diversITy Series

Promoting e-skills training for a diverse tech workforce

Country report for Poland

February 2019

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The *diversITy series* of reports presents information collected and compiled by empirica, supported by J.P. Morgan, on the technology skills training landscape in seven target countries: Spain, Germany, the United Kingdom, Ireland, Poland, France and South Africa. External sources of information and data have been credited accordingly where applicable.

The term *Information and Communications Technology* (ICT) *sector* used in this report refers to the technology or digital sector in all target countries.

The term *ICT skills* used in this report comprises two main categories:

ICT user skills: the capabilities required for effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not ICT. At the general level, they cover "digital literacy": the skills required for the confident and critical use of ICT for work, leisure, learning and communication.

ICT practitioner skills: The capabilities required for researching, developing and designing, managing, producing, consulting, marketing and selling, integrating, installing and administrating, maintaining, supporting and servicing ICT systems.

The term *ICT skills training* refers to programmes and initiatives aimed at improving or upgrading peoples' skills and knowledge in ICT user and practitioner skills.

The term *ICT specialists* refers to the European Commission's definition of ICT specialists as workers whose main job involves ICT and who can deal with a wide range of tasks concerning corporate ICT systems. The terms *ICT specialists* and *ICT workers* are used interchangeably in this report.

This report has been supported by the JPMorgan Chase Foundation, the contents and opinions in this paper are those of the authors alone and do not reflect the views of the JPMorgan Chase Foundation, JPMorgan Chase & Co, or any of its affiliates.

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Preface

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, people with migrant background or unemployed adults changing careers.

In the context of this study, the term ICT skills includes both, ICT user and ICT practitioner skills. However, more importance is given to ICT practitioner skills, which the European ICT skills Forum defines as, "The capabilities required for researching, developing and designing, managing, producing, consulting, marketing and selling, integrating, installing and administrating, maintaining, supporting and servicing ICT systems".[1]

The target countries are Germany, France, the United Kingdom, Ireland, Spain, Poland and South Africa.

The work product of the diversITy project informs policy development on the European and national level and provides 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. Brief descriptions of these 96 cases are available on the diversITy online repository, which can be accessed at www.eskills4diversity.com. In addition to the online repository of case studies, we produced seven country reports for each target country, analysing in-depth each country's ICT skills gap and unique training landscape. In each report we showcase a set of good practice show cases, setting a benchmark to foster exchange.

The diversITy project is part of the J.P. Morgan New Skills at Work initiative that aims to identify strategies and support solutions that help improve labour market infrastructure and develop the skilled workforce globally. This $250 million five-year global initiative, first launched in December 2013, brings together leading policymakers, academics, business leaders, educators, training providers and nonprofits with the goal of connecting labour market policy with practice, supply with demand and employers with the workforce.

We greatly acknowledge the support and collaboration of J.P. Morgan to produce this report.

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[1] See European Commission (2004), *e-skills for Europe*.

Executive Summary

- There is now evidence of persistent shortages in ICT specialists in Poland in spite of the large graduate output of the country's education and training system. The current shortage is about 40,000-50,000 ICT specialists.
- The country faces difficulties in attracting larger numbers of girls and women to embark on a career in ICT. Women are significantly underrepresented in the ICT workforce. Current trends in enrolment in ICT studies do not indicate any tangible improvement in the near future.
- There are significant mismatches due to a widespread lack of non-technical skills among graduates from traditional ICT programmes, such as project management ability and social skills. This implies that even if employees have ICT skills, they may lack the ability to use them effectively in modern work settings, e.g. in team work.
- In spite of notable improvements in youth unemployment, long-term unemployment and young persons not in employment, education or training (NEET) since the latest recession, persons from a disadvantaged socio-economic background still face significant barriers in finding quality employment.

Current developments in the ICT labour market in Poland

The Polish ICT workforce accounts for about 424,000 workers, or 2.6% of the total workforce. In absolute terms, this is the sixth largest headcount of ICT workers in Europe and the largest in Eastern Europe. Between 2011 and 2015, the number of ICT workers has grown significantly, with most of the growth coming from software developers & analysts and applications programmers.

The average annual need for new ICT specialists according to our model is about 24,000, the sum of expansion and replacement demand. This is less than the 34,700 ICT graduates produced each year by the country's education system, but it does not yet take account of the current vacancy backlog of 40,000-50,000.

Large numbers of ICT graduates leave Poland every year for countries with higher pay grades, such as Germany, the UK and the USA. The share of highly educated persons among emigrants from Poland has grown constantly and now includes significant numbers of ICT specialists.

Poland has traditionally one of the largest gender gaps in Europe. Women are significantly underrepresented in the total labour force and even more so in the ICT workforce. Young women are much less likely to choose ICT related subjects in university and vocational education. Underlying reasons include deep-rooted cultural norms and out-of-date value systems, including stereotypical views about what type of school subjects and jobs are best suited for girls and women. Moreover, when it comes to retention the lack of childcare facilities and regulatory disincentives such as lack of parental leave that is transferable between both partners and "financial support for families (i.e., in almost all cases, women) that provide long-term care to family members" discourage many women from taking up any paid employment or returning back to work after a family break.[2]

There is room for improvement with respect to the proportion of NEETs

17.2 % of the 20-34 olds in the EU in 2017 were neither in employment nor in education and training ('NEETs'). The proportion of NEETs ranged from 7.8 % in Sweden to 29.5 % in Italy with Poland with 17.1% in the middle. This compares to lower figures with 11.9% in Germany and 13.7% in the UK but higher ones in France (18.2%) and Spain (20.8%).[3]

The government response

The Polish government has initiated a range of policies to address these challenges. Government policies since

[2] European Commission (2017b) 'Country Report Poland 2017', p. 22

[3] Eurostat: Statistics on young people neither in employment nor in education or training (28 August 2018): https://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_young_people_neither_in_employment_nor_in_education_or_training

2015 and recently since 2018 reflect awareness, in particular, of the need to better match skills production in the education and training system with the ICT skill needs of employers. Opening up careers in ICT to a wider range of young persons, including women, and other members of groups currently underrepresented in the ICT workforce, is another focus area. Moreover, and over the last 10-15 years, the Polish education system has undergone two reforms which have introduced significant changes to the vocational education and training system (see next paragraph).

Priority is given to reform of the vocational education system to enable it to better respond to labour market needs while offering novel pathways into employment for people at risk of exclusion. This process, however, will take many years to create tangible impact. Little can be said at the moment about whether the reforms will achieve the desired results.

Programmes for addressing unemployment and skills shortages in Poland are mainly organised in the context of the Operational Programmes (OPs) for using European Structural Funds, the main source of funding for this type of activities. The current set of OPs puts strong emphasis on inclusive ICT training, for which substantial financial resources have been made available.

The inclusive ICT training landscape

ICT is currently the most popular field of study in Poland. There are more than 800 fields of study in the ICT domain. While there are multiple pathways for individuals to gain entry into the digital labour market university degrees are still the most common. 70% of ICT specialists have an academic degree.

Employers are increasingly willing to hire graduates from areas other than ICT. The shortage of ICT skills has had the result that candidates who completed secondary education but have not gone on to pursue higher education, and who have obtained ICT skills through non-formal or short-cycle courses, have good chances of finding employment in entry-level ICT specialist jobs. This is opening up new opportunities for inclusive ICT training programmes.

More and more private sector companies have embarked on partnerships with vocational schools. Their main objective is to be able to influence future availability of skilled staff. This is achieved through co-operation in drafting of curricula and by offering work placements in the form of apprenticeships. Companies can also take patronage of a school class at local vocational school.

Progress is needed in the domain of vocational education and training (VET). In general and also for persons from disadvantaged socio economic backgrounds, VET is a possible traditional pathway into labour, due to the financial burden of academic education and the non-fulfilment of educational entry requirements. However, feedback from employers suggests that graduates from vocational ICT programmes are insufficiently prepared even for entry positions in ICT specialist occupations. There is a need for an adaptation of the VET system in Poland to ensure necessary quality of training.

Industry-driven ICT training programmes are of special relevance for youth and adults without the qualification required to enter one of the traditional pathways into ICT. Programmes such as Coders Lab and Ericsson's Software Development Academy (SDA) offer intensive courses designed in close collaboration with employers from the ICT sector.

Co-operation between such programmes and stakeholders from the social NGO sector is required to give persons from a disadvantaged social background access to such programmes. Coders Lab's cooperation with NESsT Empowers, an NGO-driven initiative for targeting groups at highest risk of social exclusion, shows how this can be achieved.

Employers demand that applicants have well-developed soft skills in addition to digital skills. For this reason, exposure to the digital tech sector itself is seen as crucial to support someone into employment. Such exposure can take the form of a work placement which is part of the training course, or an apprenticeship where training and work experience are combined throughout.

The quality of work placements in the context of ICT training schemes in Poland is often low. Available evidence suggests that improvements are needed in terms of the average length of the placement, the level of integration of learners in the work process, and support offered to them by mentors assigned.

SMEs face barriers in offering work placements due to lack of resources, lack of experience, lack of a suitable curriculum, risk of losing of trained apprentices after completion, and lack of perceived benefits. **A major challenge in both tertiary and vocational education is the low share of women embarking on careers in ICT**. While Poland ranks 5th in the EU for female scientists and engineers (STEM), this does not translate into ICT careers for women. There still seem to be stereotypical views about women in the ICT domain.

A number of NGOs, industry stakeholders and state agencies have taken the initiative to explore alternative options. They have started to demonstrate the potential for innovative approaches to ICT training focusing on groups currently underrepresented in the ICT workforce.

Poland has a very strong community of engaged citizens who are working, in particular, to promote equality of chances for women in ICT education and the digital workforce. They are carrying out a large range of activities, many of which by women working in ICT and keen to reach out to girls and young women at a time when they make career choices. Successful examples include "Perspektywy" Education Foundation, the organiser behind the "IT for SHE" initiative.

Inclusive ICT training schemes are unlikely to achieve sustainability if employers are asked to absorb costs. One of the main competitive advantages of the ICT sector in Poland is related to low costs in comparison to other countries. Cost-efficient models for inclusive ICT training are therefore required. Different models are explored to this end, such as public subsidies, fellowships, third-party charging and student loans.

Key Recommendations

Promote ICT careers to women

- Modes of training need to be adapted to the need of learners for flexibility and support. Poland has a large share of women who state that they would like to take up a job but are prevented from doing so due to family commitments. ICT training programmes should therefore provide for as much flexibility as possible, making extensive use of ICT (e.g. eLearning) for this purpose.
- Provide more childcare facilities and regulatory incentives (e.g. parental leave that is transferable between both partners) and financial support for families that provide long-term care to family members to encourage women to take up paid employment or return back to work after a family break
- Changing deep-seated misconceptions about women's suitability for tech jobs and the lack of child care facilities for working women and men will require a consistent, strong effort from all major stakeholders.
- The power and creativity of existing communities of activists should be leveraged. Their experience is of great value for giving groups currently underrepresented in the ICT workforce a stronger voice, and for experimenting with novel ways to boost diversity and inclusiveness.

Offer better support to SMEs and training providers to engage them in inclusive ICT training

- A comprehensive support system is required to address the main barriers which keep SMEs from stronger engagement in inclusive training.
- For arranging such a system, multi-stakeholder partnerships at local and regional level have been shown to be most effective.
- The many small specialised providers contracted to operate ICT training programmes have limited capacity to deal with the special challenges posed by the demand for inclusiveness. They require effective, hands-on support to deal with minority groups with which they have had little experience so far.

Open up industry-driven training programmes for people from groups at risk of social exclusion

- Commercial training providers will require some kind of financial arrangement to cover the participation fee as learners are typically not able to afford them.
- In addition, teaching methods, content and support structures may need to be adapted to take account of the needs of, for example, at-risk young people.

- New funding models need to be developed in co-operation between commercial providers and NGOs operating in the social and education domains.

Improve the provision of work placements and mentorship

- Innovative measures need to address structural, bureaucratic and financial barriers to SMEs offering of work placements.
- Industry stakeholders, providers of training and education, NGOs and government should engage in a concerted effort to boost the quality of work placements across all sectors.
- The ICT sector should explore the possibility of launching a larger number of patronage classes, a form of collaboration between employers and VET schools which is showing much promise.
- For increasing use of mentorship, innovative models may need to be developed, such as cross-organisational and cross-regional mentor networks, possibly operating online only.

Improve evaluation and statistics

- There is the lack of serious evaluation of learning interventions, especially those conducted under OPs and funded from the European Structural Funds. Little is known about their impact in terms of employment and career building.
- Research is required on reasons why learners are dropping out, gaining employment or starting own businesses, and why some employers invest in ICT training while others stay inactive.
- Regular up-to-date insight into skills shortages and their relationship to skills produced by the education and training system are required for stakeholders to take the best possible decisions. For instance, training providers need the best information they can get about current and expected future demand for skills. Currently, one-time examples of such reports exist, e.g. NESsT 2017 report on “Closing the Skills Gap in Poland” and FIT Ireland’s “ICT Skills Audits”. Yet, this form of reporting must be institutionalised.

Introduction

Poland's ICT industry has grown substantially since the last recession, as have many of the other sectors depending heavily on ICT expertise. There is now evidence of persistent shortages in ICT specialists in Poland in spite of the large graduate output of the country's education and training system. One possible way to mitigate the problem, widely discussed among stakeholders, is to provide ICT career opportunities to groups of people currently underrepresented in the digital workforce, such as women, persons from a challenging socio-economic background, and people with disabilities. We conducted a comprehensive survey to determine the impact and challenges of inclusive e-skills training programmes for diverse groups to enter the digital labour market in Poland. In this report, we provide an analysis of our main findings.

According to current estimates, Poland has a shortage of 40,000-50,000 ICT specialists. Shortages exist in relation to a number of occupations from entry level positions to highly qualified.

Reasons for this shortage are manifold:

Many ICT specialists with academic degrees often end up in sectors like banking or public administration, not making it to ICT labour market. Others tend to leave the country for higher salaries in Western European countries.

At the same time, lower skilled positions are unfilled because many people at working age are either outside of the labour force, unemployed or in low-paid, precarious forms of employment.

Here, the vocational education system and training programmes have been lacking behind the development of adequate curricula to meet industry demands.

In spite of economic growth much above the EU average, the share of NEET youth in Poland is at the level of the EU28 average, indicating continuing problems in placing young persons into employment.

A large share of Poland's adult labour force lacks basic ICT skills. Over 40% of active adults have no ICT experience, by far the highest figure in the OECD countries. The figure is all the more troubling given the fact that Poland produces some of the world's best programmers and also has become Europe's largest market for IT outsourcing.

In the recent past the country has experienced one of Europe's largest emigration waves. The number of Polish citizens residing temporarily abroad has exceeded 2 million ever since 2007.[4] The share of highly educated persons among emigrants from Poland has grown constantly and now includes significant numbers of ICT specialists. In response, Polish Minister of Development Mateusz Morawiecki in 2016 asked skilled Poles living abroad to return to Poland. However, unless working conditions (e.g. salaries, flexibility and support for women) do not improve, this remains an unanswered request.

The country faces serious difficulties in attracting larger numbers of girls and women to embark on a career in ICT. Young women are much less likely to choose ICT related subjects in university and vocational education. As a consequence, women are significantly underrepresented in the ICT workforce.

Independent analysis found mismatches due to a widespread lack of non-technical skills among graduates from ICT programmes, such as project management ability and social skills. This implies that even if employees have ICT skills, they may lack the ability to use them effectively in modern work settings, e.g. in team work, complex problem solving skills[5].

The Polish government has initiated a range of policies to address these challenges. For example, the vocational education and training sector has been subject of several rounds of reform over the last 10-15 years. The main objective is to improve the match of graduate skills with employer needs, for example by involving employers much closer in the design and operation of training programmes.

Even if these reforms turn out to achieve the desired results, it will take many years before the changes will be reflected in the quality and quantity of graduate output.

In this situation, a number of NGOs, industry stakeholders and state agencies have taken the initiative to explore alternative options. They have started to demonstrate the potential for innovative approaches to ICT training focusing of groups currently underrepresented in the ICT workforce. Our investigation of the inclusive ICT training landscape in Poland found a range of successful and promising approaches.

Section 1 of this report presents a snapshot of Poland's ICT workforce today and a forecast for its development over the coming years. Section 2 provides an overview of the current diversity situation in Poland's labour market, with a focus on the ICT workforce. Section 3 summarises policies and frameworks introduced by the government sector to address ICT skills shortages. Section 4 presents the findings from the survey of existing inclusive ICT skills

[4] Główny Urzad Statystyczny (2013) 'Informacja o rozmiarach i kierunkach emigracji z Polski w latach 2004–2012'

[5] For more details see: OECD: Skills for Jobs Database: https://www.oecdskillsforjobsdatabase.org/index.php#PL/

training programmes. It provides a brief look into the pathways available to gain an entry into the digital labour market and investigates the success factors and challenges of a suggested training taxonomy. In the last section, we offer recommendations to key stakeholders for future action.

1

ICT Skills Forecast

The Polish ICT workforce accounts for about 424,000 workers, or 2.6% of the total workforce. In absolute terms, this is the sixth largest headcount of ICT workers in Europe and the largest in Eastern Europe. Between 2011 and 2015, the number of ICT workers has grown significantly, with most of the growth coming from Software developers & analysts and Applications programmers. The average annual need for new ICT specialists according to our model is about 24,000, the sum of expansion (13,300) and replacement demand (10,600). This is less than the 34,700 ICT graduates produced each year by the country's education system, but it does not yet take account of the current vacancy backlog, which is estimated to be about 40,000-50,000. Moreover, large numbers of ICT graduates leave Poland every year for countries in which pay levels are higher, such as Germany, the UK and the USA.

Baseline figures and forecast for Poland

The ICT skills challenge for Poland

According to Cedefop, the EU agency responsible for the development of vocational training, ICT is a "high shortage occupation" in Poland. Cedefop estimates the shortage at 40,000-50,000 people (see Box 1 below).[6]

Data from the BKL Study ("Bilans Kapitału Ludzkiego", Human Capital) project, a research collaboration between the Polish Agency for Enterprise Development and the Centre for Evaluation and Analysis of Public Policies of Jagiellonian University, is useful for shedding further light into supply and demand of ICT-related skills in Poland. It also indicates substantial skills mismatches.[7] According to this study's findings, challenges in the ICT sector are not only related to technical skills but also to project management skills and social skills which are required to enable effective teamwork. It follows that in order to be successful, inclusive ICT programmes need to take account of the requirements of employers in terms of the mix of skills required from job applicants.

The number of employed ICT specialists grew by 3.4% from 2011 to 2015 (exponential growth assumed), which is similar to EU28 (3.5%). In total numbers, this figure translates into 13,300 more ICT specialist jobs per year (linear growth assumed) over the period.

Figure 1 depicts the distribution of ICT specialists across economic sectors in Poland. Compared to EU averages, Poland's ICT workforce is somewhat skewed towards the ICT sector, which employs 46% of all ICT specialists (EU: 41%). On the other hand, the ICT workforce share of the professional services sector is smaller than the EU average (7% in Poland versus 11% in EU), which reflects the fact that this sector is comparatively little developed in the country. In the other sectors, the shares tend to be similar.

A closer look at the development of the number of jobs for individual ICT occupations (see Table 2) shows that the largest relative growth has taken place for occupations Telecommunications engineers (28%

Box 1 The ICT skills challenge according to analysis by Cedefop

"Greatest shortages are observed in relation to programmers, network and computer systems administrators, installers and servicing of computer systems. [...] Shortages result from three overlapping factors. While the number of graduates from all forms of education covers the current demand for new workers in the ICT sector, the quality of education is not always tailored to the needs of the market. This is particularly noticeable in the case of vocational education, where training programmes are based on the core curriculum developed before 2012, resulting in education not entirely corresponding to the current state of developments in ICT. The second factor stems from the spread of ICT technologies across all economic sectors. As a result, most ICT specialists in Poland are employed by the e-commerce sector, banking and public administration, sectors which often offer better working conditions than ICT companies. The third factor is the difference in salaries between Poland and Western European countries, which means that in the absence of other barriers, specialists, especially those that are highly qualified, often decide to work abroad. The combination of these three factors results in an ever-present shortage not only of ICT workers, but also of ICT skills in general. It is estimated that this shortage ranges from 40 to 50 thousand employees."

Source: Cedefop Skills Panorama, 10/2016

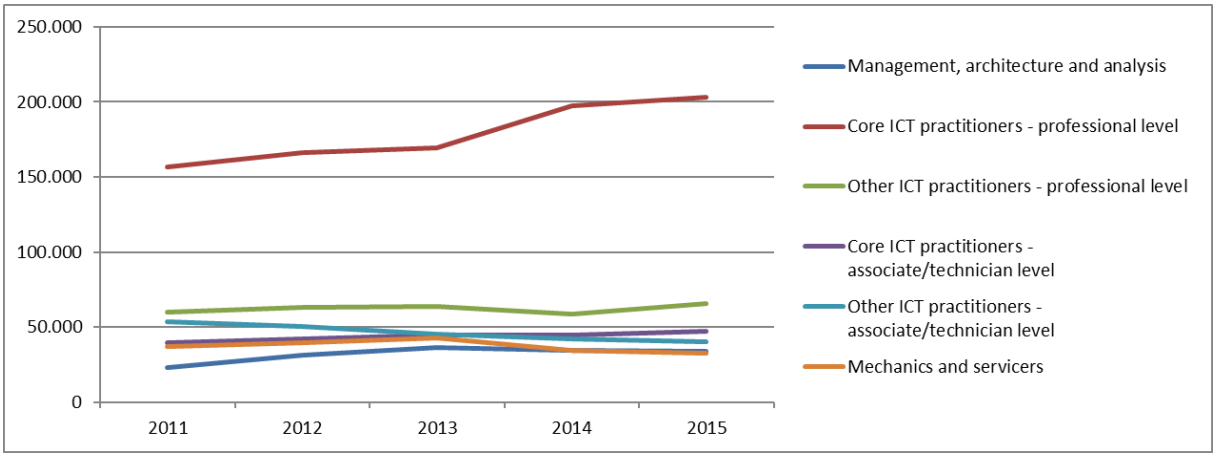
[6] As the Cedefop data are unclear whether the figures presented refer to ICT specialists alone, the forecast model used for the present report, works with the lower figure of 40,000.

[7] Górniak (2015) 'The Hidden Human Capital'. Data collection for this study was through online surveys, group interviews with representatives of government, employers and training institutions, and in-depth interviews with representatives of central and regional administration, academia, employer organizations, etc.

CAGR 2011-15), Software/applications developers & analysts (24%) and Systems analysts (21%). The strongest growth in terms of number of jobs added has been in Software/applications developers & analysts (+10,300 per year), Applications programmers (+8,200 per year) and Telecommunications engineers (+ 3,100 per year).

For occupations that do not usually require an academic education, the most dynamic jobs are Web technicians (+17%; 290 per year) and ICT user support technicians (+8%; + 2700 per year). For a breakdown of ICT occupations according to ISCO (international classification of occupations), see Appendix B.

Figure 1 ICT specialists in Poland, 2011-2015



Source: Eurostat, "Employed ICT specialists"

Box 2 Snapshot: Poland's ICT Workforce

In Poland, the ICT specialist workforce accounts for 424,000 workers, or 2.6% of the total workforce. In absolute terms, this is the sixth largest headcount of ICT workers in Europe after the United Kingdom, Germany, France, Italy, and Spain, responsible for 5.3% of Europe's ICT practitioners. As share of total domestic workforce, however, Poland's ICT workforce is small; it ranks 24th on this indicator, much behind other larger continental EU countries such as Germany (rank 11), France (16), Spain (17) and Italy (18).

Only 1.5% of the Polish ICT workforce is female, which is the 22nd rank in the EU. Furthermore, only 12% of Polish enterprises employ ICT specialists (27th in EU), and only 5% of enterprises provide training for ICT specialists (25th). Poland traditionally educates large numbers of technology specialists in universities. This is reflected in the country's above-average tertiary educational attainment. On the level of tertiary education, the number of first degree graduates in Poland ranks 5th in the EU. On vocational level, the number of ICT graduates in Poland ranks 2nd in the EU. In total, this creates a surplus in ICT workers (see Figure 4, later in the text).

Table 1 Key figures at a glance

	Poland	Rank in EU28
ICT workforce	424,000	6
As % of domestic workforce	2.6%	24
% female	13.5%	22
Estimated annual replacement need	10,600	
Latest vacancy figures (including contractor vacancies)	40,000- 50,000	
Vocational graduates	20,400	2
Tertiary graduates (only first degrees)	11,800	5
Projected jobs potential until 2025 (8 years)	246,000	
of which expansion	161,000	
% of enterprises that employ ICT specialists	12%	27
% of enterprises providing training for ICT specialists	5%	25
% of ICT specialists with tertiary education	70%	8

Source: Eurostat (2015)

Table 2 ICT occupations in Poland

	Usually requires academic degree	Absolute employment (2015)	Absolute employment growth (rank)	Absolute growth p.a. (4 year avg.)	%- Growth (rank)	%-Growth (4 year CAGR)
Telecommunications engineers	Y	20,124	3	3,146	1	28%
Other software and applications developers and analysts	Y	70,813	1	10,325	2	24%
Systems analysts	Y	14,942	5	1,966	3	21%
Web technicians	N	2,437	8	286	4	17%
Applications programmers	Y	78,668	2	8,166	5	14%
ICT user support technicians	N	39,666	4	2,647	6	8%

Source: Eurostat, "Employed ICT specialists"

Trends in education and training of ICT specialists

In Poland, 70% of ICT specialists have an academic degree. This is above the European average of 62% and leaves Poland at rank eight. There are no data available of field of education, whether it is ICT or not, but the available evidence suggests that a large majority holds ICT degrees.

The number of ICT graduates entering the labour market is therefore a major determinant of the development of skills supply in Poland. In 2015, there were roughly 22,900 vocational education graduates[8] (latest available data) and 11,800 tertiary education graduates in 2015 (first degrees[9]). In total, roughly 34,700 ICT graduates leave schools and universities for the labour market per year, see Table 3.

The recent development of graduate numbers is depicted in Figure 2. After a dip in 2008, the number of vocational ICT graduates has grown continuously until 2013, when it reached an all-time high of 21,800. Since then the figure has declined somewhat. For tertiary graduates, the time line data indicates a slow decline between 2007 and 2015.

Table 3 ICT graduates in Poland in 2015

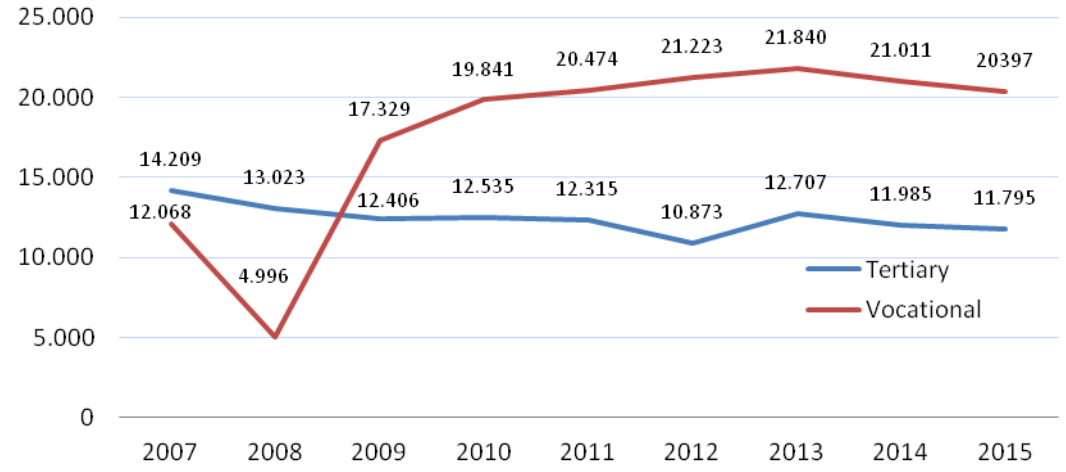
ICT graduates	Total	% ICT graduates/ all graduates
(1) Upper secondary education - vocational	20,397	11.5%
(2) Post-secondary non-tertiary education - vocational	2,534	3.3%
(3) Bachelor's or equivalent level	11,795	3.5%
(4) Master's or equivalent level	3,867	2.2%
(5) Doctoral or equivalent level	82	2.2%
Approximate maximum labour market inflow with ICT degree (1+2+3)	***34,700***	

Source: Eurostat (uoe_grad02). Rounding applies

[8] All figures here were rounded to the next 100, but additions are done using unrounded figures, therefore some inaccuracies are introduced.

[9] To avoid double counting, we must argue that all bachelor level graduates go *eventually* into the labour market, some with a master's or even PhD "detour", and that the flows from bachelor degree into masters studies are about the same size as the flows from masters or PhD studies into the labour market.

Figure 2 Poland - ICT graduates 2007 - 2015, first degrees



Source: Eurostat [educ_grad5 and uoe_grad0]

Obviously, not all 34,700 graduates entered the Polish ICT labour market as there is an imbalance with workforce inflow, which is only about 24,000 ICT specialists per year. Thus, in Poland the number of ICT graduates exceeds the demand for ICT specialists

Migration as a factor in ICT skills supply

Poland shows emigration trends following the end of communism since 1989. During the time from 2004 to 2015, the country has lost half a million people on balance, according to Eurostat data:

1.95 million emigrated permanently, while 1.45 million immigrated. [10] Looking only at native Poles rather than the entire population, the figures are even more striking: Whereas 1.49 million Polish nationals left the country permanently between 2004 and 2015,[11] only 0.87 million returned. The last peak in terms of migration losses was in 2011. The most recent data does not yet suggest, however, that more Polish nationals return than leave. The gap is made up to some extent by migrants from Ukraine, whose numbers have grown rapidly in recent years because of the political turmoil in their home country.

The OECD International Migration database allows a look at the breakdown of migrants by level of qualification, see Figure 3. It shows that highly-educated persons have a higher share among emigrants compared to immigrants. The emigration rate for highly educated persons of Polish nationality increased significantly from 2000 to 2010, when it was 15.5%, compared to an average of 5.3% for European OECD countries.[12] The main destination countries of highly-educated from Poland were the United Kingdom and Germany, ahead of the US.

The World Bank's research on Global Talent Flows confirms that outflow of "specialists" is particularly strong in Poland, for which the source reports the second-highest brain drain in the world following India.[13]

There is evidence of high readiness of Polish ICT specialists to move abroad for work. A 2017 survey of Monster Polska, an online placement company, found that 50% of Polish ICT specialists are ready to work abroad – 19% for a few weeks at most, 12% for a few months, and 19% for a year or more.[14] An additional 26% would consider the possibility of working abroad.

Immigration of ICT specialists has so far not played a big role in Poland according to the data available. However, many observers believe this could change in the future due to the widening gap in the wages paid in Poland and potential source countries such as Ukraine and Belarus.[15]

Actual numbers on Poland's balance of migration in ICT specialists are not available. Statistics from Germany, the largest destination country, can

[10] Databases tps00176 and tps00177.

[11] excluding the year 2008, for which no immigration data are available from the Eurostat database

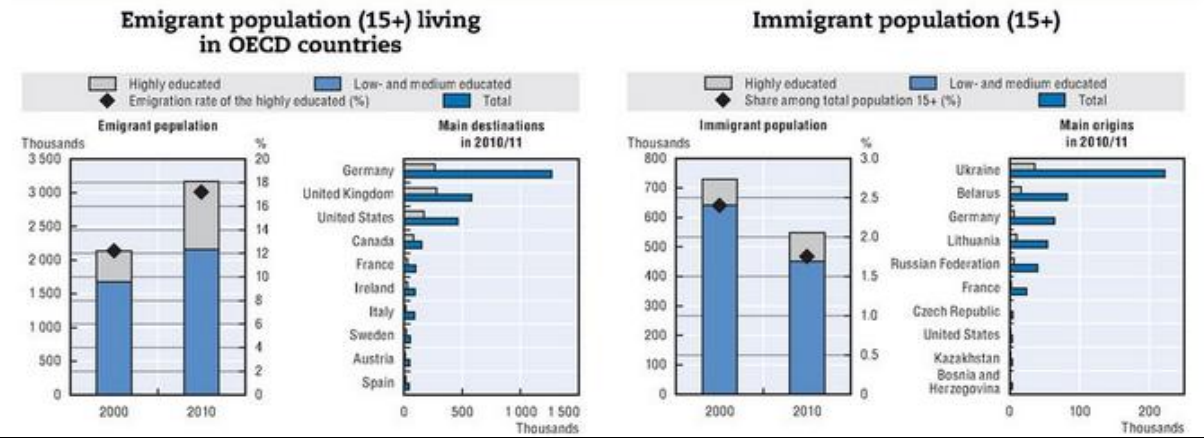
[12] OECD (2013) 'World Migration in Figures'

[13] Pekkala-Kerret al. (2016) 'Global Talent Flows'

[14] Pasławski (2017) 'Specjaliści IT wyjadą z Polski?'

[15] MonsterPolska (2017) 'Czy specjaliści IT zaczną migrować?; Chmielewska et al. (2017) 'A new wave of Ukrainian migration to Poland'.

Figure 3 OECD data on emigration from and immigration to Poland



Source: OECD (2015) 'Connecting with Emigrants'

however help shed some light on the topic. Counting employees who are subject to social insurance contributions, data on the composition of the German ICT workforce show that about 2,100 ICT specialists of Polish origin work in Germany. If ICT specialists in other forms of employment are added, their number is likely to exceed 5,000 in Germany.[16]

Taken together, these statistics point towards a significant number of Polish ICT graduates who search for jobs abroad, especially in the US and the EU, where they help mitigate ICT skills shortages – at the risk of exacerbating skill shortages for selected ICT professional skills in Poland itself.

Many Polish people live and work in the UK, of which some are expected to return to Poland in course of the Brexit. Yet, despite improved labour market conditions in Poland, it is unclear how many of them might return. Comfortable lives and salaries, specifically in London are holding back the people Poland's economy requires the most: high-level bankers, executives and managers[17] There is not data available how this is going to affect ICT specialists but it is likely that the same applies to this occupational group.

ICT skills forecast model for Poland

Today the ICT skills gap is significantly smaller than in other countries in Europe. For analysing current and projecting future ICT skills gaps, we need to look at demand in terms of changes to the underlying demand exerted by employers (workforce expansion) as well as replacement demand – the need to replace workers who leave the workforce for good or temporarily, typically because of retirement. In terms of supply, the most important determinant is the number of ICT graduates who enter the labour market. Net migration of IT workers and "lateral entries" of non-ICT graduates into IT occupations also need to be taken into account.

For modelling ICT specialist demand we estimate that planned workforce expansion will continue along the same lines as the workforce has expanded since 2011. This means that employers will intend to grow the number of employed ICT specialists by 13,300 per year (see above). As regards annual net replacement, data from Cedefop, the EU agency responsible for the development of vocational training, allows for an estimate. Cedefop publishes estimates of future replacement demand by occupation, which in the present case is 10,600 per year.

The average annual need for new ICT specialists is thus approximately 24,000, the sum of expansion (13,300) and replacement demand (10,600). To assess total demand, one also has to account for the current vacancy backlog (40,000). Hence there is met and unmet demand, with the current vacancies being (in a simplistic model) "unmet demand" and actual expansion and actual replacement being "met demand".

In the past five years, the Polish economy has thus absorbed on average 24,000 new ICT workers per year. The model calculation in this report assumes that this is the natural rate of "inflow" which employers will sustain in the near future.

[16] Bundesagentur für Arbeit (2018) 'IT Fachleute'
[17] Joanna Plucinska: Poland hopes Brexit guides star natives home. It probably won't work. POLITICO, 1 February 2018: https://www.politico.eu/article/poland-hopes-brexit-will-lead-its-native-stars-home/

Box 3 Baseline projection for Poland's ICT Skills Gap

A simple projection is calculated that basically rests on assuming a baseline scenario of a steady state of flows. It should be noted that this is a "Things stay the same"-scenario. It simply shows the number of jobs to be filled in the near future if the demand keeps growing in a linear fashion, with annual supply of new labour remaining the same as in the last five years. This is a projection based on a baseline scenario, and not necessarily the one we would deem most likely after a deeper analysis of technological, socio-economic and political trends. Nevertheless, it shows a basis to ponder on trends and think about likely other, different scenarios, which might include technology leaps or disruptions, but also social, economic or political impact. These are not allowed for in this model. It rests on these inputs:

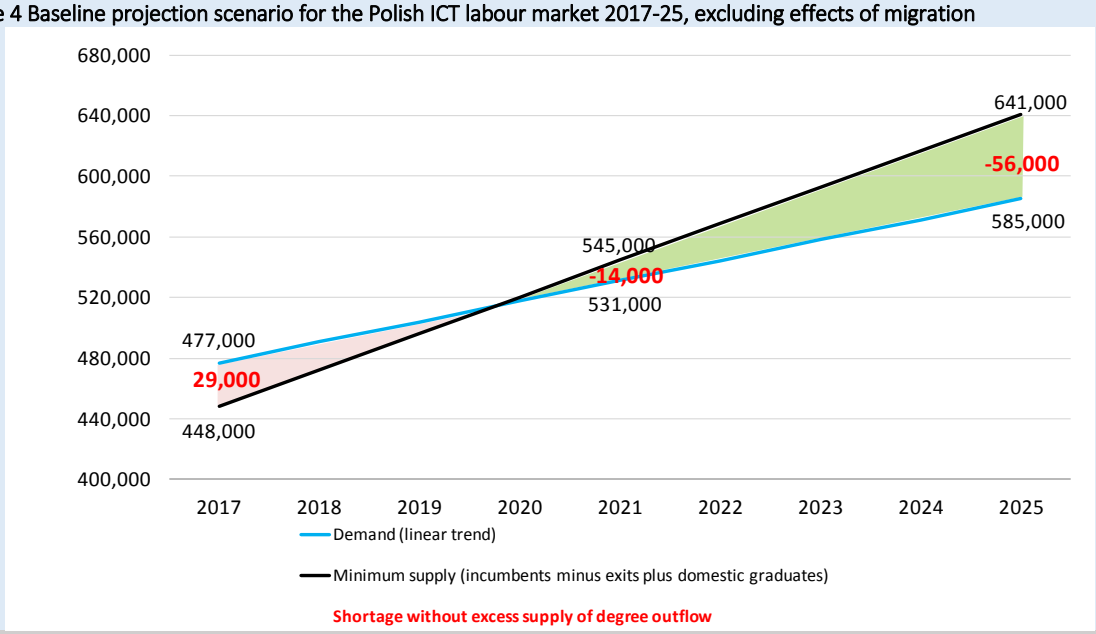
- Demand for ICT specialists grows linearly, i.e. the increase from year to year remains the same (here: 24,000 p.a.).[18]
- New supply of ICT specialists from vocational & secondary education remains at the level of 2015, i.e. 34,700.
- The excess supply of degree outflow is set to 10,700 on average and this remains the case.[19]

The negative shortage of skills of -56,300 in 2025, i.e. an oversupply or unemployment, highlighted by red font in the above chart, is to be understood as the oversupply that remains when all expected domestic ICT graduates try to enter the Polish ICT specialist labour market. It does not take account of the observable outmigration or taking up of non-core ICT jobs as discussed elsewhere. It is, so to speak, the cumulative expected outflow of graduates from the ICT labour market.

It needs to be stressed that the model is constructed such that the actual projected shortage is exactly as "today", meaning at starting point of the model, namely 40,000.

The total potential for new jobs until 2025 will be 246,000 in this model. This number represents the total number of new entrants to the ICT labour market in eight years, consisting of 161,000 expansion and 85,000 replacement jobs. The structural oversupply in Poland of ICT graduates makes it hard for outsiders to enter the ICT labour market, however, the constant brain drain and signs of mismatch leave some scope also for lateral entries in the Polish labour market, to the extent that these are closely targeted to the demand as expressed by employers who complain about hard-to-fill vacancies.

Figure 4 Baseline projection scenario for the Polish ICT labour market 2017-25, excluding effects of migration



Source: empirica (2017)
See yearly data breakdown in Appendix A.

[18] A fixed percentage growth would imply exponential growth. This has been the case throughout more than a decade, but because we expect maturity effects, the linear growth model is chosen here.

[19] This figure is the difference between new supply of 34,700 and new demand of 24,000. Calculatorily, a number of graduates of this order of magnitude must at least work abroad, work in non-ICT jobs or pursue other activities.

2

Trends in Diversity

Poland's swift economic recovery after the latest recession has led to notable improvements concerning the rates of youth unemployment, long-term unemployment and young persons not in employment, education or training (NEET). Persons from a disadvantaged socio-economic background, however, still face significant barriers in finding quality employment. Poland has traditionally one of the largest gender gaps in Europe, which means that women are significantly underrepresented in the total labour force and even more so in the ICT workforce. Young women are much less likely to choose ICT related subjects in university and vocational education. Underlying reasons include deep-rooted cultural norms and out-of-date value systems, including stereotypical views about what type of school subjects and jobs are best suited for girls and women.

Employment and diversity in Poland's labour force

Table 4 Employment and unemployment indicators for diverse groups

	PL	EU28	Rank
Long-term unemployment rate	2.2	4.0	9th
Young people not in employment, education or training (15-24 years) – NEET	10.5	11.6	14th
Youth unemployment	17.7	18.7	15th
Employment rate of older workers (55-64 years)	46.2	55.3	21st
Age employment rate gap (15-64 vs. 55-64 years) in p.p.	18.3	11.4	22nd
Gender employment rate gap (15-64 years) in p.p.	12.9	10.5	22nd
Non-natives born outside the EU, as share of total population	1.1	6.9	26th
Non-native employment rate gap, in p.p.	1.5	8.3	11th
Disability employment gap, 2011, in p.p.	30.0	19.6	21st
Disability unemployment gap, 2011 in p.p.	2.1	2.5	10th

Source: empirica calculations based on latest available Eurostat data (2016)

The prevalence of **long-term unemployment**[20] provides an overall indication how many people find it particularly difficult to find a job or are continuing to have skills not matching labour market demand. In Poland, this rate was 2.2% in 2016, significantly below the EU28 average, which indicates relatively favourable conditions for entering or re-entering the Polish labour market. The share of long-term unemployed among all unemployed persons in Poland was about one in three (35%), which also compares well to the EU28 average of 46%.

Young people commonly find it difficult to access the labour market. Poland's **youth unemployment** rate (17.7%) and the share of young persons neither in employment nor in education or training (**NEET**) (10.5%) are similar to the EU averages. In comparison to those European member states which best succeed in enabling the young to join the labour force, however, demonstrates the size of the challenge that remains: the Netherlands, Germany and (among Eastern European member states) the Czech Republic all perform much better.

Poland's **gender** employment rate gap is at 12.9 p.p., higher than the EU28 average (10.5 p.p.), which puts the country at rank 22 among the EU28. There has hardly been any change over the past ten years: the figure was 13 p.p. in 2007. Analysis of the underlying causes of the gender gap in employment points to a range of factors. They include a lack of childcare facilities and regulatory disincentives such as lack of parental leave that is transferable between both partners and "financial support for families [i.e., in almost all cases, women] that provide long-term care to family members". In practice, these measures discourage many women from taking up any paid employment.[21]

Such structural barriers may need to be removed before ICT training programmes targeting women can contribute significantly to increasing female employment. Well-designed programmes can, however, open up new opportunities for women to start a career in a sector with excellent career prospects, thereby helping to mitigate widespread perceptions that there are no suitable jobs for women available.[22]

Poland has one of the lowest shares of **non-native inhabitants born outside of the EU** in all of Europe (1.1%). The employment gap between natives and people born abroad (1.5 p.p.) is negligible and anyway of little relevance because of the small number of non-natives in the country.

The country's **disability** employment gap, in contrast, is huge. When a definition of disability is applied that is based on persons reporting "severe difficulty in basic activities" (rather than formal disability status), the difference in employment rates is 30 p.p., which puts Poland at rank 21 among EU28 countries. As the European Commission (2017b) complained in its

[20] For definitions used in this section, please see Appendix B

[21] European Commission (2017b) 'Country Report Poland 2017', p. 22

[22] Przybysz et al. (2016) 'Closing the Skills Gap in Poland'

latest Progress Report, "the employment rate of disabled people has hardly changed in recent years, further widening the gap with the gradually increasing employment rate of people without disabilities". The comparatively small gap between the unemployment rate of people with and without disability (2.1 p.p.) suggests that most people with disability are outside of the labour force. This suggests clearly that more should be done to address this group.

Diversity in Poland's ICT Workforce

This section discusses diversity only in terms of gender, as data on other groups currently underrepresented in the ICT workforce is not available.

According to our own analysis of Eurostat data, the share of women in Poland's ICT workforce is relatively small with 13.5%, against an average of 16.1% in the EU28.

The current share of women among ICT students does not offer any hope for significant improvements in the near future. The situation is worst in upper secondary vocational education, where the share of female graduates is a mere 6.2%. Table 6 shows women's shares in ICT graduates on different levels.

In vocational education, the situation is equally unsustainable: in 2016/17, only 8,216 out of 86,684 ICT students in technical secondary schools (9.5%) were women.[23]

A 2014 survey of upper secondary school children, conducted in the context of the BKL project[24], found a very low share of women among those who plan to study ICT (8%), even lower than the current share of female students in tertiary ICT education (12%).The same source reports that even among ICT graduates, men and women choose very different occupational paths. Female ICT graduates are much more likely to apply their skills in the teaching profession, and much less likely to work as ICT professionals compared to men. This indicates that the ICT specialist profession is currently not able to attract women as effectively as men. "In comparison with men graduating from the same study fields, women clearly less frequently work as professionals (and associate professionals) in IT, and also as science and engineering professionals".[25]

What are the reasons for women's low representation in ICT education and workforce? Stakeholders agree that the main cause of the low interest of young women to embark on a career in ICT are deep-rooted, cultural norms and value systems, including views among key influencers (e.g. parents, teachers, peers) regarding young women's choices in school subjects and jobs.[26]

According to employers' statements about gender preferences in the BKL survey, Poland's companies have no explicit policy to prefer men over women for filling ICT specialist positions.[27] One potential reason for the low share of women in the ICT profession in Poland might be the low number of suitably skilled female ICT specialists available on the labour market rather than biased decisions taken by recruiters. Nevertheless, if other reasons exist, they are not easily obtainable. Other than that, qualified women are likely to undergo prolonged periods of labour market withdrawal because of motherhood and the insufficient use of child care and parental leave. Further, many women exit the labour market earlier than man for retirement.

Table 5 ICT graduates in Poland by gender, 2015 data	Percent male	Percent female
(1) Upper secondary education – vocational	93.8%	6.2%
(2) Post-secondary non-tertiary education – vocational	83.1%	16.9%
(3) Bachelor's or equivalent level	79.2%	20.8%
(4) Master's or equivalent level	84.7%	15.3%
(5) Doctoral or equivalent level	82.9%	17.1%

Source: Eurostat (uoe_grad02)

[23] Central Statistical Office (2017) 'Education in 2016/2017 School Year', p. 204. See also: OECD (2018) 'Poland – Country Note: Education at a Glance 2018'
[24] Górniak et al. (2015)
[25] ibid., p. 54
[26] Sznykat al. (2016) 'Kobiety w technologiach'
[27] Górniak at al. (2015)

3

Policy Overview

Consecutive governments have agreed that Poland's ICT sector as well as most other sectors of the Polish economy is increasingly depending on access to ICT specialists who can demonstrate the right mix of up-to-date skills. This is reflected in policy strategies in the education & training, employment and digital domains. Priority is given to reform of the vocational education system to enable it to better respond to labour market needs while offering novel pathways into employment for people at risk of exclusion. This is expected to open up careers in ICT to a wider range of young persons, in particular members of groups currently underrepresented in the ICT workforce. Poland's policy on gender equality strives to boost the share of women in occupations traditionally dominated by men, including ICT specialist jobs. Programmes for addressing unemployment and skills shortages in Poland are mainly organised in the context of the so-called Operational Programmes (OPs) for using European Structural Funds, the main source of funding for this type of activities. The current set of OPs puts strong emphasis on inclusive ICT training, for which substantial financial resources have been made available.

ICT skills have been a high priority on the agenda of the Polish government for many years already. It is widely understood that Poland's ICT sector, one of the most dynamic in Europe, needs to increase its productivity to keep performing well. To this end, a workforce with the right mix of up-to-date skills is seen of paramount importance. Government policies reflect awareness, in particular, of the need to better match skills production in the education and training system with the ICT skill needs of employers. Opening up careers in ICT to a wider range of young persons, including women, and other members of groups currently underrepresented in the ICT workforce, is another focus area.

The main strategic document guiding government policy in Poland is the **Responsible Development Strategy by 2020** (including outlook for 2030) from 2017. Human capital and social capital have been identified in the document as areas of major importance for the implementation of strategic objectives. The strategy provides for the introduction of changes in the system of education, and in vocational education and training and higher education in particular. It addresses the challenges of youth unemployment and persons outside of both education and the labour market (NEET).

Addressing youth unemployment

Actions to support the employment of young NEET as well as the long-term unemployed are also part of the **2017/2018 National Reform Programme (NRP)**, which includes implementation of the EU's **Youth Guarantee** programme (Gwarancje dla młodzieży). The Youth Guarantee is a commitment by all European Member States to ensure that all young people under the age of 25 years receive a good quality offer of employment, continued education, apprenticeship, and traineeship within a period of four months of becoming unemployed or leaving formal education. The Youth Guarantee programme in Poland is carried out by labour offices, Bank Gospodarstwa Krajowego (BGK) which operates a nationwide loan programme, and the **Voluntary Labour Corps** (Ochotnicze Hufce Pracy – OHP).

OHP is an organisation under the Ministry of Family, Labour and Social Policy specialised in supporting youth at risk of social exclusion and unemployed persons under 25 years of age. The Voluntary Labour Corps offer young people over 15 years of age, who are not in education and have not graduated from lower secondary school, the possibility to attain vocational qualifications and/or to supplement their education in one of the 217 Corps agencies. Many students receive free meals and accommodation during the education period. The Voluntary Labour Corps provides education in over 60 professions, both in their own workshops or as on-the-job training with an employer. Each year, over 800,000 young people receive various forms of help from Corps agencies. An example of a partnership between the Voluntary Labour Corps and the ICT sector is the annual "National Competition of IT Knowledge of Youth Volunteer Labour Corps", of which Microsoft Poland is the official patron and main sponsor.[28]

The reform of higher and vocational education

Over the last 10-15 years, the Polish education system has undergone two reforms which have introduced significant changes to the vocational education and training system. This was a response to the gradual decline of vocational education pathways, itself an unintended result of the rapid expansion of the country's higher education system since the 1990s.

The reforms made changes to qualification and assessment systems and provided for financial aid to encourage employers to participate in vocational training. Moreover, they included the gradual introduction of a 'dual system of vocational education and training' inspired by the German model, defined as organising theoretical education at school and the practical instruction at workplace.

In December 2016, the Ministry of National Education introduced structural reform influencing the structure, length and progression routes within the education and training system (**Law on School Education**). One of its main aims is promoting employers' co-operation with schools, especially to organise practical training in real working conditions (see Box 4). The main changes foreseen are: (a) four-year upper secondary VET programmes will be prolonged to five-year duration; (b) a so-called two-stage sectoral school (will replace the existing three-year basic VET school. In this new structure, the first stage sectoral school will offer a three-year VET programme, followed by an optional two-year second stage sectoral school. Completing this second stage will allow learners to enter higher education. The new

[28] "Ogólnopolski Konkurs Wiedzy Informatycznej", see http://warminsko-mazurska.ohp.pl/ogolnopolski-konkurs-wiedzy-informatycznej/

regulation modifying VET curricula is in the process of adoption.

Inclusive ICT training within government information society policies

The Polish Government created a dedicated **Ministry of Digitisation**[29] in 2015. It aims to develop a high-quality ICT infrastructure by particularly focusing on the development of e-services in public administration and the provision of digital literacy among students at school. Social inclusion is also on the ministry's agenda: It stresses the importance of making online content available to everyone, including people with disabilities.

In July 2013, Poland became the first EU Member State to launch a **Broad Agreement for Digital Skills.**[30] It is a national response to the European Commission's Grand Coalition for Digital Jobs[31]. The Polish Government invites major national stakeholders in e-skills to join the Agreement in order to make it "broad". One of the first signatories has been the Polish Information Processing Society (PIPS), the association of ICT professionals. Polish universities, associations and major ICT companies including UPC Poland, Microsoft and Cisco Systems have joined as well.[32] In the meantime several awareness raising but also training activities have been identified documented by the coalition run by the Institute for Public Affairs. Most of them are addressed to increasing the level of digital literacy of the population.

Funding inclusive ICT training

National programmes covering inclusive ICT training programmes in Poland are mainly organised in the context of the so-called **Operational Programmes (OPs)** for using European Structural Funds. OPs are action plans that break down overarching strategic objectives of a Member State into investment priorities, specific objectives and concrete actions. Such investments may be in human capital via training programmes. In the programming period 2014 – 2020, Poland manages six national OPs and 16 regional programmes, one for each region. Of the national ones, two are relevant here:

- **OP Knowledge, Education and Development** ("POWER") aims to improve the quality and efficiency of the Polish higher education system. The OP's target groups reflect the goal of social inclusion: They include, among others, NEET youth and people with disabilities. The European Social Funds and the Youth Employment Initiative fund this programme. It is worth about € 4.7 billion. One of the main priorities of POWER is to integrate young people in the labour market.
- **OP Digital Poland** has three priorities: Common access to high-speed internet; Extension of e-government, focussing on applications in the labour market; Digital competences of society. It focuses explicitly on ICT specialist skills to solve identified social or economic problems, also related to social inclusion. The OP pays special attention to Poland's rural areas and small towns. In total, the programme seeks to reach 400,000 people and directs funding to four education and information campaigns concerning ICT.[33]

A large share of the inclusive ICT training programmes identified in our research (see Section "Findings") are funded by one of these two OPs.

Government policies on diversity and inclusiveness of education, training and employment

With regard to policies supporting workforce diversity, Poland's policy on gender equality is of particular relevance. Gender equality policy is located in various ministries and departments that are responsible for implementing measures and undertaking actions in their own areas, including access to training and initiatives for boosting the share of women in occupations traditionally dominated by men. Of special importance is the **Department for Women, Family and Prevention of Discrimination** within the Ministry of Labour and Social Policy. It focuses on improving the situation of women in employment. The **National Programme for Equal Treatment** (*Krajowy Program na Rzecz Równego Traktowania*) was approved in 2013 and ran for three years. It covered access to all types of education and training. As such it has provided the basis for a range of activities about women's access to work-related ICT training and related career paths.

[29] https://mc.gov.pl/

[30] http://umiejetnoscicyfrowe.pl/

[31] https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition

[32] Dashja et al. (2015) 'e-Leadership Skills for Small and Medium Sized Enterprises', p. 6.

[33] https://www.polskacyfrowa.gov.pl/en

Box 4 Snapshot: Reform of Vocational Education and Training (VET) in Poland

Changes introduced to the vocational education system since September 2012 have widened the scope of possible forms of the cooperation between schools and employers. Employers can now participate in every stage of vocational education process: from the process of identifying the skills needs for an occupation to the moment of assessing learning outcomes of VET students during external exams. Since 2016, a range of further measures focusing on VET have been implemented by the Ministry of National Education. These include:

- Enhancing practical training by allowing schools to increase the number of hours for practical training implementation;
- Introducing compulsory career guidance at schools in order to increase the validity of decisions related to the choice of a career;
- Modifying the model of financing vocational education with taking into account the cost intensiveness of training in individual occupations;
- Acquiring partners to work together on behalf of vocational education and training at sectoral and regional level – management boards of special economic zones have declared their cooperation with the Ministry of National Education and support for schools teaching specific occupations;
- More than 1000 employers actively participate in the development of curricular amendments (including the development of state-of-the-art core curricula, which will take effect on 1 September 2019);
- A new tool for monitoring the demand for VET graduates is developed in cooperation with the Central Statistical Office;
- The Ministry of National Education announces competitions for employers to present the best solutions in the area of practical training;
- Companies conclude agreements with schools, which provide for the formation of forms sponsored by such companies;
- Representatives of individual industries conclude agreements with the Ministry of National Education aimed at the development of vocational education and training;
- Each employer interested in starting cooperation with a given school can use the services of VET Coordinators appointed for this purpose at each education authority.

Also in 2016, the Centre for Education Development, a government institute, initiated a project aimed at adapting vocational education programmes to the needs of the labour market by involving employer and employee representatives.

Source: Eurydice (2018) 'National Reforms in Vocational Education and Training and Adult Learning: Poland'

4

Findings

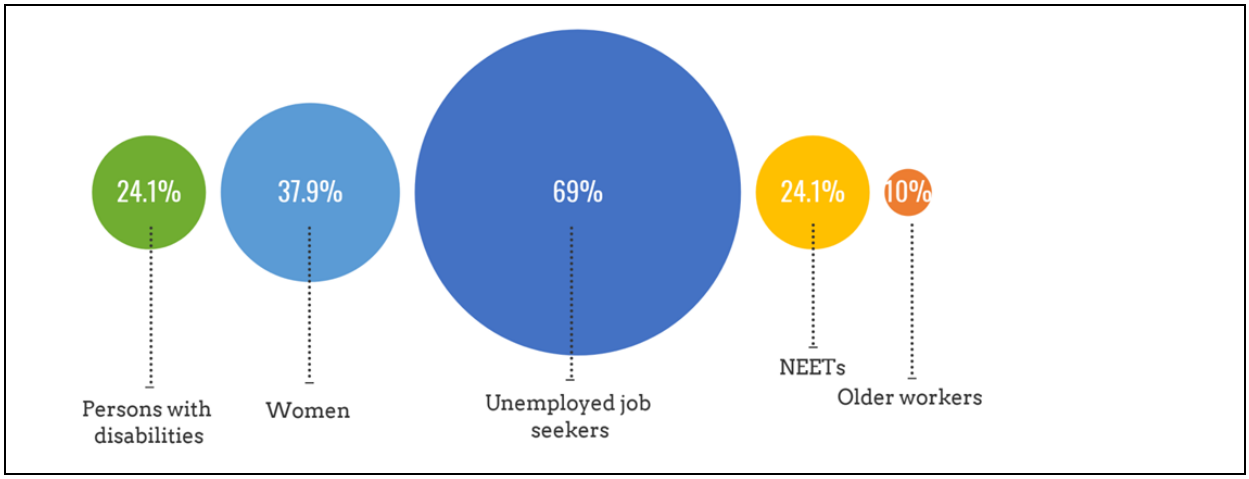
Out of 47 programmes identified in Poland, 29 were found to be directly relevant to inclusive ICT skills training as defined in the scope of our study. In this section we analyse the results of our survey of stakeholder approaches towards inclusive ICT skills training programmes. We provide a brief look into the pathways available to gain an entry into the digital labour market in Ireland and suggest a taxonomy to classify the programmes surveyed. We conclude this section with a summary of lessons learnt from our selected programmes.

Methodology and research

We conducted a comprehensive survey to determine the impact and challenges of inclusive ICT skills training programmes for diverse groups to enter the digital labour market. Our research combined both qualitative and quantitative methods, including surveys, individual interviews with training providers, and in-depth interviews with the selected best cases and employers.

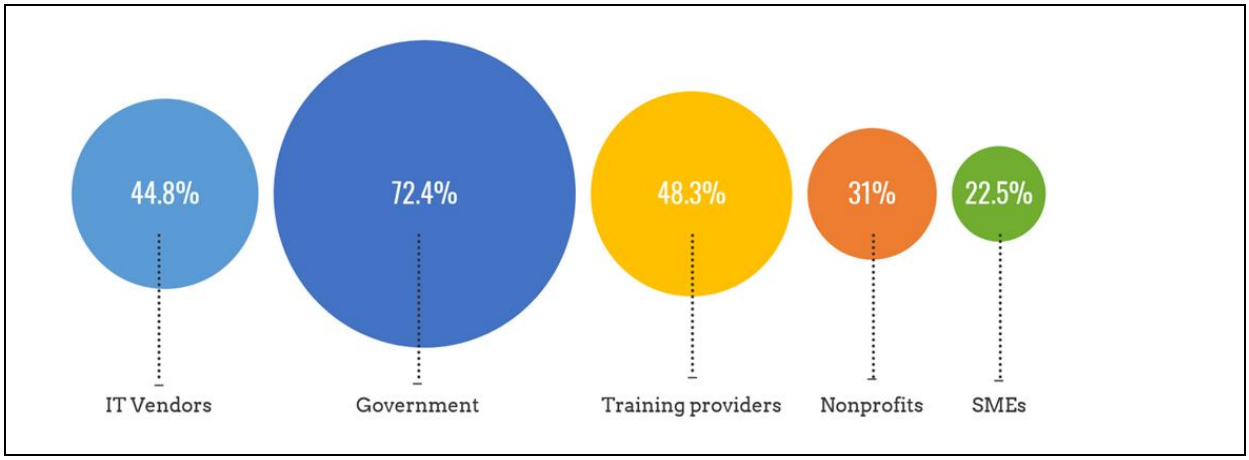
Out of the 47 programmes identified in Poland, 29 were found to directly relevant to inclusive ICT skills training as defined in the scope of our study. These programmes were specifically targeted towards disadvantaged socio-economic groups such as persons at risk of long-term unemployment and youths not in employment or education and training (NEET). Another frequent focus was women. Figures 5 and 6 show a further breakdown of these programmes in terms of target groups addressed and stakeholders involved in inclusive ICT training in Poland.

Figure 5 Share of target groups in inclusive ICT training in Poland, % of programmes surveyed



Source: diversITy Survey, empirica (2017)

Figure 6 Share of stakeholders in inclusive ICT training in Poland, % of programmes surveyed



Pathways to ICT skills training and jobs

ICT is currently the most popular field of study in Poland – according to data from the Ministry of Science and Higher Education, there were more than 800 fields of study in this domain (including first and second cycle studies) in 2016.[34] ICT as a field of education ranks 8 of 11 with a total of 74,000 students. In comparison, the highest number of students takes up the field of Business Administration and Law (306,000 students). However, in combination with Technology, Industry, Construction and Natural Science, Mathematics, Statistics, the ICT related fields of education make up for 392,000 students, the biggest share of students.[35]

There are multiple pathways for individuals to gain an entry into the digital labour market; traditional education in the form of university degrees is still the most common: In Poland, 70% of ICT specialists have an academic degree, which is significantly above the EU average of 62%.

Recent years have seen strong efforts to overhaul the country's vocational education system with the purpose to increase its contribution to tackling the challenges of both skills shortages and youth unemployment. This process, however, will take many years to create tangible impact. Little can be said at the moment about whether the reforms will achieve the desired results.

The favourable conditions on the Polish labour market for ICT specialists have resulted in a strong demand for possibilities to add digital skills training to educational attainments from another area, such as a degree in the humanities. In response, new pathways have emerged for adults seeking to transition from other sectors into the ICT sector. The four main pathways in Poland are listed in the table below.

The university pathway in Poland

Poland has been highly successful in expanding its higher education system, a process which has started in the 1990s. Today Poland's universities benefit from a high reputation internationally; they are, in particular, praised for producing first class computer engineers.[36] University-based ICT training suffers, however, from two major shortcomings related to the topic of the present report:

- The share of women choosing ICT subjects is very low, as discussed in Section 2. Experts agree that systematic efforts are required to mitigate the situation, which would need to address all main stages of the talent pipeline. In the meantime, valuable work is done by NGO programmes driven by activist's intrinsic interest in boosting diversity, exemplified by the Geek Girls Carrots and IT for SHE initiatives, both voluntary membership organisations focusing on networking, organisation of workshops and other events, as well as promotional campaigns.
- Industry representatives continue to complain that the skills of ICT specialists graduating from university are not fully sufficient to meet their needs.[37] Some larger companies have taken the initiative and embarked on co-operation with Polish universities to implement their own academy. An example is the Infosys Campus set up by the Indian ICT multinational in partnership with the University of Łódź.[38]

The vocational pathway in Poland

In a parallel process to the expansion of university education, vocational education and training (VET) has rapidly lost in reputation and relevance since the 1990s. As a consequence, the decline in interest among students led to employers losing trust in the vocational system. Employers feared that co-operation with vocational schools does not meet the educational standards and qualification for recruitment. Both the quality of education provided by vocational schools and the employability of graduates have suffered.[39] Against this background it comes as no surprise that Poland suffers from a shortage of junior-level ICT specialists such as ICT technicians, as the Human Capital in Poland study found. There is now a consensus among stakeholders that the VET system is in urgent need of modernisation, which also relates to the need to

[34] https://www.radasektorowa.pl/index.php/rada

[35] https://stat.gov.pl/en/topics/education/education/higher-education-institutions-and-their-finances-in-2016,2,10.html

[36] Trikha (2016) 'Which Country Would Win in the Programming Olympics?'

[37] Górniak et al. (2014) 'Competencies of Poles vis-a-vis the needs of the Polish economy'

[38] See description in Przybysz et al. (2016), pp. 69-70

[39] ibid., p. 6.

Pathways

University Education

In Poland, the most common traditional pathway for students is a degree in Computer Science or a related subject obtained from a Higher Education Institution (HEI), either a University (uczelnia akademicka) or a University of Applied Sciences (uczelnia zawodowa). This is a typically a three year undergraduate (BA) plus a two-year master's degree (e.g. Master of Computer Science). Most of the graduates working in the ICT sector have a university degree. Public HEIs are free of charge for Polish students.

Vocational Qualifying Skills Courses

Adults who seek to obtain formal recognition of ICT skills acquired outside of formal education, re-qualify to work in an ICT occupation, or upgrade their qualifications, can do so by attending what are known as Vocational Qualifying Skills Courses. These courses take place outside of the formal school system and are provided by public education institutions such as practical training centres, higher education institutions, private training companies, or at enterprises, employers, associations or other bodies. Adult learners can complete several of these courses which are usually privately funded. This allows learners to gain all the skills needed to qualify for work in a particular occupation.

Vocational and Technical Education and Training

In Poland, school is compulsory until the age of 18. Young people can opt for a vocational pathway at the end of the first cycle of secondary education, i.e. after completing middle school. Many vocational schools offer programmes preparing for occupation as "IT Technician", "ICT Technician" or in a related field. Work placements are a common ingredient of such trainings, for which schools enter into a contract with employers. VET programmes offered by public sector institutions are free of charge.

Industry-led trainings

Originally designed for further training, ICT-Vendor certificates have a good reputation as such. The certificates enjoy a high reputation and are accepted as valuable for career entry and career transitioning youth and adults – specifically when obtained from reputable international ICT vendors.

From our employer survey we know that such certificates are credentials for jobs like IT operations technicians, IT engineers, and IT user support technicians.

Nevertheless, fees charged by providers can be substantial, but these can often be subsidised or fully paid for by third parties such as Labour Offices.

attract more women to VET programmes in general, and vocational ICT programmes in particular – Poland performs worse than the OECD average on both indicators, see Section 2.

Young persons who seek to embark on vocational and technical education can choose from several options:

- The basic vocational school (Zasadnicza szkola zawodowa), taking 3 years, leads to a certificate as a skilled worker, but does not prepare pupils for the Matura[40]. Practical training takes up to over 60% of the total time.
- The secondary technical school (Technikum), offering a 4-year course (in future: 5 years), leads to both the Matura and a vocational qualification at technician level. After obtaining the Matura they can opt to go on to university education.
- Post-secondary schools (Szkoly policealne) offer courses lasting 2½ years to high school graduates who wish to gain a professional qualification. Most of them are operated by commercial providers and charge fees, which reduces their relevance for persons from disadvantaged socio-economic backgrounds. Most learners attend post-secondary schools as part-time students.

The out-of-school vocational education institutions are: Continuing Education Centres (CKU), Practical Training Centres (CKP) and Voluntary Labour Corps (OHP). Practical vocational training also takes place on the premises the school or the employer, as in the case of a temporary placement in a job to gain practical work experience while studying.

[40] Matura is the upper secondary school-leaving certificate

Box 5 Snapshot: The Training and Recruiting Landscape in Poland

- Feedback from Polish employers reveals that learners with well-developed transversal skills are better positioned to be recruited by employers. Digital skills are linked to a number of different non-technical skills (English language, commitment to quality) as well as soft skills
- Soft skills in demand range from the ability to take initiative and work motivation; interpersonal skills such as effective communication and coordination, negotiation, teamwork and collaboration; to goal orientation, problem-solving, ability to cope with stress, and honesty. Polish employers indicated that graduates and trainees with no prior work experience tend to lack such skills, which they consider one of the main explanations for graduate unemployment in the country at a time of ICT skills shortages.
- Exposure to the ICT sector itself is seen as crucial to support someone into employment. Such exposure can take the form of a work placement which is part of the training course, a traineeship or an apprenticeship where training and work experience are combined throughout.
- Mixed or integrated approaches to training are the most desirable for both trainees and employers in Poland, particularly those in an experiential learning setting.
- Co-operation with businesses, if possible from the local economy, 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.

Source: diversITy survey (2017), empirica; Górniak (2014)

Only a very small share of students at technical schools enrol in ICT related subjects (e.g. IT Technician, ICT Technician, Digital Graphics Technician) – about 14% of all male and a mere 3% of all female students, according to analysis of the NESsT project.[41] To change this picture, industry stakeholders are pushing for introduction of new occupations in VET. For example, the Polish Marketing Association formally applied for the occupation of electronic customer service representative to be become one of those taught in technical schools and on vocational courses.

In recent years, also as a result of new legislation introduced to support employer engagement in VET (see Section 3), more and more private sector companies have embarked on partnerships with vocational schools. Their main objective is to be able to influence future availability of skilled staff. This is being done, for instance, by co-operating in drafting of curricula and by offering work placements in the form of apprenticeships. Companies can also take patronage of a class at local vocational school. In this case the practical education is fully organised by and on the premises of the employer, who also has a say in the design of the learning programme.

New interest in non-academic pathways

The shortage of ICT skills has had the result of increasing the willingness of employers to hire graduates from areas other than ICT (e.g. humanities), and candidates who completed secondary education but have not gone on to pursue higher education. This is confirmed by the evidence obtained by Przybysz et al. in their study of the Business Services Sector, a sector showing much growth, which is also a major employer of ICT specialists.[42]

Industry-driven ICT training programmes

Our survey of ICT training programmes shows that industry-driven ICT training programmes like Coders Lab and Ericsson's Software Development Academy (SDA) are particularly helpful for youth and adults without the qualification required to enter one of the traditional pathways into ICT. They offer intensive courses designed in close collaboration with employers from the ICT sector (see Good Practice

Showcases in Appendix D). This enables them to guarantee that a large share of graduates will be employed within a short period after completing the programme, either within one of the partner companies (which also offer work placements, an important means to build links between learner and

[41] ibid., p. 35

[42] ibid.

Good Practice Showcase: Coders Lab

Intensive coding courses for vulnerable persons at risk of unemployment, including youth leaving state-run foster care institutions

Coders Lab is a commercial provider of ICT training programmes designed based on models used by American short-term training schools (e.g. Dev Boot Camp in the USA). These aim to prepare participants to change their professions in a short time and without enrolling in long-term academic courses. Coders Lab runs intensive coding courses in 8 large cities in Poland for youth across all levels of education. Trainees are participating in 9-week (full-time) or 16-weekends (part-time) courses in front-end and back-end development. In both courses, students learn selected programming languages, web application frameworks and database management systems. Courses addressed to at-risk youth who receive funding from the Public Employment Service also integrate soft skills trainings (80 hours), as a response to the specific needs of target group: teamwork, time management and interpersonal communication. All Coders Lab participants receive support in getting a job once they are finished with the programme. It has extensive links with the business sector which are leveraged for this purpose. Since 2017, Coders Lab in a separate programme targets youth leaving state-run foster care institutions, a group at big risk of social marginalisation. Participants are provided with the training free of charge and 15% also receive scholarships to secure their needs, such as accommodation, meals, etc. 1, 500 completed the programme. 80% were placed in employment.

Why a good practice showcase?

- **Coders Lab is a well-recognized training provider in Poland, as it has been the first of its kind in the country.** Today it describes itself as "leader of the market, with the highest number of courses and graduates". This position means that the organisation has the experience and knowledge required for designing and executing training courses which are tailored to both, the needs and preferences of learners as well as the demand of potential employers.
- **Participation in the NESsT Empowers initiative has meant that the Coders Lab team received active support, for instance in the area of social impact measurement advice on seeking pro-bono support.** Collaboration with NESsT Empowers, an NGO with extensive experience in social enterprise management, enabled Coders Lab to launch a programme focusing specifically on providing ICT training to severely marginalized youth, i.e. youth leaving state-run foster care institutions. Participants need no prior ICT knowledge, just commitment. The collaboration has provided Coders Lab with the required capacity and financial support, including expanded network and leveraging contacts with potential corporate and public administration partners and investors.

For full details of the case, see Appendix E.

potential employers already during the course) or elsewhere.

Both Coders Lab and SDA are commercial programmes offered at market rates; they are also accessible to job-seekers who lack the means to afford the costs – if they are registered as unemployed and as such qualify for free training. In this case the responsible labour office will pay for all costs of the training, often in the context of Operational Programmes (OP) which are themselves funded from the European Structural Funds.

The disadvantage of this kind of offer is that applicants usually need to be able to demonstrate strong motivation to work in the digital sector as well as well-developed analytical and logical thinking skills. This tends to exclude individuals who require stronger activation to enable them to embark on the ICT training journey. Coders Lab's cooperation with NESsT Empowers, an NGO-driven initiative for targeting groups at highest risk of social exclusion (here: young persons leaving foster care), shows how established ICT training programmes can be opened up for persons who require hands-on support to enable them to enter into ICT training leading to employment in the sector.

In order to reach NEET youth, it will often be necessary to equip them with basic skills before they can hope to qualify for a mainstream ICT training course, even if this is fully funded by the state. Poland has well-developed system for skills provision to this clientele, including the extensive network of Voluntary Labour Corps as well as private initiatives such as Akadamia Pozytywnej zmiany (Academy of Positive Change)[43].

[43] https://eskills4diversity.com/map.html

Box 6 Snapshot: Examples of progress in inclusive ICT trainings[44:]

ICT Training in rural and peripheral regions:

- Examples are the E-Centres set up by Fundacja Aktywizacja, initially with the intention to provide wheelchair users with a workplace close to where they live. The objective was to remove the need for strenuous commutes to a central office. Today, there are 400 E-Centres across all areas of Poland, catering to people with a disability and others who would like to work closer to their home.
- The euroKobieta initiative, which ran from 2007 to 2015 and was funded by the European Social Fund (ESF), provided women in the Lower Silesian region with free ICT training, with special emphasis on skills required for ICT-enabled remote work either from home or from a centre in their vicinity.

Communities and engaged groups in ICT training:

- Examples of NGOs with outstanding success in the area include, Geek Girls Carrots and "Perspektywy" Education Foundation, the organiser behind the IT for SHE initiative. Geek Girls Carrots was founded in Warsaw in 2011, since when it has extended its activities to many other countries including the Czech Republic, Germany, Holland, Israel, Japan, Portugal, South Korea, Switzerland and the UK. IT for SHE has, in 2018, organised the largest European get-together for women operating in the ICT domain, the international Women in Tech Summit.

Support to SMEs to engage in inclusive ICT training:

- A good example of a possible approach is presented by the Foundation Educational Centre of Improvement. It was established by the Pomeranian ICT Cluster to actively pursue the strategic goal of improving availability of qualified human resources to the members of the cluster. Its programme Kobiety w IT ("Women in IT") is built on a strong partnership with the Job Centre of Gdansk and a larger number of the region's ICT companies. The latter are involved in drafting the curriculum in order to ensure that the participants gain theoretical and practical ICT skills which are likely to result in successful job placement. Programme participants are typically rewarded with a job offer once they have successfully finished a period of internship in one of the cluster's enterprises.

Empower training providers to deliver effective inclusive ICT training:

- Examples from our analysis of Poland's inclusive ICT training landscape include commercial providers Akademia Umiejetnosci Jezykowych i Komputerowych, Dobry start, Mlodzi Aktywni Wykwalifikowani and, and public sector providers ICT Lab dla NEET, ICT Lab Centrum Szkolen Informatycznych and Fundacja dla Uniwersytetu Kazimierza Wielkiego w Bydgoszczy.

Access to Industry-driven training programmes for people from groups at risk of social excursion:

- Coders Lab (see Good Practice Showcase in the Appendix) is an example of an arrangement between a commercial training provider and an NGO that provides access to funding.
- Coders Lab gained the needed expertise h from NESsT Empowers, a private donor-funded NGO with years of experience in the social innovation domain.
- Both partners are currently working on a business model to sustain the training programme over a longer time. For this purpose several different models are explored – subsidies, fellowships, third-party charging (future employers), loans to be paid back after getting employed.

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[44] https://eskills4diversity.com/map.html

Training taxonomy targeting training needs

We classified the ICT skills training programmes identified in Poland in six categories based on the programmes' approaches to learning. The most promising programmes use multiple methods that are a combination of two or more approaches. The advantage of using integrated approaches is that it allows for the development of both technical and cognitive skills. These approaches are discussed in more detail below.

Bootcamps

Intensive training programmes generally lasting from a few days to several months. Training can be full- or part-time depending on the programme and consists of lessons, individual and team projects, 1:1 tutoring and tests.

Workshops

These typically take one to three days. Training is on specialised topics and consists of presentations and interactive peer-to-peer sessions.

A variety of training providers use both bootcamps and coding workshops. Bootcamps have a skill-intensive focus that cover areas such as intermediate to advanced programming languages, supplemented by smaller sessions or workshops on soft skills training. Workshops tend to be less wide in scope and broader in terms of target audience.

Success factors

- Affordability: Bootcamps are an affordable alternative to a four-year university degree as they require less time to complete and tend to cost less.
- Flexibility: Compared to university programmes, bootcamps are more flexible in terms of curricula and can respond faster to changing market demands.
- Prior Experience: Bootcamps are less selective than universities in terms of prior qualifications. Individuals who are interested and do have some previous knowledge, but not from formal training & education, can enrol in training bootcamps.
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Challenges

- Certifications: Bootcamps tend to not offer standardised certifications but rather follow a variety of teaching and training techniques.
- Employability: In terms of employability, bootcamp qualifications are not always sufficient and employers tend to prefer more traditional technology qualifications or longer work experience in the ICT sector – although they often become more open to alternative options in case they face serious problems in filling open vacancies.

Classroom

Traditional, instructor-led training in a classroom setting, in most cases using tailored e-learning platforms. Training usually leads to a certificate and can last for several months.

Online

Training includes but is not limited to massive open online courses (MOOCs). Courses are available on online platforms, are mostly free to join and may or may not have instructors. Assessments are sometimes self-administered or based on peer-to-peer feedback, while others offer the possibility to take a final exam and earn a certificate.

Classroom training, sometimes complemented by online learning elements, is by far the more popular approach towards ICT skills training used by most training programmes in Poland.

Success factors

- **Flexibility:** Learning through online platforms can be more flexible as trainees can access courses and schedule tests based on their own availability. However, this may not be possible with classroom training if programmes follow a strict in-house schedule.
- **Learner engagement:** Classroom training tends to be much more suitable for ensuring engagement of persons who lack self-efficacy, such as often found among NEET youth and the long-term unemployed.
- **Certifications:** Courses include but are not limited to content provided by IT vendors, such as Microsoft, SAP, Cisco and Oracle. Vendor-specific trainings follow a partner-centric approach in which companies create the curriculum which is then delivered by partners.
- **Employability**: Such trainings have the advantage of providing certifications that are valued by employers. A disadvantage of vendor programmes is their focus on the vendor's products, which means they tend to be considered by employers as not generic enough to educate on the underlying principles. Stakeholders in the sector report that employers increasingly want employees to cross-certify with multiple vendors.

Challenges

- **Affordability:** Classroom training following a vendor-specified curriculum resulting in a certification tends to cost more, both for trainees and training providers. These programmes, unless funded through sponsors and other mechanisms, are unable to reach low income groups like NEET youths.
- **Accessibility:** Training programmes which require the presence of the learner at the location of the training provider tend to be available most of all in the major urban centres of the country, as our assessment of the training landscape shows. Other parts of the country, such as the rural eastern Provinces of Poland, tend to be underserved. Classroom based training is also less suited for persons demanding flexibility about when to learn, such as mothers of young children.
- **Prior Experience:** These programmes, especially if offered for free, tend to be more selective when choosing prospective participants. Stricter selection criteria have the risk of excluding those who may have the most to gain from such employability skills.

Experiential

A mix of technical and experiential learning including classroom-oriented learning and company placements. Both digital apprenticeships and, to a lesser degree, traineeships are designed around experiential learning.

Mentorships

Not a stand-alone training type and is integrated with other types. A trainee can choose or is appointed a mentor who is an experienced instructor or employee. The mentor is responsible for providing 1:1 guidance.

Experiential programmes such as an apprenticeships and traineeships are a general feature of ICT skills training in Poland, but often suffer from problems of quality.[45] Depending on the programme, training can last from a few days to several years. Mentorship programmes that seek to increase workforce diversity and gender equality often make use of volunteer mentors who have a personal interest in helping young persons succeed in the ICT sector.

Success factors

- **Certifications:** Depending on the programme, a trainee may or may not receive a certification. However, the number of hours worked are recognised as formal work experience.
- **Employability:** Internships and workplace learning programmes have high added value for trainees as they learn both technical skills and soft skills, and get in touch with employers who may want to offer them a job after completion.
- **Employer engagement**: As training is structured to reflect the demands of employers, employers can benefit from being involved in the training by getting relevant skills in return. This is a major success factor of experiential training programs, especially those developed with the help of business-education partnerships.
- **Mentorships:** In many such programmes, technical training is accompanied by mentorships. Mentors are a valuable source of learning for new trainees or employees at the beginning of their careers. Mentorships work well if mentors are selected based on an intrinsic interest in supporting others during their career.

Challenges

- **Prior Experience:** Trainees must be enrolled in education and training to get placed into an internship. Few training programmes guarantee an internship for all participants and places might be subject to employer acceptance of the learner. Training programmes that offer compulsory work experience tend to be more selective in terms of prospective participants.
- **Affordability:** It is challenging for training providers to find employers who are willing to train and hire interns because of the resource burden on employers. Usually, experiential training is offered by well-reputed training programmes with a vast network of partners.

[45] Contact Committee of European Union Supreme Audit Institutions (SAI) (2018) 'Audit Compendium - Youth unemployment and the integration of young people into the labour market'

IT vendor certifications, such as those mentioned above, provide an added value for both trainees and employers. Originally designed for further training, ICT-Vendor certificates have a good reputation as such. The certificates enjoy a high reputation and are accepted as valuable for career entry and career transitioning youth and adults – specifically when obtained from reputable international ICT vendors. From our employer survey we know that such certificates are credentials for jobs like IT operations technicians, IT engineers, and IT user support technicians. An IT vendor certification is an accepted form of certification preliminary in further education and training because it is recognizable and uses benchmarks for skills assessment of trainees.

Moreover, these certifications are designed based on a variety of specific skill sets, which can be adapted and updated to match the changing needs of the ICT sector. For this reason, vendor certified programmes generally require individuals to retake assessments at regular intervals.

The added advantage of skill-specific certifications is that many of them do not require an extensive educational background. Training providers can utilise this advantage by focusing on training content that specifically addresses low-skilled ICT occupations that do not require an academic background and for which certifications are sufficient for finding employment in the ICT sector.

Good Practice Showcase: Software Development Academy

Focusing on equipping participants with soft skills and providing recruitment services that together lead to outstanding impacts in terms of employability

The Software Development Academy (SDA) Poland, operated by ICT multinational Ericsson, runs ICT training courses and recruitment services catering to people with an ICT background, those re-entering the ICT industry, and those who have no background in ICT but are interested in a career in the ICT domain. The SDA initiative was established as a bottom-up response to digital skills shortages in the Polish labour market. SDA operates in Gdańsk, Warsaw, Łódź, Poznań, Wrocław and Krakow and is currently planning to scale up its activities in other cities as well. SDA offers training in Java programming, Java for beginners, test automation and various other entry-level ICT courses. Courses are offered at market rate, but persons registered as unemployed can get the costs funded by the Labour Office. Candidates must be able to demonstrate that they have strong analytical and logical thinking skills, motivation and strong commitment, teamwork skills and the ability to spend at least 16 hours per week on the programme. In 2018, 35 people graduated in the first round and 81% of SDA graduates have found employment within three months after completing the course.

Why a good practice showcase?

- **Training programmes cover a range of soft skills for improving participants' employment prospects.** 80% of the learning content is comprised of practical content, such as exercises, live coding sessions and problem discussions. Once applicants have completed their training, they participate in work placement interview simulations with trainers.
- **The design of training programmes is guided by up-to-date requirements within industry.** All of SDA trainers are active programmers with industry experience. The programme by default helps its participants to build their portfolios, which are useful for recruitment opportunities.
- **The Academy cooperates closely with many companies that recruit ICT specialists.** Eight enterprises were involved in working with SDA Poland in its initial phase; currently their number is exceeding 50. These are involved as partners who cooperate and participate in building training programmes and choosing and providing industry trainers, and most importantly, recruiting graduates as employees in their respective companies.

For full details of the case, see Appendix E.

Good Practice Showcase IT for SHE

Mobilising experienced ICT specialists in Poland for providing mentoring, training, networking and career advice to female students to prepare them for IT careers and to become volunteers in the 'IT for 1000 kids' programme

IT for SHE aims to increase participation of women in the ICT workforce by providing hands-on support to talented female students from ICT faculties at universities but also children from the poorer areas encouraging them to seek education and work in IT. For this purpose, IT for SHE brings together female students and experienced ICT specialists from Poland from the partnering organisations (Cisco, Citi, Ericsson, Goldman Sachs, Google, Intel, P&G, Samsung) for mentoring, training, networking, career advice and project activities. The **Mentoring Programme** focuses on finding and developing each student's potential through a six-month partnership between a selected experienced ICT specialist (mentor) and the student (mentee). It uses inspiration and counselling based on the mentor's knowledge, life experience and professional experience. About 40 mentors, all of which currently working as ICT specialist in companies across Poland, work as volunteers for the programme. Students are invited to apply to one of the mentors based on the latter's' profile posted on the web. Around 50 female students have in the meantime volunteered to become active in the 'IT for 1000 kids' programme visiting schools and motivating and teaching programming and technological knowledge to increase interest in STEM (Science, Technology, Engineering, Mathematics) among children demonstrating a career in IT as a worthwhile opportunity.

Finally, the **Women in Tech Camps** brings together >100 ambitious female ICT students from Polish universities to discuss and study latest developments in advanced programming, participate in hackathons and meet top class mentors. Networking among present and future female ICT specialists is at the core of the event. IT for SHE is operated by "Perspektywy" Education Foundation, an NGO led by present and former rectors of Polish universities and other public figures keen on developing higher education in Poland. Perspektyw's activities for promoting women in ICT have gained international recognition. In 2018 the Foundation organises the Women in Tech Summit 2018, currently Europe's largest event dedicated to the topic, bringing together more than 1,000 of the "most talented women in the technology industry".

Why a good practice showcase?

- **IT for SHE takes a systemic, long-term approach to improve the prospects for women in Poland's ICT sector.** For doing so, the initiative fully exploits the potential of mentoring as a means to equip female students with the capability to succeed in building a career in ICT, in spite of the deep-seated misconceptions and negative attitudes which still exist towards women working in previously male-dominated engineering jobs.
- **Close relationships to a number of industry partners who believe in the need to mobilise the potential of women in ICT.** These companies have a vital interest in the future of the Polish labour market in the area of ICT and new technologies in general.
- **Since sponsorship agreements tend to be short-term, IT for SHE's sustainability depends on the extent to which the organiser can maintain the current level of interest in the programme.** For this reason IT for SHE has put much effort into securing extensive media coverage as well as the personal commitment of key (female) players from the country's major ICT companies, all of which has enabled organiser Perspektywy to attract sufficient support in terms of sponsor money.

For full details of the case, see Appendix E.

Lessons learnt

Feedback from employers reveals that well-developed soft skills are a key to recruitment as they are important for digital skills as well. Soft skills in demand range from effective communication and coordination to problem-solving, negotiation, teamwork and collaboration, and decision making. Therefore, it is crucial to expose learners and students to practical work experience early on. Such exposure can take the form of a work placement which is part of the training course, or an apprenticeship where training and work experience are combined throughout

Employers indicated that graduates and trainees with no prior work experience tend to lack such skills, which points towards the potential of digital apprenticeships to significantly increase the number of suitable candidates available on the job market.

Good ICT skills training programmes in Poland address the development of soft skills, for example, by using smaller sessions within larger training modules. Such sessions are specialized to account for different needs of the trainees, such as conducting interview simulations, workshops on communication and team-building exercises.

Programmes such as the Coders Lab cooperation with NESsT Empowers (see Good Practice Showcase in Appendix D) address the development of behavioural and mind-set skills by including training in employability skills to help apprentices succeed and develop in the workplace, such as in teamwork. This approach helps to prepare trainees for actual situations encountered at work.

Mixed or integrated approaches to training are the most desirable for both trainees and employers in Poland, particularly those in an experiential learning setting. Co-operation with businesses, if possible from the local economy, 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. In this respect industry-driven programmes such as Ericsson's Software Development Academy (SDA) have an advantage because of their close links to in-house and partner HRM departments.

Traditionally, employers in Poland have been reluctant to hire candidates who do not have an academic background in ICT or related fields, regardless of certifications. Interviews with employers of ICT specialists conducted by Przybysz et al. (2017) found that "at the beginning of the recruitment process [employers] often do not fully realize that tasks related to a particular position can be learned and skills applied by people who do not hold a master's or bachelor's degree".[46]

The shortage of ICT specialists, however, has started to change this. To quote the NESsT study again: "During the interviews, employers reiterated that they are ready to reduce formal requirements, such as those concerning education, if they have a candidate who demonstrates the expected level of job and/or interpersonal skills".[47] This is opening up new opportunities for many individuals belonging to diverse socio-economic groups, for whom an academic background is a difficult criterion to meet due to considerable investment of time and finances.

Our analysis shows that the mentorship model is particularly well suited to encourage girls and women to consider ICT careers for two reasons: first, because female role models have been found to play a key role in young women's attitude to working in the digital sectors; second, because it tends to be comparatively easy to recruit volunteer mentors among women working in the digital sectors. This is because, as surveys have repeatedly shown, they have typically perceived a range of gender related obstacles themselves during their career, which they are often keen to help remove for future generations of women working in the sector. The Good Practice Showcase (GPS) IT for SHE brings together female mentors with future and current female ICT students.

[46] Przybysz et al. (2017) , p. 23
[47] ibid., p. 24

Box 7 Key lessons learnt from ICT training in Poland

Outreach

- Programmes target a variety of socio-economic groups (see Figure 5). A high proportion is geared towards NEET youth, long-term unemployed job seekers and women.
- Outreach to highly vulnerable groups is mostly done jointly by public sector agencies (such as Labour Offices), industry stakeholders and, where applicable, the NGO sector. Media campaigns are often financed from the budgets of OPs funded by the European Structural Funds.
- Initiatives jointly operated by NGOs with major employers in the digital sectors are the most effective in terms of outreach, particularly through effective campaigning using well-established channels of communication. They typically benefit from the personal commitment of volunteers who use their own networks for outreaching purposes.

Training

- Business-education partnerships are essential for developing training curricula. Training programmes designed with strong input from industry or IT vendors can better reflect the market need for ICT skills.
- An added advantage of IT vendor programmes is the lower risk of training being outdated because of frequent new qualification offers and options to renew past certifications.
- Successful trainings combine a variety of training methods. The most important aspect of multi-level training is the development of both technical and cognitive skills, such as the ability to work in teams, effective communication and problem-solving. In addition, many successful programmes equip participants with skills in self-marketing.
- Mentoring using (mostly) volunteer, seasoned ICT specialists as mentors and role models has been tried and tested and proven to be able to effectively address challenges in attracting and supporting women, but not yet other underrepresented groups.

Employability

- Polish employers frequently state that both the level of technical skills and prior experience in the work environment are important. Work placements such as apprenticeships and traineeships, therefore, are potentially or major importance as they can offer a route into employment; they could also be of special value to underrepresented groups. Their quality, however, often suffers from lack of resources on the part of employers.
- Programmes that are designed with strong input from employers in the digital sectors and also offer periods of work placement often lead to direct employment of after participants have completed the training. The main challenge in this case is ensuring that the selection process for admitting candidates to the training does not work to keep out members of groups currently underrepresented in the ICT workforce.
- Certifications have a high added value for job seekers. Employers prefer hiring those candidates who have successfully completed high quality training from reputable training institutions. If programmes do not equip successful participants with well established, third-party certifications, they risk to be of limited impact in terms of improving employability.

Source: diversITy Survey, empirica (2017)

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Conclusion

Poland's ICT sector is among the most dynamic in Europe. The country has established itself, in particular, as one of the top markets for ICT-related outsourcing in the world. This would not have been possible without Poland's excellent higher education system, which produces large numbers of ICT graduates. Young persons who prefer a practical learning style or for whom an academic qualification is not an option or due to the investment of time and money, are less well served by available ICT training programmes. The vocational education and training (VET) system is criticised for producing many graduates who are not even qualified for entry positions in ICT specialist occupations. The private sector, including IT vendors, is offering fast-track ICT training programmes tailored to the needs of employers, but charges fees which make them all but unaffordable for persons from a disadvantaged socio-economic background. Against this background, a number of NGOs, industry stakeholders and state agencies have taken the initiative to explore alternative options. This section presents the main recommendations derived from our analysis of the he inclusive ICT training landscape in Poland.

Poland has an excellent higher education system that is producing large numbers of ICT graduates, which has helped make the country's ICT sector one of the most dynamic in Europe. Poland is ranked among the top 10 in Tholons Top 100 ICT Outsourcing Destinations, a much-quoted industry source.[48] Poland has also, through out-migration of skilled ICT specialists, contributed to address skills shortages in other countries such as Germany and the UK.

Additional changes are needed in the domain of vocational education and training (VET), as recognised by the Polish Government in the past.[49] Thus far, curricula have been based on learning outcomes rather than on a description of subject content, giving schools more autonomy to adapt their programmes, including better collaboration with employers.

However, feedback from employers still suggests that graduates from vocational ICT programmes are insufficiently prepared even for entry positions in ICT specialist occupations.

The government has identified the need for much stronger co-operation between VET providers and employers to improve the match between training offers and labour market demand. A range of measures have been taken in the context of the ongoing reform of the country's VET system. For these to bear fruit it will be necessary to adjust the financial model to the changes in structure and content introduced by the reform, as Cedefop has noted.[50] The European Commission's Training Monitor also calls for more flexible learning pathways and better guidance and counselling, which will require additional government funding.[51]

The private sector, including IT vendors, is offering fast-track ICT training programmes tailored to the needs of employers. As these are commercial offers, they charge significant fees from participants, which limits their suitability e.g. for NEET youths.

A major challenge in both tertiary and vocational education is the low share of women embarking on careers in ICT. Deep-rooted cultural norms and out-of-date value systems, including stereotypical views about what type of school subjects and jobs are best suited for girls and women, still keep female participation rates in ICT training programmes low.

Against this background, a number of NGOs, industry stakeholders and state agencies have taken the initiative to explore alternative options. They have started to demonstrate the potential for innovative approaches to ICT training focusing of groups currently underrepresented in the ICT workforce. Our investigation of the inclusive ICT training landscape in Poland found a range of successful and promising approaches. In the following we derive several recommendations from our analysis.

[48] Tholons (2016) '2016 Top 100 Outsourcing Destinations'
[49] The System of Education in Poland in Brief, Polish Eurydice Unit, 2015
[50] Cedefop (2018) 'Developments in vocational education and training policy in 2015-17: Poland'
[51] European Commission (2017a) 'Education and Training Monitor 2017 Poland'

Recommendations

Promote ICT careers to women

Only a small share of female students at technical schools and universities enrol in ICT related subjects, as discussed above.

It is therefore of vital importance to give special encouragement to young women in Poland to consider a career in ICT.

There should be a high profile, multi-channel marketing campaign on opportunities for women in digital jobs. This also needs to challenge traditional perceptions around technical vocational education and include parents, teachers and the wider public.

Intervention in the form of awareness-raising and taster programmes is already being utilised by programmes in Poland to encourage young women to contemplate careers in technology. These activities should be continued and extended to reach many more young women and their main influencers.

Offer training that is adapted to the need of learners for flexibility and support

Many women will need flexible arrangements and additional support that indirectly help and motivate them to embark on and complete their ICT training. Poland has a large share of women who state that they would like to take up a job but are prevented from doing so due to family commitments.[52]

The aim is to not reduce the amount of learning, but to enable different ways to fit learning and work around people's lives. A range of other people could also benefit from flexible trainings, including people with disabilities and health problems, and with caring responsibilities.

Support services that can help overcome practical obstacles may include childcare, eldercare, coaching, networking, and time off from work.

Make ICT training available for people in rural and peripheral regions

Another need of particular relevance to Poland is access to training provision in the more peripheral and rural areas of the country. Our analysis showed that such areas tend to be underserved by ICT training providers, especially private sector institutes.

Poland has made good experience with what used to be called tele-centres, i.e. facilities at local level that provide access to computers, the internet and training (from ECDL workshops for everybody to specialist ICT training to qualify job seekers for employment, in co-operation with local labour offices).[53]

Experience from initiatives suggest that provision in rural and peripheral areas needs to utilise both classroom and online learning. It should also focus on a realistic assessment of the region's capacities; for many people, suitable ICT specialist jobs will not become available in these regions. This means that training programmes may also need to seek changing participants' attitudes to geographical mobility.

Leverage the power and creativity of existing communities of engaged citizens

Our analysis has revealed that Poland has a very strong community of activist groups who are working, in particular, to promote equality of chances for women in ICT education and the digital workforce. They are carrying out a large range of activities, many of which by women working in ICT and keen to reach out to girls and young women at a time when they make career choices.

Groups currently underrepresented in the ICT workforce can learn from the experiences NGOs made and leverage their existing knowledge. Government funding, for example from current and future OPs, could help increase the reach of NGOs that provide effective, short-term ICT training such as coding clubs to groups currently underrepresented in the ICT workforce. It may be a good idea to develop a

[52] Przybysz et al. (2017), p. 37

[53] Garrido et al. (2012) 'Literature Review of how Telecentres operate and have an Impact on eInclusion'

framework together with performance criteria through which such NGOs could receive accreditation and, based on it, public funding.

Offer better support to SMEs to engage them in inclusive ICT training

Most SMEs find it difficult to divert resources to offering apprenticeships or traineeships to young persons, especially from groups currently underrepresented in the ICT workforce, many of whom need special support in one way or the other. Financial incentives such as access to ESF funding alone will not suffice to change the situation.

A comprehensive support system is required to address the main barriers to stronger engagement in inclusive training. For arranging such a system, multi-stakeholder partnerships at local and regional level have been shown to be most effective.

Empower training providers to deliver effective inclusive ICT training

Much of the inclusive ICT training on offer in Poland is provided by private or public sector, specialised training providers that apply for funding in response to calls published in the context of OPs funded by European Structural Funds. The little evidence that is available suggests that many of these small training providers have limited capacity to deal with the special challenges posed by inclusive approaches to training. They require effective, hands-on support to deal with any hurdles that might keep them from offering ICT training to members of minority groups with which they have made little experience so far.

Equalities help lines should be established to support both SMEs and training providers in their equality policy. In larger companies, networks of current employees from underrepresented groups plus HRM experts and third party providers of support measures can go a long way towards establishing "wrap around" support to trainees, line managers and others whose day-to-day commitment is needed.

For inclusive ICT training funded under future OPs, Poland may want to consider requiring training providers to undergo diversity training as a precondition for participation.

Open up industry-driven training programmes for people from groups at risk of social exclusion

Commercial ICT training programmes can be very well suited for persons from groups currently underrepresented in the ICT workforce. Providers will, however, require some kind of financial arrangement to cover the participation fee as learners are typically not able to afford them. Fees charged by providers can be substantial, but these can often be subsidised or fully paid for by third parties such as Labour Offices.

Opening up industry-driven training programmes for people from groups at risk of social exclusion requires more than just dealing with the funding issue. Coders Lab needed to adapt both teaching methods and content to the needs of at-risk young people (here: young persons leaving foster care). It has also had to acquire skills in recruiting participants and keeping them motivated throughout the course programme.

Experience from Coders Lab shows so far that in many cases, some preparatory measures are required to enable individuals to succeed in the training. This refers, in particular, to the need for English language and soft skills training. In addition, learners require high-quality mentorship throughout the duration of the training.

In terms of ensuring that the training leads to employment, the project initiators stress the need for close involvement of employers from both the private and public sector. Curricula should be consulted with stakeholders, also including public schools and universities, recruitment agencies and labour market experts. Only this will ensure that the programme is kept up to date and properly reflects the needs of prospective future employers.

New funding models

While many parts of Poland's economy that rely heavily on ICT are in good health, one of their main competitive advantages is related to low costs in comparison to locations in Western Europe and North America.[54] This applies, in particular, to the thriving business services outsourcing industry. Inclusive ICT training schemes are therefore unlikely to achieve sustainability if they do not offer a short-term solutions to the challenge of who will absorb the costs.

The Polish government should assess to what extent existing funding programmes can be utilised for this purpose, and also provide additional financing from

[54] INVESTIN (2017) 'Growth Perspectives for Polish ICT Sector by 2025'

budgets reserved for measures tackling skills shortages and youth unemployment.

Improve the quality of work placements

Work placements are a tried-and-tested way to establish co-operation between employers and training providers. They allow learners to apply newly acquired skills in practice and get used to working in a real workplace environment. Employers benefit because they become acquainted with the profile of future job prospects, which often leads them to make to employment offer to the learner at the end of her training.

Work placements are a general component of ICT training schemes in Poland, but the available evidence suggests that their quality is insufficient in terms of the average length of the placement, the level of integration of learners in the work process, and the support offered to them by officially assigned mentors.[55]

The reasons SMEs mention most often for not offering apprenticeships or internships are lack of resources, lack of experience, lack of a suitable curriculum, risking loss of trained apprentices after completion, and lack of perceived benefits.[56]

Industry stakeholders, providers of training and education, NGOs and government should engage in a concerted effort to boost the quality of work placements across all sectors. This may require experimenting with innovative ways of engaging employers in vocational ICT training, as in the example of the so-called Patronage classes.

Patronage classes are a form of collaboration between employers and schools. A company acts as a patron extending its support towards a class in an upper-secondary vocational school. "The conditions of the collaboration are specified in a memorandum of understanding or in a contract. The patronage can take many different forms. Most often, the company invites student for curricular internships, equips the school with appliances for its workshops and with didactic materials, offers additional training for the teaching staff or funds scholarships for the most talented students. The best students are guaranteed to be employed by the company once they graduate".[57]

Offer more mentorship

Mentoring programmes have been discussed previously as a training approach in experiential learning. There is, in addition, the possibility of mentorship programmes for students and trainees during their education, specifically for women and people from minority groups. Mentors can play an important role as role models who help question traditional gender roles; they can demonstrate career opportunities for groups currently underrepresented in the ICT workforce; and they can provide practical, tried-and-tested ways how to address obstacles in day-to-day training. Moreover, mentors provide network contacts which can make all the difference once the time has come to apply for a job.

Many mentorship programmes make use of seasoned employees who volunteer for the role based on an intrinsic interest in advancing progress in the diversity area. However, the small number of people from many underrepresented groups in the workplace means that findings mentors in-house – for example, successful employees with a disability – can pose a challenge. For this purpose, innovative models may need to be developed, such as cross-organisational and cross-regional mentor networks, possibly operating online only, for which employers can apply.

Carry out frequent ICT skills audits

Up-to-date insight into skills shortages and their relationship to skills produced by the education and training system are required for stakeholders to take the best possible decisions. For instance, training providers need the best information they can get about current and expected future demand for skills. The better the data, the more they are able to design learning programmes in ways that support graduate employability. Recruiters need the information for preparing decisions about investments in training measures, including where relevant co-operation with training providers.

The 2017 report produced by NESsT, on "Closing the Skills Gap in Poland" demonstrates the added value of research based on interviews with employers as well as learners, rather than simply analysing data published by the Statistical Office. A similar approach

[55] Contact Committee of European Union Supreme Audit Institutions (SAI) (2018)
[56] OIC Poland Foundation (2017) 'National Report on Apprenticeship in Poland', pp. 20-21
[57] Tobys (2017) 'Patronage classes', n.p.

has been used in Dublin by FIT, a major stakeholder in the Irish inclusive ICT training landscape, for production of the so-called ICT Skills Audits.[58] The audits are based on face-to-face interviews with senior HR and business development managers in a larger number of ICT-intensive companies across Ireland.

We recommended combination of the methodological approaches applied by NESsT and FIT for regular publication of ICT skills reports in Poland. These should be published annually to take full account of the fast-changing nature of the ICT industry and related skills needs.

Need for better evaluation

A further shortcoming of current practice is the lack of serious evaluation of learning interventions, especially those conducted under OPs and funded from the European Structural Funds. Little is known about their impact in terms of employment and career building apart from evidence that participants found the experience valuable. Research is required on reasons why learners are dropping out, gaining employment or starting own businesses, and why some employers invest in ICT training while others stay inactive.

[58] FIT (2018) 'FIT ICT Skills Audit 2018'

References

Bundesagentur für Arbeit (2018). IT Fachleute. Berichte: Blickpunkt Arbeitsmarkt, 3/2018.

Cedefop (2016). Poland: Mismatch priority occupations. Skills Panorama. Online article, 10/2016. Retrieved from: http://skillspanorama.cedefop.europa.eu/en/analytical_highlights/poland-mismatch-priority-occupations

Cedefop (2018). Developments in vocational education and training policy in 2015-17: Poland. Cedefop monitoring and analysis of VET policies. Retrieved from: http://www.cedefop.europa.eu/en/publications-and-resources/country-reports/vetpolicy-developments-poland-2017

Central Statistical Office, Poland (2017). Education in 2016/2017 School Year. Warsaw: Central Statistical Office.

Chmielewska, I. et al. (2017). A new wave of Ukrainian migration to Poland. Retrieved from: https://financialobserver.eu/poland/a-new-wave-of-ukrainian-migration-to-poland/

Contact Committee of European Union Supreme Audit Institutions (SAI) (2018). Audit Compendium - Youth unemployment and the integration of young people into the labour market. Audit reports published between 2013 and 2017. Luxembourg: Publications Office of the European Union

Dashja, E. et al (2015). e-Leadership Skills for Small and Medium Sized Enterprises. Country Report Poland. A Snapshot and Scoreboard of e-Leadership Skills in Policy, Higher Education and the Labour Market. Bonn: empirica.

Dotti, N.F. (ed.)(2016). Learning from implementation and evaluation of the EU Cohesion Policy: Lessons from a research-policy dialogue. RSA Research Network on Cohesion Policy, Brussels. OECD (2016). OECD Economic Surveys: Poland. Paris: OECD.

Dvorak, J. (2010). Evaluation of the European Union Structural Funds Support in Poland: Scope and Significance. Baltic Journal of Law & Politics 3(1): 53-75.

European Commission (2017a). Education and Training Monitor 2017 Poland. Luxembourg: Publications Office of the European Union.

European Commission (2017b). Country Report Poland 2017, 2017 European Semester: Assessment of progress on structural reforms, prevention and correction of macroeconomic imbalances, and results of in-depth reviews under Regulation (EU) No 1176/2011. SWD(2017) 86 final. Brussels: European Commission.

Eurydice (2018) 'National Reforms in Vocational Education and Training and Adult Learning: Poland', retrieved from https://eacea.ec.europa.eu/national-policies/eurydice/content/national-reforms-vocational-education-and-training-and-adult-learning-50_en

FIT (2018). FIT ICT Skills Audit 2018 – Widening the ICT Talent Pipeline for Sustained and Inclusive Growth. Dublin: FIT.

Główny Urzad Statystyczny (2013). Informacja o rozmiarach i kierunkach emigracji z Polski w latach 2004–2012. Warszawa.

Górniak, J. (ed.)(2014). Competencies of Poles vis-a-vis the needs of the Polish economy – Key results of the fourth round of the BKL Study in 2013. Warsaw: Polish Agency for Enterprise Development.

Górniak, J. (ed.)(2015). The Hidden Human Capital – Additional Capacities of the Polish Labour Market. Key results of the fifth round of the BKL Study in 2014. Warsaw: Polish Agency for Enterprise Development.

INVESTIN (2017). Growth Perspectives for Polish ICT Sector by 2025. Warsaw: Polish Agency for Enterprise Development.

Jelonek, M. (2011). Students – the future force of Polish economy. Project report, The Study of Human Capital in Poland. Warsaw: Polish Agency for Enterprise Development.

Kupiec, T. (2014). Evaluation Practice of Regional Operational Programmes in Poland. Management and Business Administration. Central Europe, 22: 135-151.

MonsterPolska (2017). Czy specjaliści IT zaczną migrować? Dane o zarobkach w regionie. Retrieved from: https://szukampracownika.monsterpolska.pl/hr/hr-best-practices/zarzadzanie-pracownikami/zarzadzanie-swiadczeniami-pracowniczymi/czy-specjalisci-it-zaczna-migrowac.aspx

OECD (2013). World Migration in Figures. Paris: OECD-UNDESA.

OECD (2015). Connecting with Emigrants: A Global Profile of Diasporas 2015. Paris: OECD.

OECD (2016). OECD Economic Surveys: Poland. Paris: OECD.

OECD (2018). Poland – Country Note: Education at a Glance 2018. OECD Indicators. Retrieved from: http://gpseducation.oecd.org/Content/EAGCountryNotes/POL.pdf

OIC Poland Foundation (2017). National Report on Apprenticeship in Poland. Project report, Services for Apprenticeships (SERFA). Retrieved from: https://www.serfa-project.eu/sites/default/files/upload/projet/poland_national_report.pdf

Garrido, M. (2012). Literature Review of how Telecentres operate and have an Impact on eInclusion. JRC Technical Reports. Luxembourg: Publications Office of the European Union. Retrieved from: https://core.ac.uk/download/pdf/38628262.pdf

Pasławski, K. (2017). Specjaliści IT wyjadą z Polski?. CRN, 2017-08-09. Retrieved from: https://www.crn.pl/aktualnosci/specjalisci-it-wyjada-z-polski

Pekkala-Kerr, S., Kerr, W., Ozden, Ç and Parsons, C. (2016). Global Talent Flows. Policy Research Working Paper 7852.

Przybysz, I., Orzechowska, A., and Cichowicz, G. (2017). Closing the Skills Gap in Poland: Leveraging the Promise of Social Enterprise and the BPO Industry. Warsaw: NESsT.

Statistical Office (2017). Higher education institutions and their finances in 2016. Retrieved from: https://stat.gov.pl/en/topics/education/education/higher-education-institutions-and-their-finances-in-2016,2,10.html

Sznyk, A., Bielewicz, A. and Karasek, J. (2016). Kobiety w technologiach – Obecność kobiet w polskim sektorze teleinformatycznym. Raport 2016. Warszawa: Znane Ekspertki and Instytut Innowacyjna Gospodarka.

Tholons (2016). 2016 Top 100 Outsourcing Destinations – Rankings & Executive Summary. Retrieved from: http://www.tholons.com/Tholonstop100/Tholons_Top_100_2016_Executive_Summary_and_Rankings.pdf

Tobys, J. (2017). Patronage classes. Linking labor market with education. Blog post. Retrieved from http://cometaresearch.org/educationvet/patronage-classes-linking-labor-market-with-education/

Trikha, R. (2016). Which Country Would Win in the Programming Olympics? Hacker Rank, August 25. Retrieved from https://blog.hackerrank.com/which-country-would-win-in-the-programming-olympics/

Appendices

Appendix A: Definitions and methodology

Appendix A.1: Methodology for baseline projection of ICT skills gap

Demand is following a linear trend, i.e. the average absolute growth of the last few years with plausible data is extrapolated.

Minimum supply is calculated as incumbents' workforce in a previous year minus exits plus domestic graduates. Exits are calculated using a percentage derived from Cedefop applied to the last year where data for the incumbent workforce available (it is fixed, i.e. static, to avoid repercussions from the model itself). Domestic graduates are assumed to be constant and equal to the latest available plausible official statistics. Graduates counted are VET graduates, short cycle programme and bachelor level graduates. Masters and PhD level graduates are not counted because they usually have previously earned a bachelor's degree and would hence be double counted.

Supply in a scenario with constant lateral entries adds also the "Minimum lateral entry inflow" to minimum supply

Minimum lateral entry inflow is the calculatory structural gap that remains when the number of domestic graduates (as defined in minimum supply) is subtracted from the need for new labour market entries (expansion and replacement).

Shortage without lateral entries is the gap that remains when the need for new labour market entries were only covered from domestic graduates.

Shortage with constant lateral entries ("everything stays the same") is the gap the remains when a constant number of lateral entries flows into the labour market.

The total potential for new jobs until 2025 is calculated as:

Demand 2025	**585,000**
Minus incumbent jobs 2016	424,000
Plus cumulative replacement 2017-2025	85,000
Jobs potential	246,000

Appendix A.2: Yearly breakdown for baseline projection of ICT skills gap

(in '000s)	2017	2018	2019	2020	2021	2022	2023	2024	2025
Demand (linear trend)	477	491	504	518	531	544	558	571	585
Minimum supply (incumbents minus exits plus domestic graduates)	448	472	496	520	545	569	593	617	641
Supply in a scenario with excess supply of degree outflow	437	451	464	478	491	504	518	531	545
Shortage without excess supply of degree outflow	29.3	18.6	7.9	-2.8	-13.5	-24.2	-34.9	-45.6	-56.3
Shortage with constant excess supply of degree outflow ("everything stays the same")	40	40	40	40	40	40	40	40	40

Source: empirica (2017)

Appendix B: Definition of ICT occupations according to ISCO

ICT Specialists by skill level according to ISCO (International standard classification of occupations)	
Level	ISCO (International standard classification of occupations)
High	Management, architecture & analysis
Mid	Core ICT practitioners – professional level
Mid	Other ICT practitioners – professional level
Lower	Core ICT practitioners – associate / technician level
Lower	Other ICT practitioners – associate / technician level

Eurostat: ICT specialists according to ISCO
Management, architecture & analysis
133 ICT Service managers
2511 Systems analysts
Core ICT practitioners – professional level
2512 Software developers
2513 Web and multimedia developers
2514 Application programmers
2519 Software and multimedia developers and analysts not elsewhere classified
2521 Database designers and administrators
2522 Systems administrators
2523 Computer network professionals
2529 Database and network professionals n.e.c.
Other ICT practitioners – professional level
2152 Electronic engineers
2153 Telecommunication engineers
2166 Graphic and multimedia designers
2356 Information technology trainers
2434 ICT sales professionals
Core ICT practitioners – associate / technician level
3511 ICT operations technicians
3512 ICT user support technicians
3513 Computer network and systems technicians
3514 Web technicians
Other ICT practitioners – associate / technician level
3114 Electronics engineering technicians
3521 Broadcasting and audio-visual technicians
3522 Telecommunications engineering technicians
7421 Electronics mechanics and servicers

Appendix C: Workforce Diversity Indicators

Indicator	Definition/Source
Long-term unemployment rate	Share of persons unemployed for 12 months or more in the total number of active persons in the labour market. Source: Eurostat [une_ltu_a], data from 2016.
Young people neither in employment nor in education and training (15-24 years) – NEET	Percentage of the population in age group 15-24 years who is not employed and not involved in further education or training. Source: Eurostat [edat_lfse_20], data from 2016.
Youth unemployment	Number of persons under 25 years who are unemployed, as share of the total number of young people in the labour market. Source: Eurostat [une_rt_a], data from 2016.
Employment rate of older workers (55-64 years)	Number of persons in age group 55-64 years who worked at least one hour for pay or profit during the reference week or were temporarily absent from such work, as share of the labour force in that age group. Source: Eurostat [lfsi_emp_a], data from 2016.
Age employment rate gap (15-64 vs. 55-64 years) in p.p.	Difference in percentage points between the employment rates of persons in age group 15-64 to age group 55-64 years. A positive figure denotes that the employment rate for older persons is lower than for the entire workforce. Source: Own calculation from Eurostat [lfsi_emp_a], data from 2016.
Gender employment rate gap (15-64 years) in p.p.	Difference in percentage points between the employment rate (15 to 64 years) for women and the rate for men. A positive figure denotes that the employment rate for women is lower than for women. Source: Own calculation from Eurostat [lfsa_ergaed], data from 2016.
Non-natives born outside the EU, as share of total population	Total population born outside of the EU (borders as of 2016) on January 1. Source: Eurostat [migr_pop3ctb], data from 2016.
Non-native employment rate gap, in p.p.	Difference in percentage points between the employment rate (15 to 64 years) for population born outside of the EU (borders as of 2016) and the rate for the population born in the reporting country. A positive figure denotes that the employment rate for persons born outside of the EU is lower than for those born in the reporting country. Source: Own calculation from Eurostat [lfsa_ergaed], data from 2016.
Disability employment gap, 2011, in p.p.	Difference in percentage points between the employment rate (15 to 64 years) of persons reporting difficulties in performing basic activities, and the rate for persons reporting no such difficulties. Difficulties can relate to seeing, hearing, walking, and communicating, and must have lasted or be expected to last for six months or more. A positive gap figure denotes that the employment rate for persons facing difficulties in basic activities is lower than for those without. Source: Own calculation from Eurostat [hlth_dlm010], data from 2011 (latest available).
Disability unemployment gap, 2011 in p.p.	Difference in percentage points between the unemployment rate of persons reporting difficulties in performing basic activities, and the rate for persons reporting no such difficulties. Difficulties can relate to seeing, hearing, walking, and communicating, and must have lasted or be expected to last for six months or more. A positive gap figure denotes that the unemployment rate for persons facing difficulties in basic activities is higher than for those without. Source: Own calculation from Eurostat [hlth_dlm030], data from 2011 (latest available).

Appendix D: Survey Methodology

Research framework and survey design

The analysis and findings of this report are a result of extensive desk research and two surveys carried out with ICT skills training providers and employers across the target countries. The approach to select and benchmark good practice showcases of ICT training programmes was based on a four-step process illustrated below. The research findings were further analysed and strengthened via expert workshops. Three expert workshops were held in Spain (Madrid), Germany (Berlin) and United Kingdom (London) and attended by a panel of experts from academia, policy, the non-profit sector and businesses.

Step 1: Collection of 300 initiatives	Step 2: Selection of 96 initiatives for the online repository
The first phase of the project, using comprehensive desk research we identified more than 300 initiatives based on the following criteria: 1 **Type of program**: Any type of ICT training programme activity, project, initiative and multi-stakeholder partnership of different levels of government, PPPs (public private partnerships), MSPs (multi-stakeholder partnerships), non-profit organisations, IT vendors, addressed to: 2 **Target group**: diverse target groups, including women, vulnerable youth with low educational achievement or from difficult socio-economic backgrounds, migrants, unemployed adults changing careers, etc., 3 **Scope**: to enable them to obtain and develop in-demand ICT skills and support their entry into the labour market. The process started with the: 4 **Analysis of around 300 e-skills programs and initiatives** identified in desk research throughout selected countries, followed by: 5 **Identification of further programmes** not covered by the initial list by national correspondents from the empirica Global Network for Innovation Research (ENIR) (www.enir.org) and other national experts where appropriate.	In the second phase, 96 inclusive programmes were shortlisted from the 300+ collected cases. Each case was given a score on a scale from 0 (low) to 2 (high) based on the following evaluation scheme: 1 **Outcome:** To what extent is the programme effective in enabling diverse populations' access employment opportunities through the acquisition of demand-driven e-skills? 2 **Target Fit:** To what extent does the program or initiative target diverse populations to support to enter the labour market? 3 **Scalability and Continuity:** What is the potential for the initiative or programme to replicate, expand or continue to reach more beneficiaries and contribute to the skills development at regional and national level? 4 **Maturity:** Has the programme been in operation for long enough to make it possible to assess performance and to learn from its experience? 5 **Policy Fit:** To what extent is the program or initiative embedded in a broader policy context? Textual descriptions of the relevant inclusive ICT skills training programmes were developed based on a common format to get an overview of training measures and how these were addressed and implemented. The selected training programmes are part of an online repository of an estimated 96 programmes, which were selected for further analysis.

Step 3: Identification of Good Practice Showcases	Step 4: Evaluation of Good Practice Showcases
The selection of good practice showcases from the shortlisted programmes was based on the following framework, with each case given a score from 1 (low) to 3 (high): 1 **Relevance:** To what extent is the programme relevant in terms of creating a diverse skilled workforce responding to demands in the labour market? 2 **Transparency:** To what extent is it possible to have access to information about the programme? 3 **Effectiveness:** How effective is the programme in providing participants with the ICT knowledge and skills, in line with current demands in the labour market? 4 **Efficiency:** How efficiently has the programme been implemented? 5 **Impact:** What were the effects of the programme on the target groups involved? 6 **Sustainability:** To what extent are the achieved benefits from the programme sustainable?	The main objective of the final phase of analysis was to further evaluate and benchmark the 22 good practice showcases against a set of defined criteria (evaluation criteria), to identify best practice elements and lessons learnt. The evaluation and assessment of best practice ICT skills training programmes was carried out making use of a qualitative survey of key stakeholders. This consisted of in-depth interviews (with decision makers from the selected best practice programs and selected employers) and a SWOT analysis to help address and understand issues relevant and factors influencing the success of training measures from different perspectives.

Employer survey

Format: in-depth telephone interviews of around 60+ minutes duration each plus completion of a questionnaire by the interviewee either prior or after the telephone interview.

Target group: 12 HR key decision makers in mainly large organisations from Spain, the United Kingdom, Germany, France, Belgium, the Netherlands, Poland and South Africa, several of which global players. ***Objectives:*** to gather insights about experiences and expectations related to (inclusive) training programmes. The primary objective was to find out whether the current ICT training(s) are attractive and making use of these would equip participants with the in-demand ICT skill sets and would qualify them for further consideration by employers. The interview results served as an input for the policy recommendations developed in the course of the project to inform policy development on the European and national level, and provide practical recommendations to non-profit organisations and training providers.

Structure of interviews:

1. General – Job profiles: type of ICT people / professions needed in the organization; roles / competences relevant and required in the organization.
2. (Digital) skills and competences needed: relevant digital skills and competences required from an employee in the organisation either already working for the organisation or those applying for a job.
3. Recruitment criteria: recruitment process, the different steps involved and main decision makers as well as main sources of recruitment and main prerequisites; minimum entry standards / credentials (e.g. degrees and certifications) required for a potential candidate to be eligible.
4. Employer involvement and collaborations: organisation already involved in training schemes addressed to diverse / vulnerable groups of people including vulnerable youth with low educational achievement or from difficult socio-economic backgrounds, people with migrant background or unemployed adults changing careers; providing any offers to such training schemes (internships, apprenticeships, mentoring, training for specific subjects, other) or involved in any collaborations with the training providers (skills needs assessment / matching, curriculum reform, research & development, equipment and facilities, advisory panels, on the job placement, certification standards, other).
5. Proposed policy interventions and programmes
6. Recommendations: to training providers for assuring delivery of the skills and talent needed in the labour market and the organisation through their education / training programmes as well as recommendations to policy makers.

Timing: October – November 2017

Appendix E: Good practice showcases

Appendix E.1 Coders Lab

CODERS LAB- IT SCHOOL SEEKS TO PREPARE PEOPLE TO JUMP-START THEIR CAREER IN THE ICT INDUSTRY VIA INTENSIVE CODING COURSES TAILORED TO THE NEEDS OF THE JOB MARKET

Target group

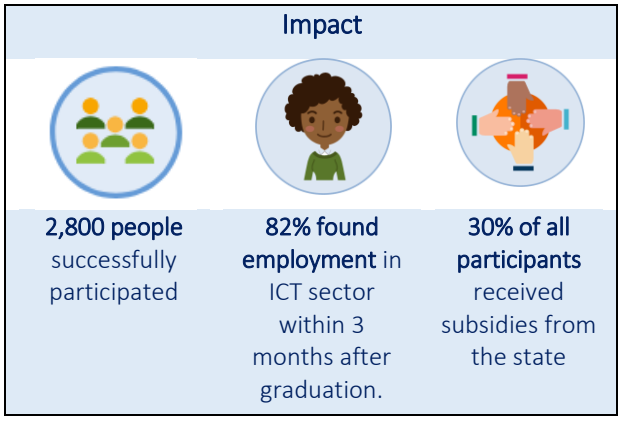
People who want to learn programming, prefer practical learning and who have an immediate need for employment (people at-risk of unemployment can apply to the Public Employment Service to subsidise the training fees). Learners need no prior knowledge.

Main activities

As a commercial ICT training provider, Coders Lab runs intensive coding courses in 6 large cities in Poland for adult participants aged from 17 to 65. Trainees are participating in 9-week (full-time) or 16-weekends (part-time) courses in front-end and back-end development. In both courses, students learn selected programming languages, web application frameworks and database management systems, such as PHP, Python, JavaScript, JQUERY, Angular, Symphony and MySQL. In 2018, the company also introduced UX Design courses and testing courses which have become very popular and now constitute an important part of the company's revenues. At the beginning of 2019 they launched their first online courses (Tester and JavaScript) which will allow participate remotely.

Founded in 2017, the "Możesz ITy" (You can do IT) Foundation targets youth leaving state-run foster care institutions, as they are in a particularly difficult situation on the labour market – they often take poorly paid jobs, as they have no prospects for quality education. The Foundation is implementing VET programmes providing vulnerable youth with appropriate skills based training and career development support. This extremely marginalised group is provided with the training free of charge and also receives scholarships to secure their needs, such as accommodation, meals, etc.

By the end of 2018 more than 2,800 people have successfully participated in one of the main Coders Lab programmes. 30% of all participants have received subsidies from the state as people at high risk of unemployment. Most of Coders Lab participants receive support in getting a job once they're finished with the programme. Coders Lab has extensive links with the business sector which are leveraged for this purpose. 82% of all graduates found employment in ICT sector within 3 months after graduation.



Industry input

Coders Lab – IT School is a private company set up in 2013 in Warsaw. It runs intensive coding courses in all larger cities in Poland. Coders Lab was created on the basis of models used by American short-term training schools (e.g. Dev Boot Camp in the USA) that aim to prepare participants to change their professions in a short time and without enrolling in long-term academic courses. While Coders Lab has been targeting all types of participants since its inception, in 2017 it embarked on a co-operation with the private donor-funded NESsT Empower Initiative to launch a programme focusing specifically on providing ICT training to severely marginalized youth, i.e. youth leaving state-run foster care institutions.

Coders Lab partners cooperate with most of the ICT companies operating in Poland, with companies from the other sectors as well as with the government sector. Based on the feedback received from potential employers, teaching methods and programmes offered by Coders Lab are constantly adjusted to the needs of the industry, so the graduates are prepared to fulfil demands of the market. The close ties to the ICT sector has also resulted in some ICT companies being willing to pay course fees for at-risk youth under the premise that they will offer them a job later if they successfully complete the course.

In 2018 Grupa Pracuj - a leading provider of solutions supporting companies in the recruitment, maintenance and development of employees in

Central Europe acquired a minority shareholding in Coders Lab.

Lessons learnt

Coders Lab is a well-recognized training provider in Poland, as it has been the first of its kind in the country. The approach to transfer best practice from the US American context to the specific environment in Poland has proven successful. Some of the lessons learnt include the following:

- An initial period of a few years was necessary to gain the experience and knowledge required for designing and executing training courses which are tailored to both, the needs and preferences of learners as well as the demand of potential employers in Poland. High quality relations to Polish employers of ICT specialists have been essential for the success of the programme.
- For establishing programmes targeted at people at high risk of social exclusion, support from an NGO with years of experience in social operations of this kind proved extremely useful. Participation in the NESsT Empowers initiative has meant that the Coders Lab team received active support, for instance in the area of social impact measurement and advice on seeking pro-bono support.
- The collaboration has also provided Coders Lab with needed capacity building and financial support, including expanded network and leveraging contacts with potential corporate and public administration partners and investors.

Appendix E.2 IT for SHE

IT FOR SHE USES EXPERIENCED ICT SPECIALISTS FOR PROVIDING MENTORING, TRAINING, NETWORKING AND CAREER ADVICE TO FEMALE STUDENTS IN POLAND

Target group

- Female students of computer sciences or a related field.

Main activities

IT for SHE aims to increase participation of women in the ICT workforce by providing hands-on support to talented female students from ICT faculties. For this purpose, IT for SHE brings together female students with experienced ICT specialists from Poland for mentoring, training, networking, career advice and project activities. IT for SHE runs three main actions:

- Mentoring Programme for female IT students, focusing on finding and developing each student's potential via a six-month partnership between a selected experienced ICT specialist (mentor) and the student (mentee). It uses inspiration and counselling based on the mentor's knowledge, life experience and professional experience. It enables focused management of life, career, and personal development and planning one's future in broad perspective. The long-term goal of mentoring is individual development, help in efficient planning of the career path and working on a satisfying approach to life's challenges. About 40 mentors, all of which currently working as ICT specialist in companies across Poland, work as volunteers for the programme. Students are invited to apply to one of the mentors based on the latter's' profile posted on the web.
- Women in Tech Camp: The self-described "biggest themed camp for women in IT in Europe" has been staged twice in Poland so far. It brings together about "130 of the best female IT students" from Polish technical universities to discuss and study latest developments in advanced programming, participate in hackathons and meet top class mentors, all of which with the purpose to develop attendees' professional career in the ICT domain. Networking among present and future female ICT specialists is at the core of the event.
- Volunteering programme: 50 volunteer female students from IT departments are sent to small towns across Poland in the summer season, to teach programming and tech knowledge at schools to youngsters. After a 3-day-training session, participants conduct 5 days of teaching at schools in teams of 2 or 4 volunteers. Participants get experience in organising an educational project for children, in the process gaining organisational skills and team working abilities.

It is operated by "Perspektywy" Education Foundation, an NGO led by present and former rectors of Polish universities and other public figures keen on developing higher education in Poland.

In 2018 IT for SHE also organises the Women in Tech Summit 2018, a major international event around women in ICT. This is currently Europe's largest event dedicated to the topic, bringing together more than 1,000 of the "most talented women in the technology industry", including senior representatives of global corporations and institutions. The conference was the first event of this type in the region of Central and Eastern Europe.

An evaluation of the longer-term impacts of IT for SHE in terms of job placement and career development has not yet been conducted. Feedback expressed in ex-post evaluations suggests, however, that participants perceive tangible positive effects on their motivation and capability to carve out a career in ICT. The programme was one of the winners in the "Digital Skills for Women and Girls" category of the 2017 European Digital Skills Award, handed out by the EU Commissioner for Digital Economy and Society.

Industry input

"Perspektywy" Education Foundation, the organiser, has over the last 10 years established a network of stakeholders from industry that actively support its programmes due to their strong interest in the topic. Support comes in the form of sponsorship but also by contributing input to the actions themselves in the form of mentors, input to the design of training measures, places for internships, etc.

Partnership with industry has been strengthened through the "Girls as Engineers!" and "Girls Go Tech!" campaigns, as well as through regular joint events that seek to confront young women with the opportunities in the ICT and STEM sectors: Lean in STEM, Girls Go Start-Up! Academy, Girls Go Science!

At the moment industry funding comes mainly from P&G, Goldman Sachs, Ericsson, Intel, Google and Samsung.

Together with Intel, the ICT multinational, the Foundation runs a scholarship programme for female ICT students who would otherwise lack the financial means to embark on a career in ICT ("Girls Go Technologies").

Impact

>1,000 women participated at Women in Tech Summit 2018

>40 mentors recruited from seasoned ICT specialists in Poland

124 women attended the latest Women in Tech Camp 2018

80 volunteer female students & from IT departments visited schools to train pupils

Lessons learnt

IT for SHE takes a systemic, long-term approach to improve the prospects for women in Poland's ICT sector.

Close relationships to a number of industry partners who believe in the need to mobilise the potential of women in ICT have proven essential for the success of the initiatives. These companies have a vital interest in the future of the Polish labour market in the area of ICT and new technologies in general.

Partnerships with other stakeholders are of essential importance as well. The Volunteering programme is a part of the "PROJEKTOR - wolontariat studencki" programme by the Polish-American Freedom Foundation, implemented by the Educational Enterprise Foundation.

Since sponsorship agreements tend to be short-term, IT for SHE's sustainability depends on the extent to which the organiser can maintain the current level of interest in the programme. For this reason IT for SHE has put much effort into securing extensive media coverage as well as the personal commitment of key (female) players from the country's major ICT companies, all of which has enabled organiser Perspektywy to attract sufficient support in terms of sponsor money.

Appendix E.3 Software Development Academy

THE ACADEMY PROVIDES JOBSEEKERS WITH MARKETABLE DIGITAL SKILLS WITH THE AIM OF ALSO TACKLING DIGITAL SKILLS SHORTAGES FACED BY POLISH EMPLOYERS.

Target group

- Jobseekers with a background in ICT;
- Jobseekers re-entering the ICT industry after a career break;
- Jobseekers with no prior work experience in the ICT domain, but interested in a career in ICT.

Main activities

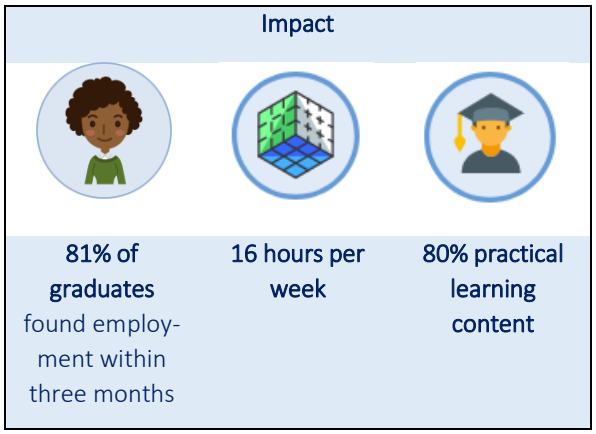
Ericsson's Polish Software Development Academy (SDA) runs ICT training courses and recruitment services catering to people with an ICT background, those re-entering the ICT industry, and those who have no background in ICT but are interested in a career in the ICT domain. The SDA initiative was established as a bottom-up response to digital skills shortages in the Polish labour market. SDA operates in Gdańsk, Warsaw, Łódź, Poznań, Wrocław and Krakow and is currently planning to scale up its activities in other cities as well. SDA offers training in Java programming, Java for beginners, test automation and various other entry-level ICT courses. Courses are offered at market rate, but persons registered as unemployed can get the costs funded by the Labour Office. SDA utilises the following approaches in delivering its training programmes: (i) Practical approach to teaching: 80% of the learning content is comprised of practical content, such as exercises, live coding sessions and problem discussions. These practical workshops are delivered over 5-7 weeks of intensive training; (ii) Classes with specialists: All of SDA trainers are active programmers with industry experience; (iii) Portfolio building: The program by default helps its participants to build their portfolios, which are useful for recruitment opportunities; (iv) Interview simulation: Once applicants have completed their training, they have the opportunity to participate in work placement interview simulations with trainers.

Candidates must be able to demonstrate that they have strong analytical and logical thinking skills, motivation and strong commitment, teamwork skills and the ability to spend at least 16 hours per week on the programme.

So far, 81% of SDA graduates have found employment within three months after completing the course.

Industry input

The Academy cooperates closely with companies that recruit ICT specialists, including Young Digital Planet, SII, Blue Media, Adar, Volanto, Astek, Speednet, DANSK Soft, Divante, jCommerce and MISYS (eight enterprises were involved in working with SDA Poland in its initial phase; currently their number is exceeding 50). These are involved as partners who cooperate and participate in building training programmes and choosing and providing industry trainers, and most importantly, recruiting graduates as employees in their respective companies.



Lessons learnt

The SDA programme starts from the premise that it is possible to learn programming from scratch in 5 months and afterwards to find a quality job in the ICT domain. During the course, participants are provided favourable conditions to acquire skills in the area of the chosen programming language that will allow them to get their first job as a junior programmer.

A main success factor has been the programme's strong focus on equipping participants with skills (including social skills) required for successful performance in the labour market.

Apart from the training fees, SDA generates income by offering dedicated staff trainings and from partner companies, which in return get full access to the database of students and graduates, including their coding projects. Based on its successful track record in Poland, SDA expanded to Romania and Lithuania where the first courses were offered in 2018.


NEW SKILLS AT WORK
J.P.Morgan