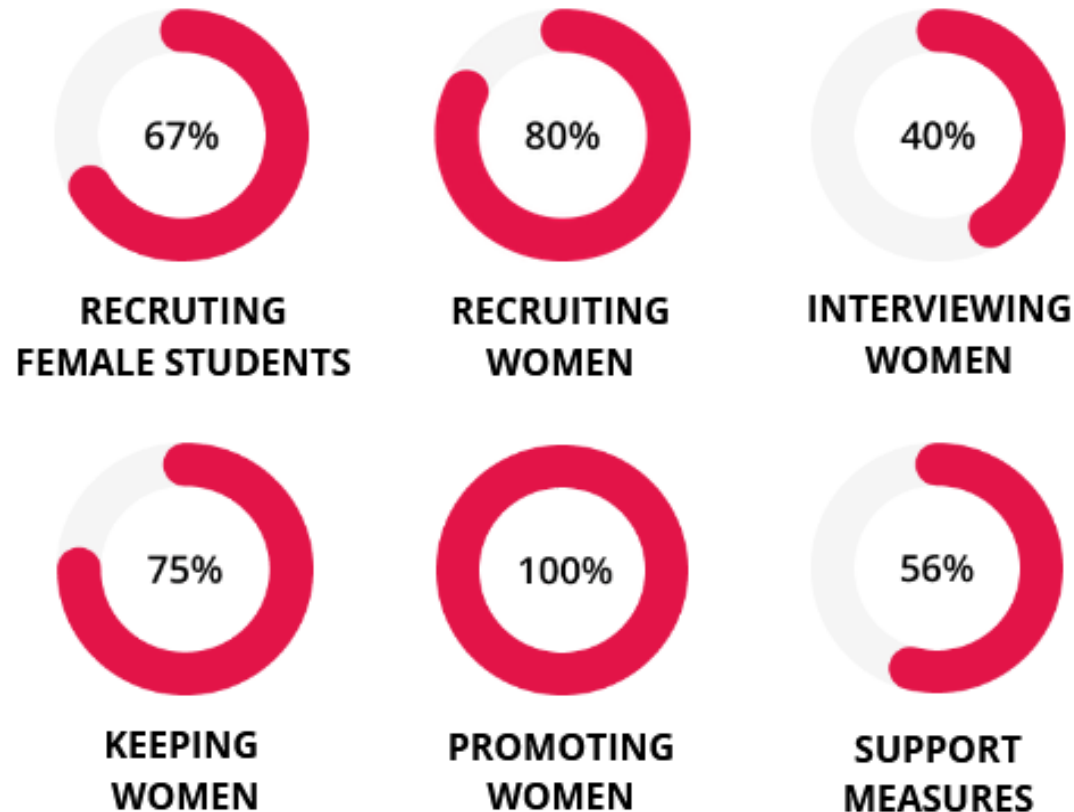
Support the creation of departmental and institutional policy that takes into account the number of children when comparing CVs in all instances related to hiring and promotions.

Develop a special program for extra tenure-track positions for high potential talent, where the recruitment criteria are based on excellence rather than topic. Consider at least an equal number of female candidates for these positions.

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Monitoring actions

■ Percentages of the achieved levels of suggested actions from the six sections are presented for the Institute of Informatics.

67% RECRUTING FEMALE STUDENTS

80% RECRUITING WOMEN

40% INTERVIEWING WOMEN

75% KEEPING WOMEN

100% PROMOTING WOMEN
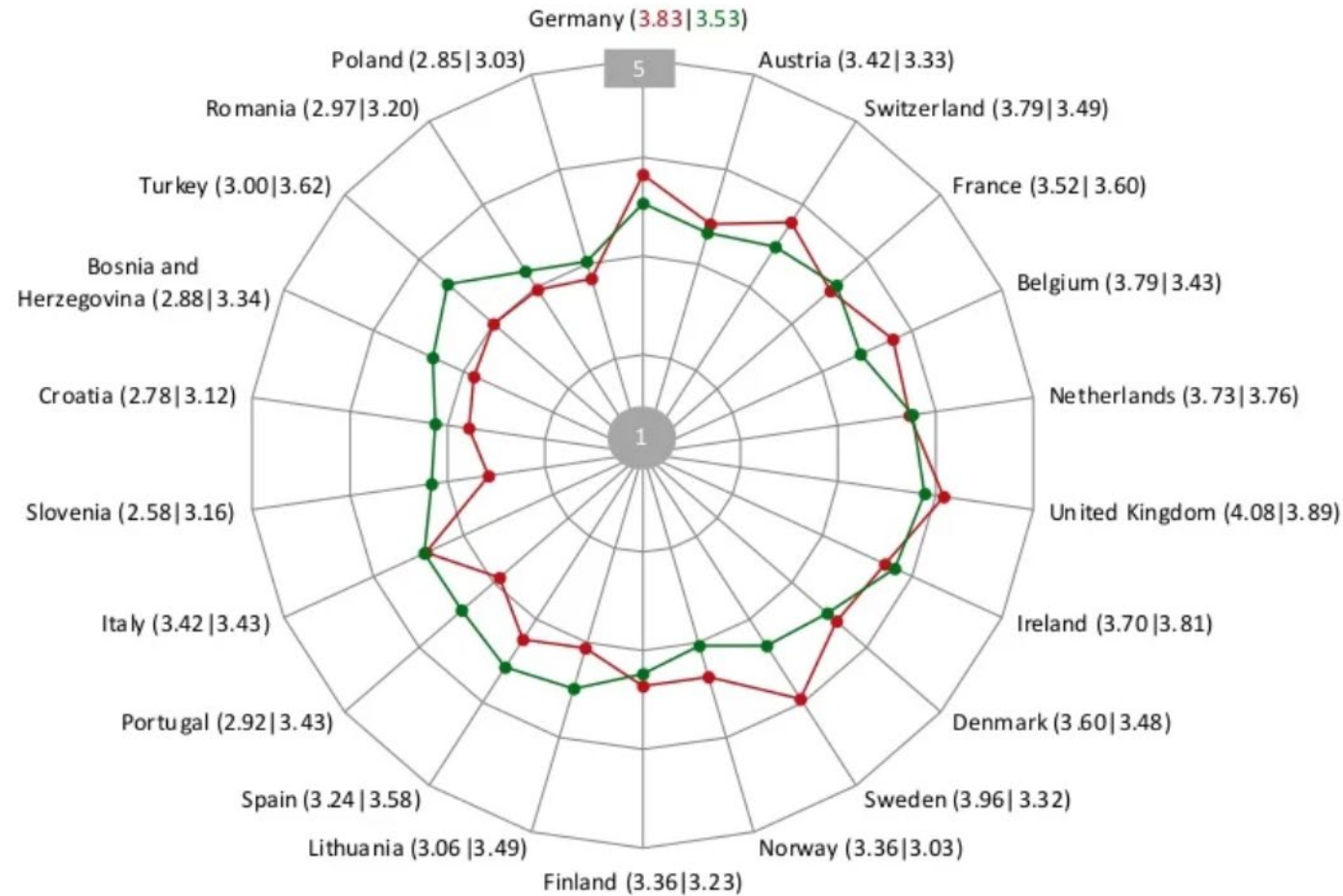
56% SUPPORT MEASURES

LET'S NOT STOP AT
GENDER EQUALITY,
BUT CONTINUE
WITH DIVERSITY, EQUITY AND
INCLUSION.

DEI is heavily discussed in the UK, Ireland, Sweden, Belgium, Netherlands, Germany and Switzerland, but less prevalent in Southern and Eastern Europe

—●— DEI is heavily discussed in the communications profession in my country

—●— I have followed the global trends and debates about DEI in organisations closely

www.communicationmonitor.eu / Zerfass et al. 2022 / n = 1,448 communication professionals from 22 countries.

Q 10: To what extent do you agree with the following statements? Scale 1 (Strongly disagree) – 5 (Strongly agree). Mean values.

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