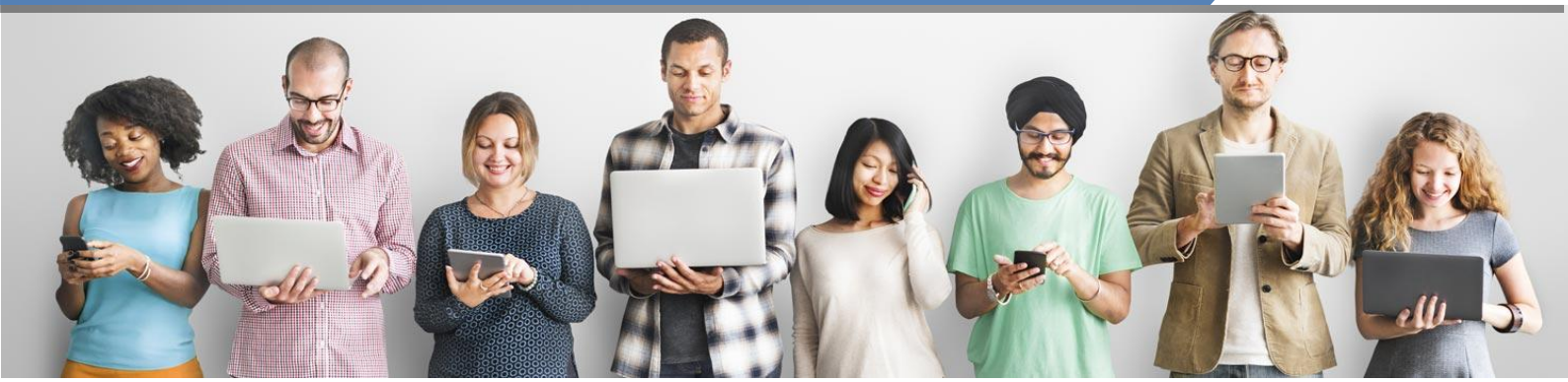
Executive Summary

Promoting Integration & Diversity In The Digital Labour Market

February 2019



- The diversITy project carried out an evaluation and assessment of ICT skills and training programmes to support diverse populations to enter the labour market. It identified and analysed ICT training programmes that aim to prepare and place jobseekers into meaningful tech jobs, with a focus on diverse target groups, including women, youth at risk of social exclusion or from difficult socio-economic backgrounds, migrants or unemployed adults changing careers. The target countries are Germany, France, the United Kingdom, Ireland, Spain, Poland and South Africa.
- The work product of the diversITy project aims to inform policy development on the European and national level and provide practical recommendations to non-profit organisations and training providers. An initial assessment and evaluation of identified ICT skills training programmes in the target countries produced a repository of 96 inclusive programmes of which 22 Good Practice Showcases (GPS) with brief descriptions available on the diversITy online repository at www.eskills4diversity.com.
- The ICT job market is growing rapidly and with it the need for qualified personnel. As of today, the gap between demand and supply of ICT jobs is widening yearly. The challenge for education, industry and policy makers is to fulfil the rising demand of skilled ICT workers. At the same time, an unfulfilled potential of a diverse population is left untapped. ICT workforce potential can be found among women, adults in career transitions, young persons at risk of social exclusion, not in education, employment or training, or persons from difficult socio-economic backgrounds such as minorities or migrants.

Diversity in the Workforce

Diversity in the workforce / workplace describes companies hiring employees from different backgrounds, regardless of race, religion, culture, gender, sex, education, disability or other. Companies that create inclusive workplaces are more successful and a relationship between diversity and business performance persists.[1] Higher levels of diversity also bring competitive advantages for companies to attract and retain diverse talent. Diverse groups the report has taken into account were young people not in employment, education or training (NEETs), women, minorities, people from socio-economically disadvantaged backgrounds and people with disabilities.

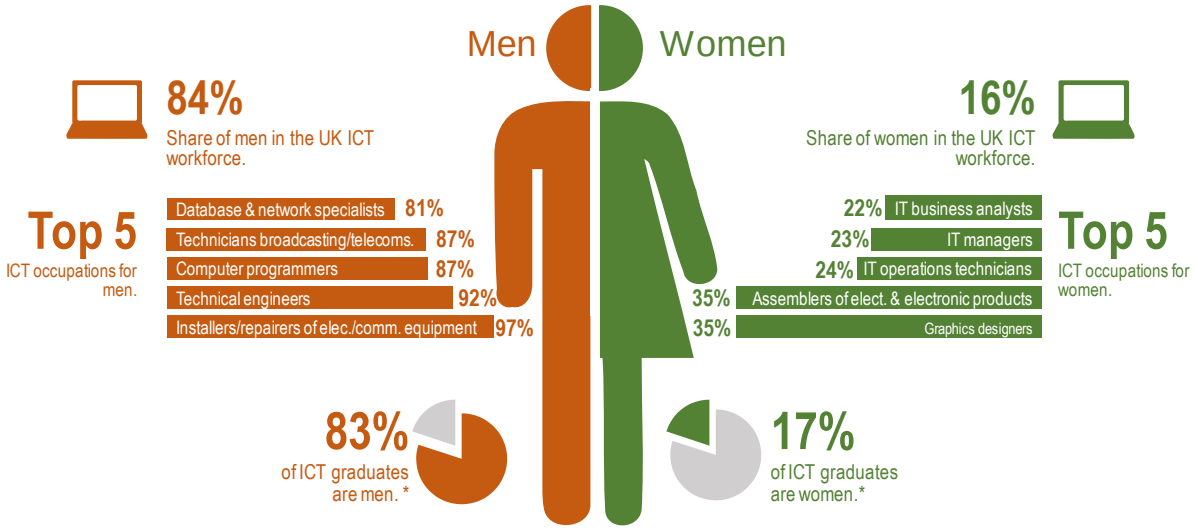
The average amount of NEETs (aged 15-24 years) in Europe (EU28) is 11.6%. Some of the assessed countries have higher rates (France, Ireland, Spain), while others are slightly below (Poland, UK). The two outliers are Germany, with a low rate of 6.7%, and South Africa with a high of 31.2%[2].

Gender diversity in the ICT workforce is a challenge. The share of women in the ICT workforce in Europe is only 16% versus 46% of the entire workforce. Only around 19% of computer science students are female and this low level of representation persists through higher education and in the workplace. The following figure shows the example case on gender diversity for the UK also providing information on the top 5 ICT occupations for men compared to those for women. The comparable figures for the other countries under review as to the share of men and women in the ICT workforce and their respective share among the ICT graduates are at very similar levels.

[1] McKinsey (2018) Delivering Through Diversity. Retrieved from: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Organization/Our%20Insights/Delivering%20through%20diversity/Delivering-through-diversity_full-report.ashx

[2] Eurostat data, for South Africa OECD data and Department of Higher Education and Training (2018) 'Fact Sheet on NEETs'. Pretoria. Department of Higher Education and Training.

Is the ICT labour market diverse? – Example UK 2017



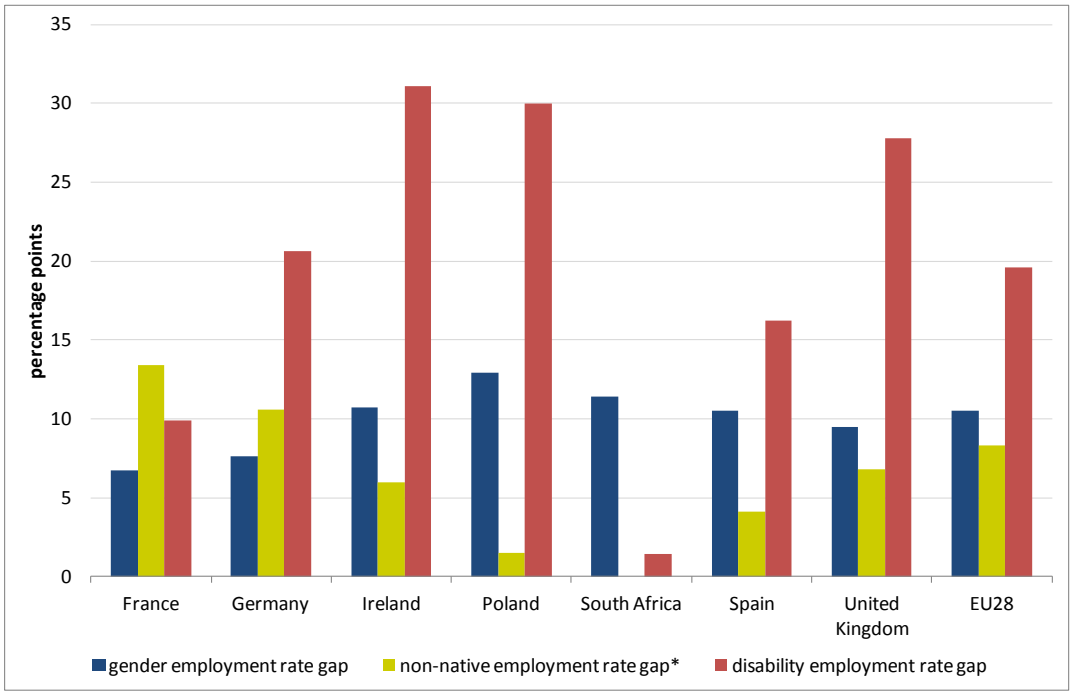
Source: *empirica calculations (2018) based on Eurostat data and ONS data. * = Bachelor's or equivalent level*

Across the EU28, the average gender employment rate gap, the difference between the overall level of employment for women and men, is 10.5 percentage points. In France it is 6.7, Germany 9.5, Spain 10.5, Ireland 10.7 and Poland 12.9. South Africa's gender employment gap is 11.4.

The labour market situation for minorities is reflected in the non-native employment rate gap, the difference between the native-born EU employment rate and the non-native-born EU employment rate. The average EU 28 gap is 8.3 percentage points. Germany has a gap rate of 10.6, France 13.4, UK 6, Ireland 6.8, Poland 1.5 and Spain 4.1. This indicator does not apply to South Africa and comparable data was not to come by.

In terms of people with disabilities participating in the workforce, the disability employment rate gap indicates the difference between the employment rate of disabled and non-disabled people. On average, the EU28 disability employment rate gap is 19.6 percentage points. Ireland's gap is at 31.1, Poland's at 30 and the UK's at 27.8. Germany's gap is at 20.6, Spain at 16.2, and France at 9.9. In comparison, South Africa's gap is only at 1.4. It shall be noted, however, that the definition of "disability" varies heavily between these countries.

Employment rates among different groups in the EU28, European Countries and South Africa -2017



Source*: empirica (2018), based on Eurostat, OECD and Statistics South Africa Data*

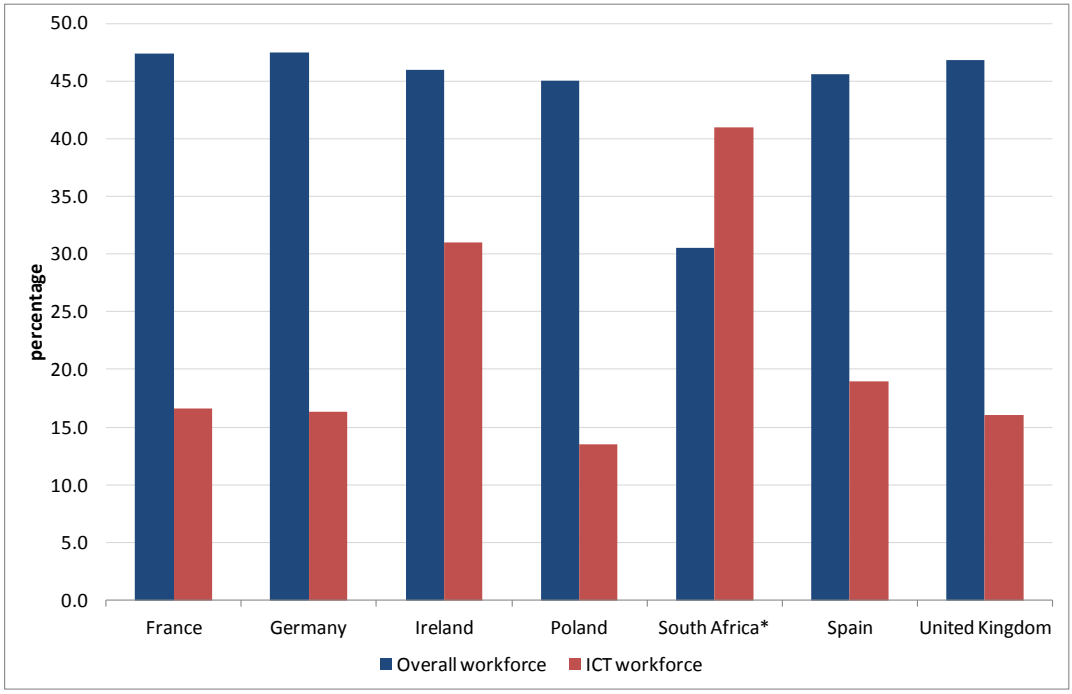
* does not apply for South Africa

Diversity in the ICT workforce

Despite the prominence of the topic "diversity", and specifically gender diversity for many years, the share of women in the ICT workforce is still low. In only three EU member states, the majority of scientists and engineers are women: Lithuania (58% female), Bulgaria (54%) and Latvia (52%). Especially in comparison to the share of women in the overall workforce, this is worrying. Of the six European countries, the one with the smallest difference between ICT and overall workforce is Ireland. Interestingly, South Africa's composition of the overall workforce features less women than its MICT sector. In all countries under review, two things have become evident: 1) the workforce outside of core ICT occupations, e.g. media industry, or interdisciplinary fields like bio-informatics is much more gender diverse (30%+) and 2) Ireland and Spain, the two countries with the highest proportion of women in ICT (of the six European countries), also have the highest share of "core ICT practitioners at associate/technician level". This leads to the conclusion that representation of women in the core ICT sector is bound to low qualified jobs on one side and a considerable image problem on the other side. While many women appear interested in tech-related jobs, core ICT topics appear uninteresting to them. Causes for this can be found in cultural perceptions of women in ICT but further in the lack of attraction of classic ICT education.

For the other target groups, reliable and comparable data does not exist.

Percentage of women in the overall workforce and ICT workforce in European countries and South Africa -2017



***Source**: empirica (2018), based on Eurostat and Statistics South Africa data*

* South Africa includes MICT sector (Media, Information and Communication Technologies)

The ICT workforce: demand today and in the future

Based on our calculations, the six European countries under review in our study are today facing a shortage of 477,000 ICT specialists at different skills levels. This could increase up to 1.26 million in 2020 and 1.67 million potential vacancies in 2025. According to labour force survey data broken down by the ISCO classification (international standard classification of occupations), currently the majority of these jobs is available for mid level skills (47.9%) and low level skills (30.7%). Positions requiring high level skills make up 21.4% of the workforce.

At the same time, ICT professionals in management, architecture and analysis, the high level skills, experienced the biggest growth since 2011, 11.9% per year. Lower level skill positions such as mechanics and servicers, also increased by 8.2% per year.[3]

Diversity in ICT education and training: inclusive ICT training programmes

Based on a comprehensive survey, the diversITy project identified over 400 ICT skills training

[3] Eurostat data, for South Africa see Adelzadeh, A. (2017) 'Modelling Future Demand and Supply of Skills in South Africa. Technical Report: 10 Year Skill Demand and Supply Forecast', Report prepared for the Department of Higher Education and Training, Pretoria.

initiatives in the seven countries aiming at underrepresented and target groups. In the end, 22 training projects were selected as 'good practice showcases' (GPS). During the assessment, six types of training were identified based on content of the curriculum, duration, the way of teaching and the accessibility: Classroom, Online, Bootcamps, Workshops, Experiential, and Mentorships. Most GPS use combinations of these or multiple methods that address different training needs such as cognitive and non-cognitive (transversal) skills, or experience.

400+

ICT skills training initiatives in 7 target countries

Country	Identified	Target Fit	Selected	GPS*
Germany	66	38	14	3
France	59	40	22	4
Spain	115	65	15	3
Poland	47	29	18	3
UK	57	29	10	3
Ireland	92	63	10	3
South Africa	51	38	17	3
Total	487	302	106	22
*GPS = Good Practice Showcase				

The report identifies advantages and barriers of various training taxonomies and provides examples of existing training programmes applying these various types.
While most promising training programmes include a mix of taxonomies, the highest success for learners can be found among such programmes offering mentorships and experiential training. Key factors in the success of programmes are affordability, accessibility, flexibility in curricula according to industry demands, and work placements.

- ***Classroom:*** Traditional, instructor-led training in a classroom setting.
  Example Programmes: Web@académie, Maharishi Institute, Code First: Girls
- ***Bootcamps:*** Intensive training programmes generally lasting for a few days to several months.
  Example Programmes: WebForce3, Code4Jobs BKK Bootcamp
- **Workshops:** One to three days training sessions on specialised topics.
  Example Programmes: ReDi School, BBC Make it Digital, TecnoLab
- **Online:** Training on online platforms, includes but is not limited to massive open online courses (MOOCs).
  Example Programmes: NetAcad, Empleo Digital, Wild Code School
- **Experiential:** A mix of technical and experiential learning, including classroom-oriented learning and company placements.
  Example Programmes: Simplon.co, Fast Track to IT, Generation
- **Mentorships:** A mentor responsible for providing 1:1 guidance in inclusive training programmes.
  Example Programmes: IT for SHE, JOBLINGE goes MINT, Maisons Digitales

The taxonomy of inclusive ICT training schemes and their advantages and disadvantages as well as the GPS themselves are further described in the full final report. More comprehensive GPS descriptions can be found on the online repository.[4]

The inclusive ICT training programmes identified address different **target groups**. These include:

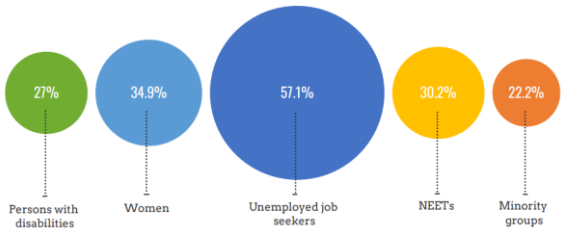
- Women
- Unemployed job seekers

[4] diversITy online repository at www.eskills4diversity.com.

- NEETs
- Low income
- Career changers
- Minority groups
- Refugees
- Persons with disabilities.

An illustration example for Spain is provided here.

Target groups of inclusive ICT training programmes – Example Spain 2018



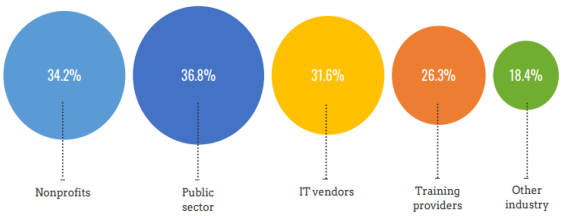
Source: *empirica (2019): diversITy - Promoting integration & diversity in the digital labour market (Final Report)*

They also include **different types of actors** in different constellations such as:

- Training providers
- Public sector / government
- Nonprofits
- IT vendors
- Other industry
- SMEs
- Unions.

The example case of stakeholder active in inclusive ICT training programmes in Germany is included here.

Stakeholder active in inclusive ICT training programmes – Example Germany 2018



Source: *empirica (2019): diversITy - Promoting integration & diversity in the digital labour market (Final Report)*

More comprehensive information on these topics for all countries under review are provided in the final report.

Policy

Developing key priorities for inclusive ICT policies and addressing the issue of ICT training, job placement and sustainable labour market integration for a diverse tech workforce requires coordinated and joint action. Governments in the countries under review have announced and launched different types of policy strategies to address these challenges. Many of these strategies have either been launched recently and are therefore difficult to assess, or they set the policy framework (and nothing more) for things to happen in the future. Several of these policy strategies are associated to funding programmes (national as well as European ones) which provide opportunities for the creation of inclusive ICT training programmes.

In brief, the overarching principle of advisable policy actions includes such policies that provide a financial framework for stakeholders to act in. One of the more successful measures is the **Grande École du Numérique** whose model could be replicable in other countries. It is a multi-stakeholder partnership founded by the Ministry for the Economy and Finance in **France** which aims to promote development of innovative ICT training offers outside of the business schools and technical universities. Its main approach is issuing a label to ICT training programmes that meet a range of criteria concerning inclusiveness and diversity. Providers of labelled programmes can receive a grant of up to 80% of costs from Grande École du Numérique. The "Grande École du Numérique" label (GEN) is awarded per course and not per structure. The same project leader can apply for the certification of several training courses. The label is valid for three years.

Of the assessed countries, policy action varies heavily. While **Germany** focuses on the general labour market, industry and work, by integrating refugees into the labour market using ICT jobs, **Spain's** focus lies on the long term unemployed and socially deprived groups, using ICT to promote job opportunities.

Ireland, Poland and UK address the ICT challenge by focusing on their educational system: creating and expanding apprenticeships and traineeship and the vocational education system. UK's digital strategy prioritises public-private partnerships with both the industry and the NGO sector. It is accompanied by the Tech Talent Charter and local Digital Skills Partnerships.

Several of these policy strategies are associated to funding programmes (national as well as European ones) which offer more or less clear opportunities for funding specific activities in the area of inclusive ICT training for the creation of a more diverse workforce. These policy programmes set the policy framework (and nothing more) for things to happen.

Addressing the challenges arising from the ambition for a more diverse tech workforce through related inclusive ICT programmes at a large scale will require action to be taken at different levels (European, national, regional, local) and in different areas (curricula / programme co-creation, operation quality labeling, certification etc.).

European Commission

The European Commission has started a number of activities in the area of ICT skills development and training and diversity:

Women in Digital: This activity launched by the European Commission at the Digital4Her conference in June 2018 includes a larger number of actions as part of a Commission strategy that will facilitate an increase in the participation of women in the ICT sector and occupations. The actions will focus on three main areas: challenging stereotypes, promoting digital skills and education and advocating for more women entrepreneurs. Actions related to these focal points are to be implemented in the course of the next two years.[5]

The Digital Skills and Jobs Coalition (DSJC): The Digital Skills and Jobs Coalition brings together Member States, companies, social partners, non-profit organisations and education providers, who take action to tackle the lack of digital and ICT skills in Europe. Actions range from training unemployed people, giving MOOCs for teachers, offering coding classes for children or cutting-edge training for ICT specialists. The Coalition also shares and promotes digital and ICT skills initiatives through the European Digital Skills Awards which can be replicated and scaled up across Europe. Each year the European Commission highlights excellent initiatives that help improve the digital skills of citizens, the labour force, ICT professionals, girls and women as well as in education through the European Digital Skills Awards. A further European initiative - the Digital Opportunity traineeships scheme - which started in 2018 - is a pilot project giving students and recent graduates an opportunity to get hands-on training in digital fields such as cybersecurity, artificial intelligence, coding or digital marketing. Member States can support collaboration between the different actors in their country on developing digital skills by bringing them together in national coalitions. The Digital Skills and Jobs Coalition has established a Governing Board which provides strategic leadership and gives high-level advice to improve the functioning and the impact of the Coalition as well as monitoring its overall progress. The Governing Board advocates the views of the Coalition partners at European level, and acts as a link between pledgers[6], national Coalitions and social partners.[7] The Digital Skills and Jobs Coalition currently has around 400 members.

Skills Agenda for Europe: On 10 June 2016 the European Commission adopted a new Skills Agenda for Europe. The agenda aims to make sure that people develop the skills necessary for the jobs of today and tomorrow. In the Skills Agenda for Europe the Commission invited all Member States to develop national digital skills strategies by mid-2017 and to set up national coalitions to support their implementation. By 2019, officially 23 more or less active national coalitions exist under the umbrella of the pan-European Digital Skills and Jobs Coalition. The other EU Member States still lack these. To support the development of national strategies, a group composed of Member State experts has put together a menu of challenges to be addressed and potential actions that could form part of a digital skills strategy – the so-called "shared concept".[8]

Conclusion

The demand for skilled ICT workers at all levels is increasing rapidly. Consensus exists that action is needed to overcome the existing and continuously rising skills shortage and gap, which can be observed in all European countries and globally. Low-skilled school leavers, school dropouts, workers with outdated skills but also individuals with diverse backgrounds and women as a large untapped resource, provide enormous potential to alter and help close the skills gap. Inclusive training programmes, such as the ones assessed for this report, can help. Such training programmes are an important step of educational journeys. However, at present these are “too little and too few”. They need to become larger in scale and sustainable in operation.

Out of over 400 training programmes we looked at, 22 qualified as Good Practice Showcases. Many training programmes struggle to provide proper teaching methods and content to prepare

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5 Women in Digital: https://ec.europa.eu/digital-single-market/en/women-ict

6 Pledgers are Coalition members who submitted one (or more) pledge(s). A pledge is a concrete commitment to carry out an action to reduce the digital skills gap in Europe, addressing one of the identified challenges/actions mentioned in the Members Charter.

7 The Digital Skills and Jobs Coalition (DSJC): https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition

8 Skills Agenda for Europe: https://ec.europa.eu/social/main.jsp?catId=1223

individuals from diverse target groups for the ICT track and career. This needs to change. A systematic overhaul of many existing programmes is needed in terms of content structure, teaching methods, collaboration with industry partners and/or the formal educational system.
Moreover, there is a need to better integrate ICT skills training in existing educational streams and at the same time, due to fast pacing developments in ICT industry, education and training need to become more flexible and up-to-date. Here inclusive ICT training programmes have an advantage compared to formal education and training.

Sustainability

In the course of this report, we have identified a number of inclusive ICT training programmes, many of which developed interesting approaches and promising concepts. Unfortunately some of these programmes struggle to continue due to difficulties in funding. Thus, sustainability should be a top priority in designing inclusive ICT training. The key to sustainability lies within strong collaboration of industry, policy and providers, to establish the necessary structures. These structures are of financial, bureaucratic and practical nature.

Aspects for training programmes include:

- work with the right partners, specifically from industry as (potential) future employers,
- design and update programmes together with industry,
- link to vocational education and training (VET) to make best use of a promising pathway to employment with the chance for their students to obtain a universally recognised formal degree,
- closely cooperate with employment agencies and obtain necessary accreditations to be able to secure long-term funding,
- decide on whether and how certification can add value,
- make use of tax-based or other types of government instruments for incentivising and funding training activities in general and specifically inclusive ICT training programmes and where appropriate.

Practital experience

The most important aspects of training are mentorship and practical experience. It is necessary to develop long lasting concepts of up-to-date curricula, work placement integration and financial incentives and structures through governments which can help create the necessary eco-system of actors needed and provide the necessary framework conditions and a sufficient (financial) basis for operation.

For training providers two of the most important aspects of training are:

- teach “transversal” skills in addition to technical ICT skills,
- implement well functioning mentorship using role models.

Furthermore, it is of the utmost importance to raise the awareness of diversity, and at a young age promote career pathways including vocational education and training and apprenticeships to children and their parents to help them make informed choices.

Policy instruments and industry input

In those cases where individuals have dropped out of the formal education system, more and larger-scale inclusive ICT training programmes need to be developed with the support from governments and industry addressed to these target groups and to make a difference and create significant impact. Governments need to provide funding channels and funding mechanisms with clear application criteria to training providers, while industry partners need to provide input into the development such criteria and offer help in the development of training programmes.

The future of ICT trainings

At the same time, permeability to formal education and training could help opening up further opportunities at a later stage and help secure jobs even more specifically in times of crisis.
While the demand of ICT jobs is already high and even growing, the potential for an inclusive workforce to enter the ICT labour market exists.

The present project has revealed that practitioners active in this field should consider – amongst others – some key points for the creation of a good inclusive ICT training programme. These require a team of actors to

- set up supportive policy and funding framework conditions together with an appropriate stakeholder eco-system,
- address the ICT and STEM ‘enrolment funnel’ to boost enrolment of girls and women in ICT and STEM, by promoting tech jobs and opportunities for girls from kindergarten to university and job

start in the labour market,offer activity spaces and funding for the co-creation and regular updating of inclusive ICT training programmes in partnership between training providers and industry,

- increase permeability of inclusive ICT trainings into the formal VET,
- develop light-weight certification options as quality labels for inclusive ICT training making it easier for graduates from inclusive ICT training programmes to enter the labour market. A first step would include commissioning the development of a 'guide to alternative certification' to training providers throughout Europe which would help to make best use of these,
- support setting up cross-organisational and cross-regional mentor networks,
- investigate whether tax-based funding can operate as incentive to further training in companies, and
- demonstrate good practice of inclusive ICT training programmes.

Key recommendations to improve diversity in the ICT workforce and inclusive ICT trainings

- **Skills Gap and Hiring Process**
  Many of the existing issues in the demand and supply of ICT labour are based on a skills gap of cognitive vs. non-cognitive skills and issues of skills matching. Existing degrees in the educational systems teach cognitive skills but lack non-cognitive ones. While the educational side of things needs to alter their curricula and adopt more transversal skills and include work placement, companies need to better understand the job market and their own job requirements. Using this approach, companies can attract and encourage different target groups that might have fewer technical skills but are highly motivated to learn them. Companies need to overhaul their hiring processes. We found a widening discrepancy between job descriptions and actual job requirements. The assessment of job requirements also feeds into the development of future ICT "skills profiles".
  The **European e-Competence Framework (e-CF)** is recommended for use here. In 2016, the e-CF became a European standard and was published officially as the European Norm EN 16234-1. The e-CF provides a reference of 40 competences as applied at the Information and Communication Technology (ICT) workplace, using a common language for competences, skills, knowledge and proficiency levels that can be understood across Europe. It is associated to 30 European ICT Professional Role Profiles built on the e-CF. These provide a generic set of typical roles performed by ICT Professionals in any organisation, covering the full ICT business processes and would be helpful in developing "skills profiles" for inclusive ICT training activities.
- **Flexibility in Education**
  The traditional education route is still seen as the most trusted pathway into ICT labour, the majority of the ICT workforce consists of workers with a university degree background. Yet, industry complains about (a) the lack of up-to-date specific programming skills and (b) the lack of transversal skills. The underlying issue is the lack of work placements and the fast developing ICT landscape. In order to meet these demands, a new flexibility in the traditional education would be required, i.e. more work placements for students and a higher flexibility in designing university curricula. Nevertheless, also other educational routes such as apprenticeships, and vocational education and training are often based on long lasting curricula as well.
- **New digital degrees, VET and apprenticeships**
  Based on a better understanding of industry demand and "skills profiles", new digital degrees can be developed, specifically non-tertiary degrees such as vocational education and training and apprenticeships. This approach could deliver a practically oriented workforce within a comparatively short amount of time. These types of degrees can be specifically attractive for the target group of NEETs or youth at the risk of social exclusion. However, not only the development of such degrees is key to the shortage of ICT workers. Currently, in many of the assessed countries, VET and apprenticeships are rather unattractive. A concentrated marketing campaign can address the lack of awareness. Yet, only industry can boost the attractiveness of such degrees, by allowing better career options and a better permeability into higher paid positions for existing workers.
- **Creating a Hub**
  One way of engaging stakeholders is by forming a system for effective communication toward collaboration, ensuring that programmes meet actual need, and expand, replicate, and share best practices. An example is the Tech Talent Charter in the UK, which is a commitment by organisations to

a set of undertakings that aim to deliver greater diversity in the tech workforce of the UK, one that better reflects the make-up of the population. Signatories of the charter make a number of pledges in relation to their approach to recruitment and retention.

- **Promote the Value of Diversity**
  More companies, especially SMEs, need to realise the value of a diverse workforce: Many studies have shown that diverse teams outperform others, generate more money and uncover more angles. Diversity is not restricted to the inclusion of women but also older, younger, and otherwise different (minorities, NEETs, different field of study) people. Policymakers together with industry need to make an effort to create and support programmes with the goal of including students from all underrepresented target groups.
- **Institutionalizing Data Collection**
  An institutionalised data collection whether on country or European level would help to better identify the existing and future supply and demand trends in ICT. Such regular audits would deliver empirical evidence on and a quantification of skills shortages and their relationship to skills produced and could directly feed into the educational and organisational system, e.g. based on "skills profiles".
- **ICT vendor certificates are important for young people and adults who want to transition into the ICT sector.** For career transitioning youth and adults, employers considered – specifically ICT vendor - certificates to be relevant for most technological job profiles. However, for most employers such certificates are only relevant if obtained from reputable national or international training institutions.
- **For individuals who do not have an academic degree and who dropped out of school or college, ICT training programmes should ideally introduce options of studying ICT-related subjects.** Evidence from our survey shows that most such programmes are targeted specifically to young learners. For younger cohorts, training programmes like these emphasise the importance of opening pathways to explore future possibilities in ICT education.
- **Job applicants with well-developed transversal skills are better positioned to be recruited by employers.** These transversal skills range from effective communication and coordination, problem-solving, negotiation, teamwork and collaboration, and decision making. Employers indicated that graduates and trainees with no prior work experience tend to lack such skills. The prevailing perception among employers is that higher education institutions in many countries do not sufficiently address the need for experiential or practical learning.
- **According to employers, ICT skills training should also address the development of behavioural and mind-set skills.** This approach helps to prepare trainees for actual situations encountered at work. One of the main reasons experiential trainings are successful is because they address a need employers feel is not being met by traditional educational institutions.
- **Mixed or integrated approaches to training are the most desirable for both trainees and employers,** particularly those in an experiential learning setting. However, only well-structured programmes with significant support from sponsors and businesses can provide this type of integrated training.
- **Business support is especially relevant for designing curricula of training programmes** for both technical and soft skill-sets because employer-driven programmes respond better to market demands for ICT and work-relevant skills.
- **Substantial long-term success can be achieved by integratability / connectivity to the local educational system.** Training programmes should achieve certifications that allow their learners to enter the traditional educational system.

Further information

For further details about our survey results and methodology, you can request access to our full report, forthcoming in 2018. For questions and queries, please contact:

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