

Skills4tomorrow:

How to Build Future Skills in the Post-Pandemic World

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Marching towards digital humanism

Digitalisation goes beyond borders. Regardless of geographical location, public institutions are at the forefront in the overall process, whether these be international blocs – like the European Union – or national and local governments. There also exist bodies such as the National Centre for Research and Development, an executive arm of the Ministry of Science and Higher Education, tasked with creating favourable conditions for innovation and offering support to the entrepreneurs and scientists who bear the risks involved in research and development projects.

As the National Centre for Research and Development, we believe that the role of the state administration is to listen attentively to those who take advantage of our activities, respond to what is taking place in both society and the economy, start new trends, and set new directions for innovation. We do not remain idle, we are looking for fresh opportunities, and we want to drive change. In what direction? The following report might offer a partial answer to this question.

The last few months have clearly shown one thing: efforts to digitise the economy and develop a digital country are not a matter of choice, but of necessity. Some researchers see the COVID-19 pandemic as the core of a thesis on the massive economic crisis of the 21st century, whilst others believe this unique occurrence may serve as a catalyst for global innovation.

How will the situation unfold in Poland? Are we ready to invite solutions like artificial intelligence, IoT, or 5G wireless network technology into schools, universities, offices, and our homes? As Poland's turbulent history demonstrates, at the heart of the country's national DNA is the ability to shift rapidly, as well as its innate capability to search for new and better solutions.

Yet these skills need to be properly accelerated. I believe that a set of recommendations arising from the following report can serve as a starting point for a common goal while digitalising our skills in areas such as building infrastructure, offering funds to interdisciplinary research teams, and making greater efforts to use the fruits of digitalisation. Why digital skills? As seen today even more clearly than ever before, the use of modern solutions should rely upon technology, but also and perhaps most importantly, on social, emotional, and cognitive skills. The Industrial Revolution 4.0., of which we are all part as both the National Centre for Research and Development and digital citizens, is now marching towards digital humanism.

Izabela Żmudka

Deputy Director, National Centre for Research and Development

Key conclusions and recommendations

The pandemic has to the great extent hastened digitalisation efforts. It has made Poles, notably local entrepreneurs, aware that digitalisation is possible, effective and – in most cases – also an indispensable part of any business strategy. Likewise, the pandemic has highlighted the weakness of both the Polish state and the country's economy – for example, infrastructure shortages and no coherent digitalisation plan. Furthermore, it has unmasked an inability to move traditional activities to the digital sphere in basically all domains of our life, from contacts with public administration, through remote learning, to working from home while still in cooperation with fellow employees.

As the pandemic suddenly moved life online, Poland saw a slew of both opportunities and threats stemming from the country's transformation, and how crucial future digital skills might be in the overall process of socio-economic digitalisation. The pandemic proved that people can work efficiently from basically anywhere in the world, whilst Poland has enough economic resources to carry out digitalisation initiatives – like talented IT experts, national and EU funds, or international IT businesses keen to share know-how – and those in Poland that are being added to value-added chains worldwide.

It has turned out in many cases that the set of large-scale digital solutions that have had emerged are in effect merely alluring gadgets which in practice are either over-demanding or redundant. We have also realised how much red tape persists in our society, whilst no busi-

ness procedures impede the digital reinterpretation of social, economic and civil life. Moreover, IT experts slow the process as they are fearful of shouldering responsibility for developing digitalisation schemes in a company or in the office. Moving lessons online unveiled how many households across Poland suffer from digital exclusion, notably poorer ones in small towns and rural areas. However, despite teachers' best efforts, the pandemic has further widened gaps in digital teaching skills both in and for the digital sphere.

All of the above, we believe, has its roots in incoherent and inconsistent steps towards building a society that relies upon future skills, whether these touch the digital, the social and psychological, or cognitive facets. As people are unable to use algorithms, or the language of machines, deal with emotions whilst working from home, feel deprived of physical contact with fellow employees, or search for data both critically and independently, the inevitable process of digitalisation may produce only drawbacks. At issue will be digital exclusion that is most likely to affect women, the elderly and the less wealthy, higher income inequalities or even viewpoints – polarised like never before.

Thus, against a backdrop of these already identified opportunities and threats to the process of digitalisation in Poland and other countries experiences in managing their IT transformations, we drafted a set of key recommendations for public policy to enable shaping the future skills to allow Poland to undergo the digital revolution as smoothly as possible.

>>A nationwide roadmap for digitalising the economy and society. The scheme should allow public institutions simultaneously involved in the process of digitalisation to coordinate their tasks at the supraministerial level. Its blueprint should involve a map of stakeholders and priority tasks, distribute mission goals and contain a list of methods to monitor both the indicators and goals. There is also the need to add regular updates and reviews to the project, with a dedicated institution able to enforce actions from other state administration bodies and oversee its unimpeded implementation.

>>More emphasis on advancing future skills public education. What stands out as the core element of the digitalisation project are efforts to develop future skills as a priority in educating both children and youth. This entails a shift in both the state education curriculum and methods currently in use. Computer sciences should be instructed, just as foreign languages are taught, with methods going far beyond merely teaching them as an abstract logical construct, but first and foremost as a problem-solving tool to tackle anything that impedes students' acquisition of knowledge in any domain. That is, computer sciences should serve both as a separate subject and become part of curricula in mathematics, Polish language, history, and, notably, ethics. Furthermore, teaching methods should become holistic and based around encouraging students from various backgrounds and having distinct viewpoints to cooperate with each other, allowing them to argue and present their beliefs and also adopt a critical approach to data and authority. For example, the way to achieve this could be efforts to promote the best educators and their online classes via MOOC, a learning platform hosting a massive open online course.

>>New software guidelines for state institutions. In another move towards the digitalisation project, central offices, local governments and educational facilities should adopt standardised software guidelines. The point is not to prompt concrete companies or solutions, but to assimilate a raft of boundary conditions as precisely chosen for any applications in use so that children moving from one school to another and their parents do not need to learn a new online learning platform, whilst offices can easily integrate the IT systems they use and exchange data. With uniformed solutions and within just one website, citizens would gain access to a whole range of online services offered by both central and local government bodies.

>>More IT infrastructure projects.

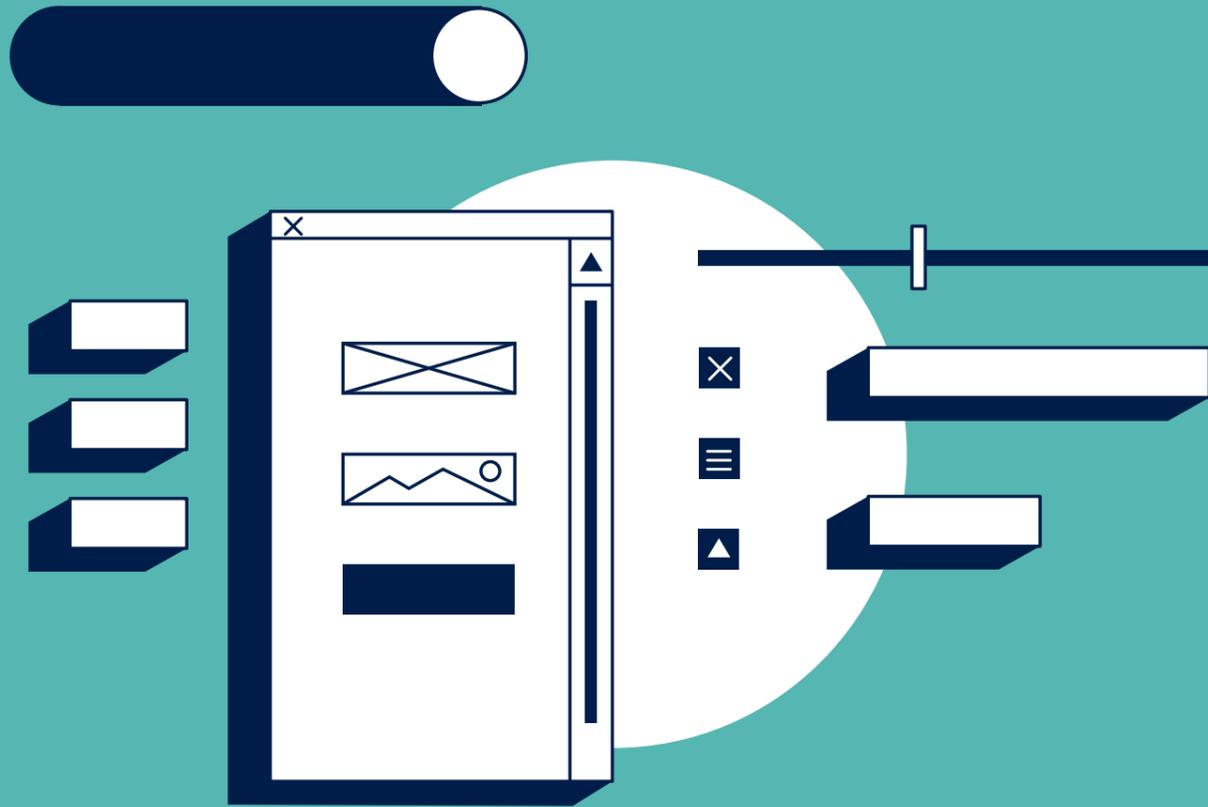
For many years now, steps to fill in what are known as „blank spots” on Poland's digital map, such as areas with no broadband coverage, have been undertaken. This could be further enabled with the use of 5G wireless technology or fibre-optic solutions, though with this must come state financial aid, as the free market is unable to tackle the issue alone if profitability is the sole criterion for companies to add broadband coverage to Poland's least wealthy and least populated areas. Besides some widely available infrastructure, it is vital to offer more computer equipment to state institutions, notably educational facilities.

>>Creating and developing online platforms for companies with ready-made tools for digitalisation. Similarly, the state should come up with a platform designed to facilitate the process of digitalisation in companies, notably micro, small and medium-sized ones, as those often lack automated or even precisely defined business procedures. Software businesses could thus submit their standardised applications or tech solutions whilst pointing out which industries and business procedures could be automated.

As part of the system, the state might develop a tool for accrediting recommended schemes.

>>Support for human capital reinvestment. The process of digitalisation should also interact with lifelong learning schemes in a move to challenge the stereotype of employees with single areas of expertise. The essence of a flexible economy relies on being able to shift skills easily. What employers should do, instead of sacking those employees whose capabilities are no longer relevant, would be to offer them job training to fill in a tech vacancy. Nonetheless, this process involves public aid, chiefly in the form of funds: scholarships, wage subsidies or low-interest loans for either businesses or individuals.

>>Creating a blueprint for best digitalisation practices. Last but not least, it is worthwhile drafting a supraindustrial list containing a set of guidelines for any entity in the midst of adopting digital blueprints, whether these be businesses, research units, offices, or educational facilities. It should lay down general guidelines that take into account the leading role of human input in the process of digitalisation, with technology as just an auxiliary to aid people, allowing them to spend more time contacting one another directly, and not to serve as its substitute. Another theme to be included should pertain to a list of detailed principles in areas like cybersecurity, health and safety guidance when remote working, or even the best ways to explain the process of digitalisation to employees, clients, or students.



02

Future skills
and the digital
world

Future skills – what a digital citizen is able to do

Future skills stretch far beyond digital skills. They encompass both any capabilities pertaining to high-tech solutions alongside those that determine how people deal with the changing reality – personally, emotionally, psychologically, socially, and professionally.

A recent key shift in how future skills may be both identified and forecast is how the human-machine relationship is seen, along with the role of humans in the technology ecosystem. To date, at issue has been a focus on purely digital skills, defined as a range of abilities to use digital devices, applications, and software. In turn, the futurological discourse places emphasis on what threats might stem from the fourth industrial revolution, understanding that devices will gradually push humans out of the job market, whilst

foreseeing the imminent domination of artificial intelligence over humans.

Current insights into technology-related shifts revolve around the relationship between man and machine and the very vague concept of the human sciences within the digital revolution. Its key thesis is that humans should not attempt to compete with machines, but learn to communicate with them, program them, specifically and in respect to their core ethical principles, and develop the unique and purely human features and skills that the machine will never have (cf. Bakhshi et al. 2017). The cocktail of digital, social, emotional, and cognitive skills is what is known as future skills.

Humans should not attempt to compete with machines, but learn to communicate with them, program them, specifically and in respect to their core ethical principles, and develop the unique and purely human features and skills that the machine will never have.

Related papers (cf. McKinsey 2018; Włoch, Śledziwska 2019) often pinpoint three categories of the skills of the future, among which are:



- **digital (technical) skills**, defined as those pertaining to creating and using technology at various levels of advancement;



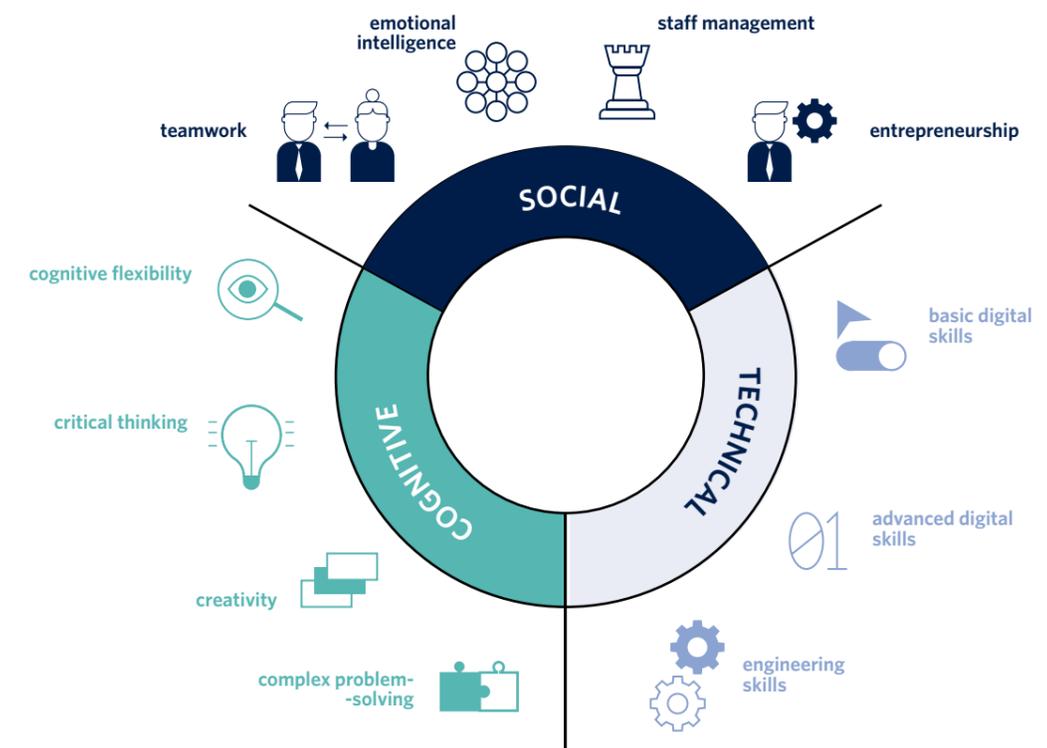
- **social and emotional skills**, defined as those referring to interactions with other people, part of the inner life of a person (understanding oneself, dealing with emotions, etc.);



- **cognitive skills**, defined as those related to how the brain functions, processes and data checking.

The following study combined the last two groups into one, defined collectively as soft skills, with their acquisition usually taking place simultaneously, with having one basically a *sine qua non* condition for acquiring the other. It is impossible to effectively fact-check any data received if one is not keen to interact with people expressing opposite viewpoints. Conversely, a person cannot fully understand themselves unless they are able to think critically.

» FIGURE 1. FUTURE SKILLS: COGNITIVE, SOCIAL, TECHNICAL



Source: Włoch, Śledziwska 2019.

DIGITAL SKILLS

In a nutshell, digital skills are defined as a range of skills that allow people to be active users of the digital world. These encompass the capacity to generate knowledge and use data online, as well as collaborate in remote teams. With them, anybody is able to be

involved in efficient remote cooperation, critically assess new data and make related decisions, either at work, in private life, or as a citizen. The higher the level of basic digital skills in society, the lower the risk of digital exclusion and the potential for sustainable socio-economic growth rises commensurately.

In a nutshell, digital skills are defined as a range of skills that allow people to be active users of the digital world. These encompass the capacity to generate knowledge and use data online, as well as collaborate in remote teams.

In practice, measuring digital literacy skills consists of checking what people actually can do while using digital devices like computers, tablets, and smartphones. In its analyses, Statistics Poland classifies digital skills into four categories in line with the purpose of computer use: (1) data-related skills, (2) communication skills, (3) problem-solving skills, and (4) software-related skills. Data-related skills encompass copying and moving files between folders, saving files online, and researching goods and services online. Communication skills embrace using

e-mail services, social media and posting content on websites. Problem-solving skills include transferring files between devices, changing software setting, using online banking, and buying goods on bidding websites. Software-related skills refer to the ability to use software like MS Office.

Other reports (Stifterverband, McKinsey 2018) also add advanced technological skills as those to both create and shape digital technology. At issue are notably coding skills, with a hold in understanding and writing algorithms and analysing large data sets.

The higher the level of basic digital skills in society, the lower the risk of digital exclusion and the higher the potential for sustainable socio-economic growth.

SOFT SKILLS

So far the report has identified seven soft skills categories, with two pertaining to cognition, two more social, and the remaining three referring to human psychology. These are already in heavy demand on the labour market (PARP 2018), and will in the future become practically imperative for more or less all jobs (WEF 2018).

Cognitive skills involve **critical thinking**, including fact-checking, detecting fake news as well as offering skillful question-posing queries to find answers, notably in search engines. Another cognitive skill is **active learning ability**, defined as the zeal of lifelong learning, constant striving to search for data, and keenness to confront various lines of reasoning.

The most important social skill is teamwork, chiefly being able to work with people expressing opposing viewpoints and beliefs. It is about being able to listen to other lines of reasoning while accepting differences and taking advantage of the strengths of each team member. A related skill is the **ability to express oneself**, by picking persuasive arguments, delivered both coherently and concisely.

Studies do not frequently encompass psychological and emotional skills, though these might possibly play a pivotal role in how societies are able to adapt to the digital revolution, as exemplified by their remote online experience during the COVID-19 pan-

demic. Whilst working remotely, it is of paramount importance to develop good **time-management skills**, set priorities, maintain mental health, and maintain a work-life balance. The second skill is **flexibility**, with the ability to quickly shift tasks, being open to change and keen to adapt to new conditions. **Mental stability** comes third, and is perhaps the least appreciated skill. Unlike in the real world, in the digital sphere, people are largely left to their own devices. Thus they need to be aware of their emotions and behaviour, as well as remember that on the other side is also a living emotion-guided creature with feelings too. The digital world is imbued with feelings like loneliness, lack of empathy, exaltation, and frustration, all of which require both self-control and perhaps also management.

» TABLE 1. SKILLS DEMAND, 2022

TRENDING	DECLINING
Analytical thinking and innovation	Manual dexterity, endurance, and precision
Active learning strategies	Memory, verbal, auditory and spatial abilities
Creativity, originality, initiative	Management of financial and material resources
Technology design and programming	Technology installation and maintenance
Critical thinking and analysis	Reading, writing, math, and active listening
Complex problem-solving	Management of personnel
Leadership and social influence	Quality control and safety awareness
Emotional intelligence	Coordination and time management
Reasoning, problem-solving and ideation	Visual, auditory and speech abilities
Systems analysis and evaluation	Technology use, monitoring and control

Source: World Economic Forum 2018.

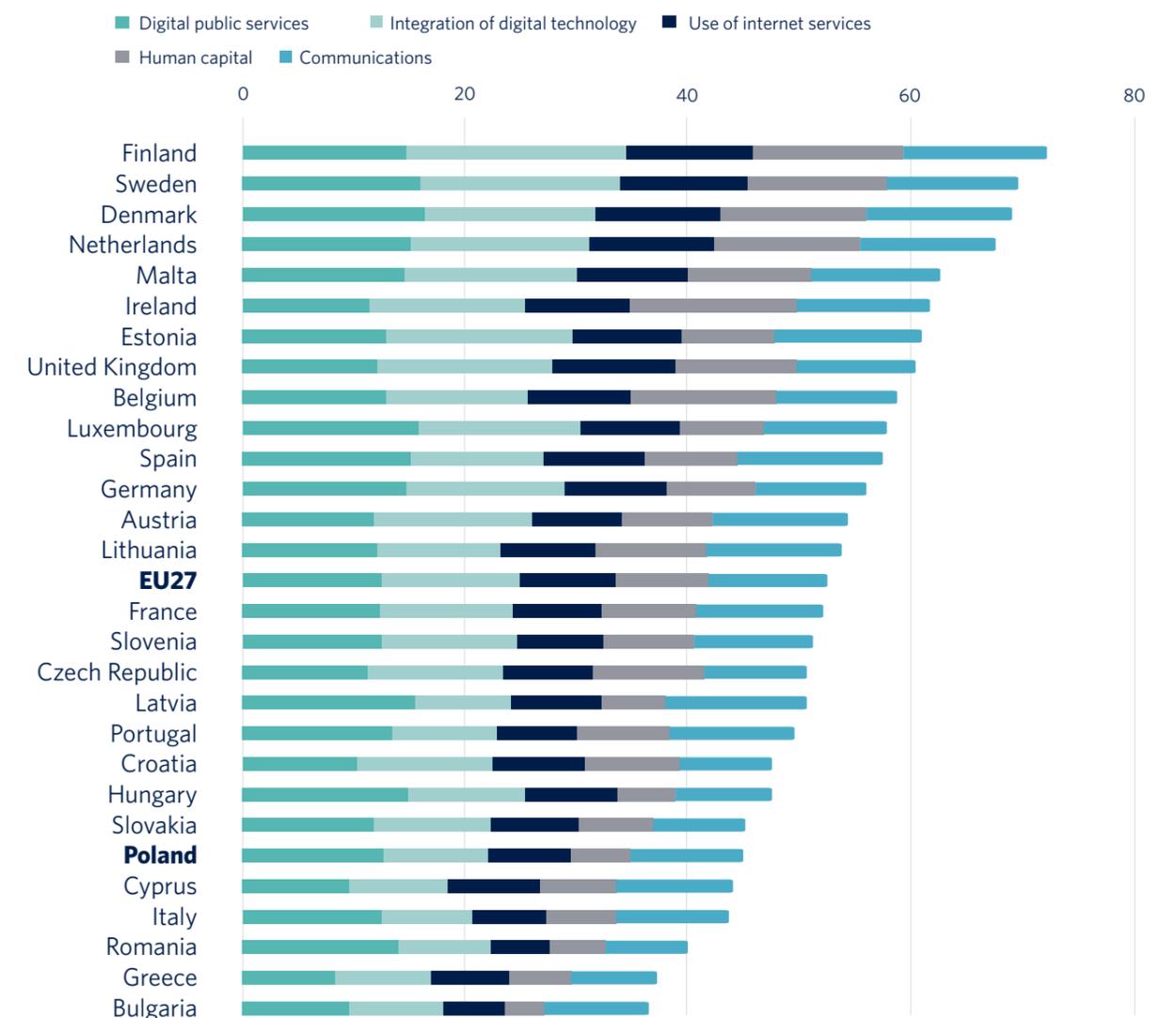
2.2

Poles' future skills

Studies on future skills in Poland have revealed a striking discrepancy between the extent to which the country's economy is digital, that is business and household access to tech solutions, and people's digital skills used for social and economic purposes.

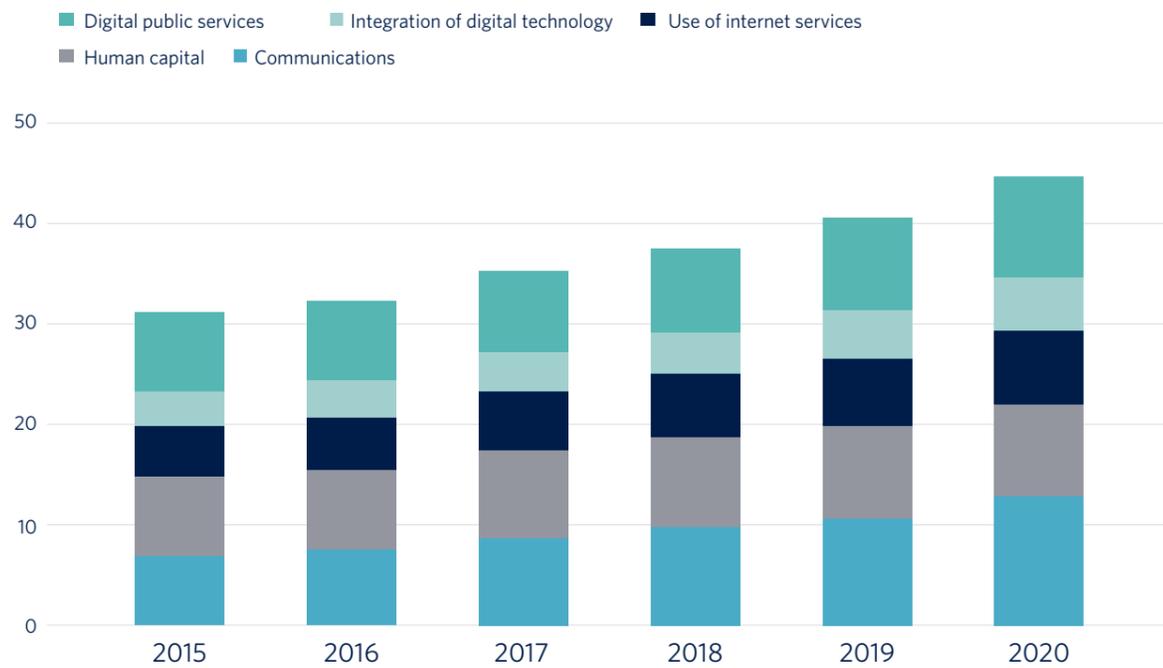
According to the 2020 Digital Economy and Society Index (DESI), an annual composite index that tracks Europe's digital performance, Poland has raised its ranking by two scores yet ranks twenty-third out of the bloc's twenty-seven member states.

» GRAPH 1. POLAND'S DIGITALISATION IN RELATION TO OTHER EU NATIONS



Digital Economy and Society Index (DESI), 2020.
Source: European Commission 2020.

» **GRAPH 2. THE RISE IN POLAND'S DIGITALISATION INDEX**



Changes in the Digital Economy and Society Index, 2015 - 2020. Source: European Commission 2020.

The report showed Poland doing best in terms of mobile broadband subscription – Europe’s leader in this respect. As this goes hand in hand with competitive prices and a wide range of high-capacity internet networks, Poland is doing better than its peers as far as connectivity is concerned.

The country is scoring well in digital public services, with its features regularly updated, notably with the electronic prescription service, digital signature, additions to the ePUAP and CEiDG platforms, and the one-stop-shop scheme to open businesses without going to the office. Nonetheless, Poland still lags far behind the Nordic countries, seen as digital champions. Yet in most cases, clients are still asked to come into the office, fill in and submit hand-written forms

or even go back and forth to a number of offices that do not communicate one with another amidst inconsistent databases and registers. The same is the case with health care facilities as people often leave their medical appointment with a pile of medical checkup papers that they need to submit to another health care professional.

Poland lags far behind other countries in two categories, notably integration of digital technology and the use of online services. The latter category embraces digital skills as described below in more detail.

DIGITAL SKILLS

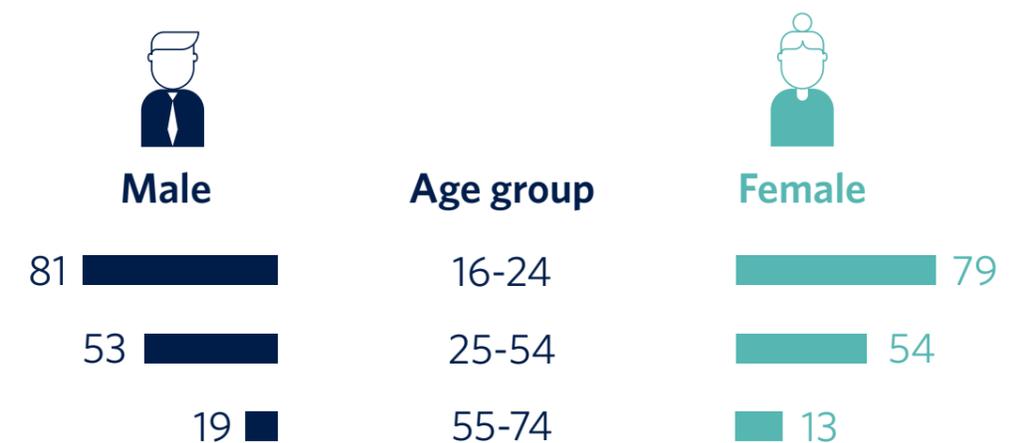
Digital skills in Poland are rising steadily; in 2019, 44 per cent of Poles had them compared to 40 per cent in 2015. Most Poles

have developed communication skills (with 73.5 per cent at either basic level or above), data-related (72.3 per cent), or problem-solving (69.7 per cent) skills. They yet tend to exhibit software-related shortages, with 20 per cent of citizens showing basic skills, whilst roughly 27 per cent being somewhat advanced. Thus Poland trails at the lower end of Europe’s highest digital skills list, 12 percentage points below the EU27 average, where only nations like Latvia and Italy scored worse, and Romania and Bulgaria came at the very end.

As elsewhere around the world, it is typically young people who develop high levels of digital literacy (84 per cent of those aged between 16 and 19 in 2019), with the elderly least keen to do so (roughly 9 per cent of people aged between 65 and 74). Also in comparison to Western European nations, there is just a slight gender gap in digital skills, with 46 per cent of men and 43 per cent of women being most digitally literate. Rather intriguingly, this does not refer to the youngest generation, with 75 per cent of both women and men aged between 16 and 29 having digital skills in 2019.

Digital skills in Poland are rising steadily.

» **GRAPH 3. DIGITAL SKILLS BY AGE AND GENDER**



Percentage of persons with basic skills or higher, in 2019. Source: Statistics Poland.

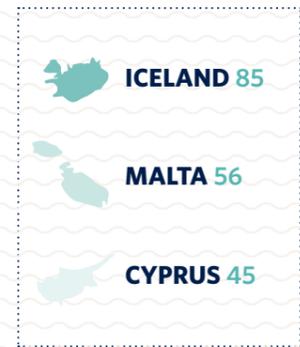
» **MAP 1. EUROPE'S DIGITAL SKILLS BY COUNTRY, 2019**

Percentage of persons with basic skills or higher.
Source: Eurostat.

EU27 AVERAGE

56

- >70
- 50-69
- <49



SOFT SKILLS

The lion's share of digital economy lists neglects future soft skills, referring to social, emotional, or cognitive layers. These can be analysed using a selection of various education, psychology, and sociology studies conducted throughout EU nations, though at different time intervals and with the use of distinct methods that also tend to change over time. Notwithstanding these, available data sets make it possible to paint a coherent picture of future skills in Poland that are usually more poorly taught than in Western European states.

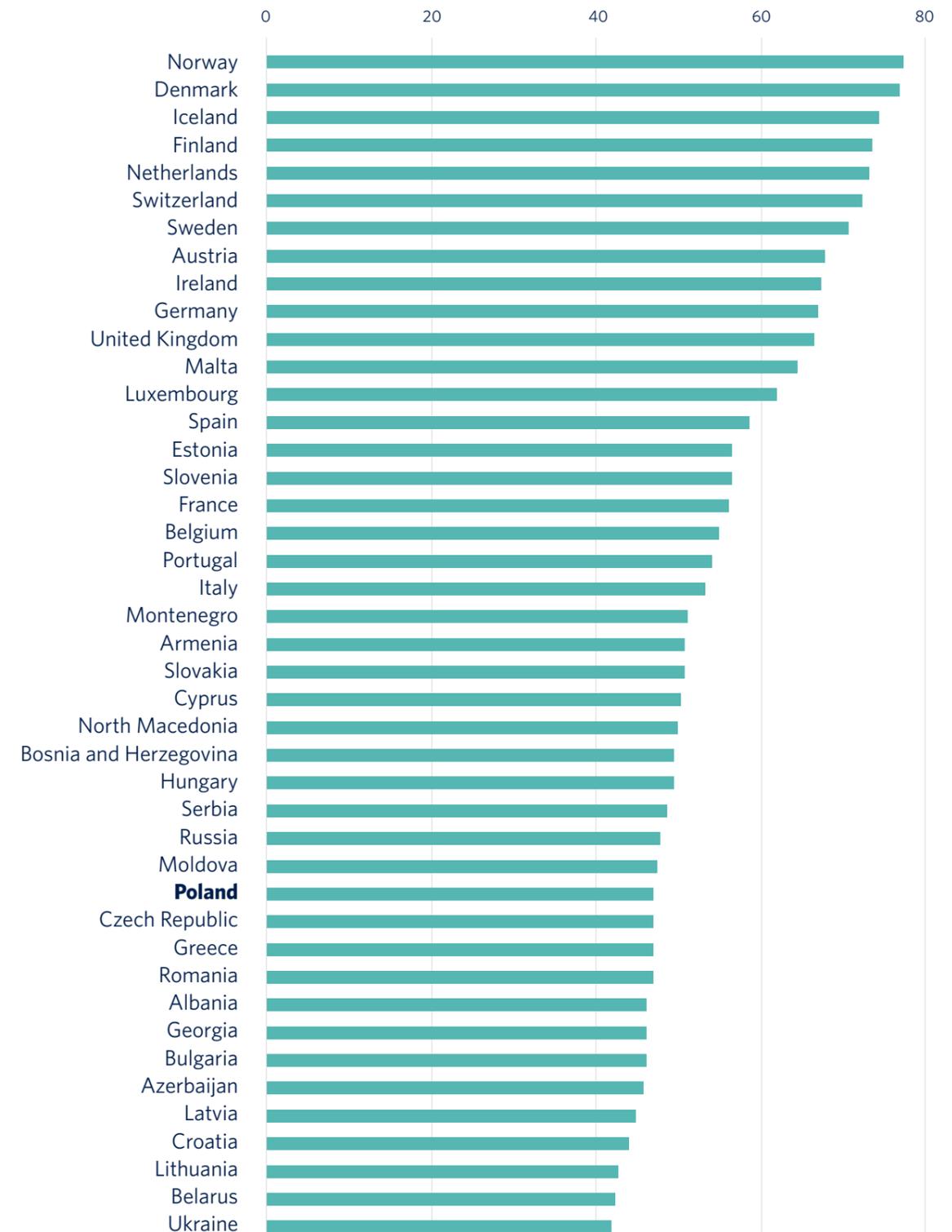
Poles have one of the lowest social skills levels compared to most EU countries. In The Legatum Prosperity Index, a global index that measures national prosperity, Poland performs worst in social capital schemes, defined as a range of relations with other people and institutions and being open to cooperation. In 2019, Poland scored roughly 47 points out of 100, thus eight points less than the EU-wide average score and as many as 30 points less than Norway, which came first. With low social capital levels come considerable teamwork problems that notably tend to occur between people expressing opposing viewpoints. On the positive side though is that Poles tend to trust their colleagues, more than they trust their neighbors but less than they usually place in friends (Statistics Poland 2020a).

Besides this, Poles tend not to pay much attention to independent learning schemes. The list of key values featured "education and self-development" in fourteenth place, behind those like "patriotism", "money", or "physical fitness". In 2018, polls found that 63.5 per cent of Poles saw value as the key factor, down 1.8 per cent from 2015 (Statistics Poland 2020a). This is confirmed by the fact that in 2018, roughly 5.7 per cent of Poles aged 25 and over took up new courses and training courses, a level that has not changed much since the study started (Statistics Poland 2019a).

In Poland, a low appetite for independent knowledge acquisition has its roots in the high self-esteem of Poles who seem rather satisfied with their education even if it remains at a relatively low level. The poll found that roughly 73.2 per cent of people with junior high school education and 83.5 per cent of those with high school education said they were happy with their current knowledge levels (Statistics Poland 2019a). Comparable conclusions come from a 2018 study by the Polish Agency for Enterprise Development, or PARP, with the interviewees seeing soft skills as their biggest advantage. Those that were highest rated were self-work organisational skills, good communication skills, teamwork, assuming responsibility for decisions, and good communication and data transfer skills.

All in all, the Polish job market is deficient in its range of well-tailored skills improvement courses. In terms of course availability, Poland comes in at one of the lowest positions compared to other countries in the EU. In 2015, employees in 7.7 per cent of all businesses had an opportunity to take part in management development courses. Employees in 4.4 per cent of all businesses had teamwork-oriented courses whilst just 3.2 per cent had attended problem-solving training. This shows how little attention Poles turn to their communication skills, an area that could affect both their work and life. As for hard skills training courses, the overall picture does not look much better. Only 14.5 per cent of businesses offered to their employees some technology-oriented, practical, or vocational courses (Statistics Poland 2017).

» GRAPH 4. SOCIAL CAPITAL IN SELECTED COUNTRIES, 2019



Synthetic social capital index, 2019.
Source: The Legatum Prosperity Index.

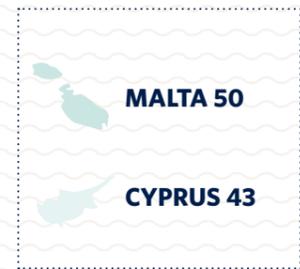
» MAP 2. PERCENTAGE OF EMPLOYEES USING COMPUTER AND INTERNET ACCESS AT WORK, 2019

Source: Eurostat.

EU27 AVERAGE

51

- > 60
- 46-59
- < 45





03

Future skills and the digital economy

Future skills and the digital economy

What seems striking as far as digital skills in Poland are concerned is the considerable gap between the employed and the unemployed, with just 28 per cent of the latter boasting a set of digital skills, compared to 44 per cent of self-employed and twice as high (56 per cent) amongst the employed. However, this is still rising rather than falling – suffice to recall the 18 per cent gap in digital skills between the employed and the unemployed in 2015. This is connected with

income inequalities, with higher-income people being far more digitally literate than their lower-income peers (56 per cent in the top fourth income quintile against 25 per cent in the first income quintile). There are fewer gaps between temporary and permanent employees, with 51 per cent and 57 per cent, respectively.

» **TABLE 2. DIGITAL SKILLS IN POLAND'S JOB MARKET, 2019**

	Unemployed	Self-employed	Temporary employees	Permanent employees	Total
Digital skills	28	44	51	57	44
including					
information skills	64	79	86	89	75
communication skills	68	74	87	88	73
problem-solving skills	60	74	81	85	70
software-related skills	30	46	52	59	47

Percentage of persons with basic skills or higher.
Source: Eurostat.

As the above data shows, top digital skills are strongly intertwined with stable employment conditions and salary, yet quite paradoxically, there is no direct correlation in this respect. According to the report by the Statistics Poland and the Human Capital Survey summary report (PARP 2018), employers rarely deploy the digital skills of their employees and they do not yet serve a pivotal role in the recruitment process when picking the best candidate. This has its roots in human resources requirement blueprints

and the attitude of businesses that until now have rarely sought to use digital technologies to raise their competitive advantage. Respondents in our in-depth interviews said that before the pandemic Polish business milieu had eyed the process of digitalisation, with the ability to let employees work remotely, as extremely challenging to implement and potentially lowering productivity. Unfortunately, such an approach bears some marks of self-fulfilling prophecy.

Benefits from a high digital skills level

Employers rarely use the digital skills of their employees and they do not yet serve a pivotal role in the recruitment process when picking the best candidate.

depend on the extent to which business employees are able to use them in practice. In addition is the fact that digital readiness does not boil down to devices like desktop or portable computers, printers, smartphones, broadband access, or leading-edge apps and operating systems. To fully utilise the digital skills of employees and attain synergy between human capital and IT solutions, employers must know how to insert cutting-edge technology into their regular duties and offer skill training to their staff among whom should be highly trained IT specialists with well-developed social skills.

Roughly all Poland-based businesses use desktop computers. In its report, the Stati-

stics Poland said these were 96.8 per cent in 2019, thus up by 2.8 per cent from four years earlier. Large companies most frequently have computers (99.9 per cent) whilst smaller firms are in 96.1 per cent thus equipped. Likewise, 96.3 per cent of all businesses have internet access, or slightly off than what was noted in Western European states (the EU-wide average stands 1 per cent higher than that).

Despite their wide access to ICT infrastructure schemes, Poland-based businesses are not ready for a tech revolution. In the Digi Index (Siemens 2020), Poland's manufacturing industry scored slightly below two points (1.9 points) on a four-point scale,

Some 96.8 per cent of Poland-based businesses use desktop computers whilst 96.3 per cent of them have internet access.

highlighting major delays in adopting digital technologies compared to Western European states. The digitalisation index stands even lower for micro, small, and medium-sized enterprises, or SMEs. This stems notably from the lack of structured processes and business strategies, seen as the starting point for business automation, and low levels of eagerness to hire IT specialists, with their high salaries the top reason for that.

In consequence, in 2019 just 17.5 per cent of businesses took up cloud service, or a third below the EU average figure (24 per cent as of

2018). Of all cloud-related tools, Polish businesses are most keen to use electronic mail service (12.9 per cent), office software packages (10.7 per cent), and file-based storage (9.5 per cent). Some 14.1 per cent of businesses with fewer than 50 employees used cloud for office purposes, compared to 27.9 per cent and 52 per cent of medium-sized and large enterprises, respectively. There were even fewer firms that offered ICT skills training courses to their employees (13.4 per cent in 2019), with just 8.8 per cent of small firms following suit.

The above data are reflected in the relatively modest use of digital skills by employees. In 2019 just 43.2 per cent of them used computers with internet connection for business purposes. Amongst them were notably ICT employees (95.5 per cent), researchers (91.7 per cent), tourism workers (89.9 per cent), contrary to representatives of such industries as textile manufacturing (20.5 per cent), food (23.6 per cent) and cleaning businesses (27.2 per cent).

That is far below the EU-wide average (54 per cent). Those who lag behind Poles in the use of digital skills at work are just their peers from Romania (31 per cent) and Bulgaria (29 per cent). In a broader perspective, there are blatant geographical discrepancies as far as the job digitalisation level is concerned. Scandinavia holds the lead in the digitalisation rate, with over 70 per cent and Sweden coming in top (82 per cent). Western European nations second (60 per cent), fol-

lowed by Mediterranean countries (52 per cent), as well as Central and Eastern Europe (45 per cent).

Assessment of the use of digital skills in the workplace looks even worse if one compares where individuals use computer equipment. Some 31.3 per cent of Poles used computer tools at work, whilst 74.6 per cent tended to do it at home. Besides, there are fewer persons using computers at educational facilities like schools or universities – in 2019 the figure stood at 7 per cent, down from 7.9 per cent in 2015. Such a feeble rate means one thing: the reason for Poles' mediocre job adjustment to digital skills is that the country's educational system overall is not ready for the digital revolution.

As a consequence, employers pay little attention to digital skills. Skills like using a computer, tablet, or smartphone was ranked twelfth highest in the most sought-after skills for recruiters, lower than soft skills,

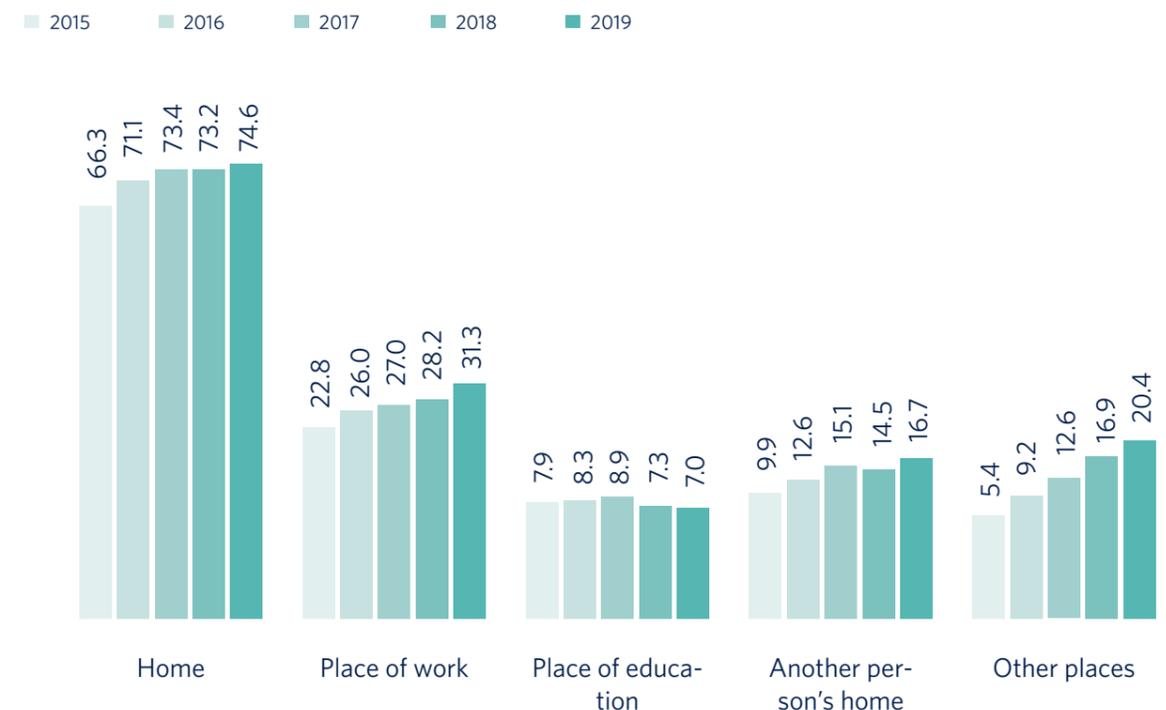
In 2019, just 17.5 per cent of businesses adopted cloud service, or a third below the EU average figure (24 per cent).

» **TABLE 3. BUSINESS READINESS TO USE DIGITAL SKILLS OF EMPLOYEES**

Companies	using computers	with internet access	buying cloud services	using voice calls apps	using electronic document management systems	using ERP or CRM software systems
total	96.8	96.3	17.5	27.3	36.1	35.8
small	96.1	95.6	14.1	23	30.6	28.7
medium-sized	99.5	99.2	27.9	40.7	54.7	61.6
large	99.9	99.8	52	70.9	83.9	90.3

Percentage of businesses, in 2019.
Source: Statistics Poland.

» **GRAPH 5. INDIVIDUALS USING A COMPUTER**



Source: Statistics Poland.

according to a poll by the Polish Agency for Enterprise Development (2018). In turn, most valued skills were pertaining to interpersonal contacts, self-organisation, responsibility, and coping with stress. Computer literacy comes to the fore, though only slightly, when looking for managers (9th place) and office work (7th place) but is still lower ranked than other, more desirable, skills. Being literate in using specialised software comes further down, in 19th place.

Growth in the digital skills level – notably amongst the young and alongside a high percentage of businesses with internet access – opens up a raft of fresh economic opportu-

nities. Yet this will never happen if employees exhibit a somewhat reluctant stance toward the use of cutting-edge solutions. Perhaps the hesitancy stems from the fact that youngest-generation employees are keener to change jobs at the dawn of their careers, and thus executives remain wary of injecting money into equipment and job training for those individuals who can hand in their notice within a few months. In the long run the urge to retain competitiveness obliges Polish companies to grasp changes in the business milieu by offering more electronic devices to their workers.

In the long run, the desire to remain competitive obliges Polish companies to grasp changes in the business milieu by offering more electronic devices to their workers.

3.2

Soft skills and the digitalisation of the economy

Nonetheless, digital skills alone are not enough to succeed. Whether a business entity emerges successful in the job market depends on its ability to blend various skills, chiefly digital with social and cognitive ones, and not on merely being good at just one particular skill area. This is of critical relevance for STEM domains, defined as a range of sciences related to cutting-edge technologies. Sometime in the future, being good at coding or having highly developed computer literacy skills will be not enough to prosper in the job market. Just like it is not enough to write correctly to become an author.

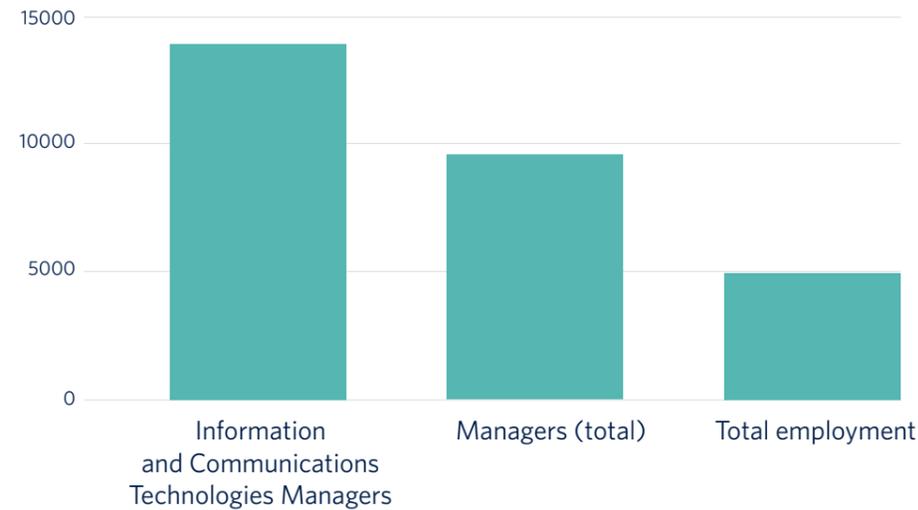
Skill-related multidisciplinary is a must both at both the individual and social level. With business process automation and artificial intelligence development comes the possibility to use technology to execute recurring tasks or processes. As a consequence, the role of humans will be to serve wherever the machine is unable to replace them – in management skills, setting development goals, and to lead empathy-based human-human or balanced human-machine interactions. What is an already evident fact is that it is the best paid IT engineers, those who develop both coding and management skills, who optimise business performance, and coherently spread knowledge to both

executives and fellow workers. According to the Statistics Poland, in 2018 monthly average earnings of heads of ICT department stood at PLN 13,900 gross, or 45 per cent more than other managers.

As far as the socio-economic order is at issue, the ability to bring together digital and soft skills is indispensable to use technology for their biggest benefit possible and that of their community. This applies in particular to the digital shift of the economy. A poll found that 70 per cent of in-house digital projects usually fail to achieve their initial goal (infuture.institute 2019). It is so for two core reasons.

First, digital transformation brings associations of tech-related shifts; the 2019 poll by infuture.institute found that 64 per cent of Polish entrepreneurs saw digital transformation integrating digital technology with all spheres of activity in what allows them to add changes to its mode of functioning. The survey also showed that well-thought tech solutions and those tailored to one's needs are key to successful digital transformation schemes (according to 39 per cent of respondents). What came second and third were adequately trained workers (36 per cent) and an increase in customer satisfaction (28 per cent).

» **GRAPH 6. AVERAGE IT MANAGERS SALARY COMPARED TO OTHER PROFESSIONAL GROUPS**



Average gross remuneration in companies with at least 10 employees, in 2018. Source: Statistics Poland.

It is thus vital to shift the approach to digital transformation, by placing the human at its heart. Making people the core element of the digital transformation should also take place in the axiological dimension.

upon ethical matters. The key is to programme machines so that flourishing artificial intelligence schemes are inclusive and do not perpetuate existing clichés, deepen structural and symbolic violence, or widen inequalities. Those tasked with stimulating transformation processes should demonstrate a highly developed humanist sensitivity, notably when writing algorithms for self-learning machines. Once combined, soft and digital skills should help avoid any pitfalls of digitalisation, such as discriminating against people due to their age, gender, religion, or ethnicity in what the machine might do unbeknown to its operator. Suffice to mention here examples such as automated credit scoring, airport security screening selection, or posts on social media feeds.

As digitalisation pundits said in our in-depth interviews, those who tend to hinder digitalisation efforts are usually IT specialists. Many lack a set of adequate

communication, psychological, and management skills to implement further steps on their own. Furthermore, though they are best informed about what other employees and clients need, they are often fearful of introducing changes and even scupper digitalisation proposals that other workers submit, asking executives not to put them into practice.

Typically, in Poland, digital projects follow a top-down plan, with the board or director ordering such change, where external IT engineers are unfamiliar with the overall business process and unaware of what employees and clients might need, thus their top goal is often to close the project and be paid as soon as possible. Once the job is complete, the business has at its disposal

As far as the socio-economic order is concerned, the ability to bring together digital and soft skills is indispensable to use technology to its greatest possible advantage and that of the wider community. This applies in particular to the digital evolution in the economy.

The data show that being overly focused on digital and tech solutions may sideline human input whether these be as a consumer or an employee. Meanwhile, without understanding the needs of consumers and their involvement in the process of employee transformation, even the best technology

will neither respond to the challenges faced by companies nor show how to solve them. It is thus vital to shift the approach to digital transformation, by making human input central.

Making the human element pivotal in the digital transformation should also touch



04

The impact of
the COVID-19
pandemic on the
use of future skills

Digital skills and the job market during the pandemic

A number of research studies are now focused on how the ongoing pandemic has affected people's lives, bringing future skills into the spotlight. As this report was being compiled (summer 2020), European nations were still grappling with a high number of new infections whilst floating various measures to contain further spread. Nobody yet knows how long extraordinary measures will remain in force or what its long-term consequences might be. A raft of COVID-19 - related implications has been identified, chiefly those linked to working conditions.

The outbreak of the pandemic has fundamentally altered the perception of new technologies and digital skills. Within just a couple of days, businesses had to apply tools that in the best-case scenario they had used as extra support in performing recurring tasks. What might best exemplify the overall process is adapting workplaces to remote working conditions.

The outbreak of the COVID-19 pandemic has fundamentally altered the perception of new technologies and digital skills.

Prior to the outbreak, roughly 80 per cent of large Polish businesses had tested remote working schemes (Iwanicz-Drozowska 2020), yet this method remained quite rare and failed to grow in popularity despite tech advancement. In 2019, 4.6 per cent of workers performed most tasks from home, up 0.1 per cent from 2010. Also, 85.7 per cent of employees said they had never been given an opportunity to work remotely. Possibly employers believed that remote wor-

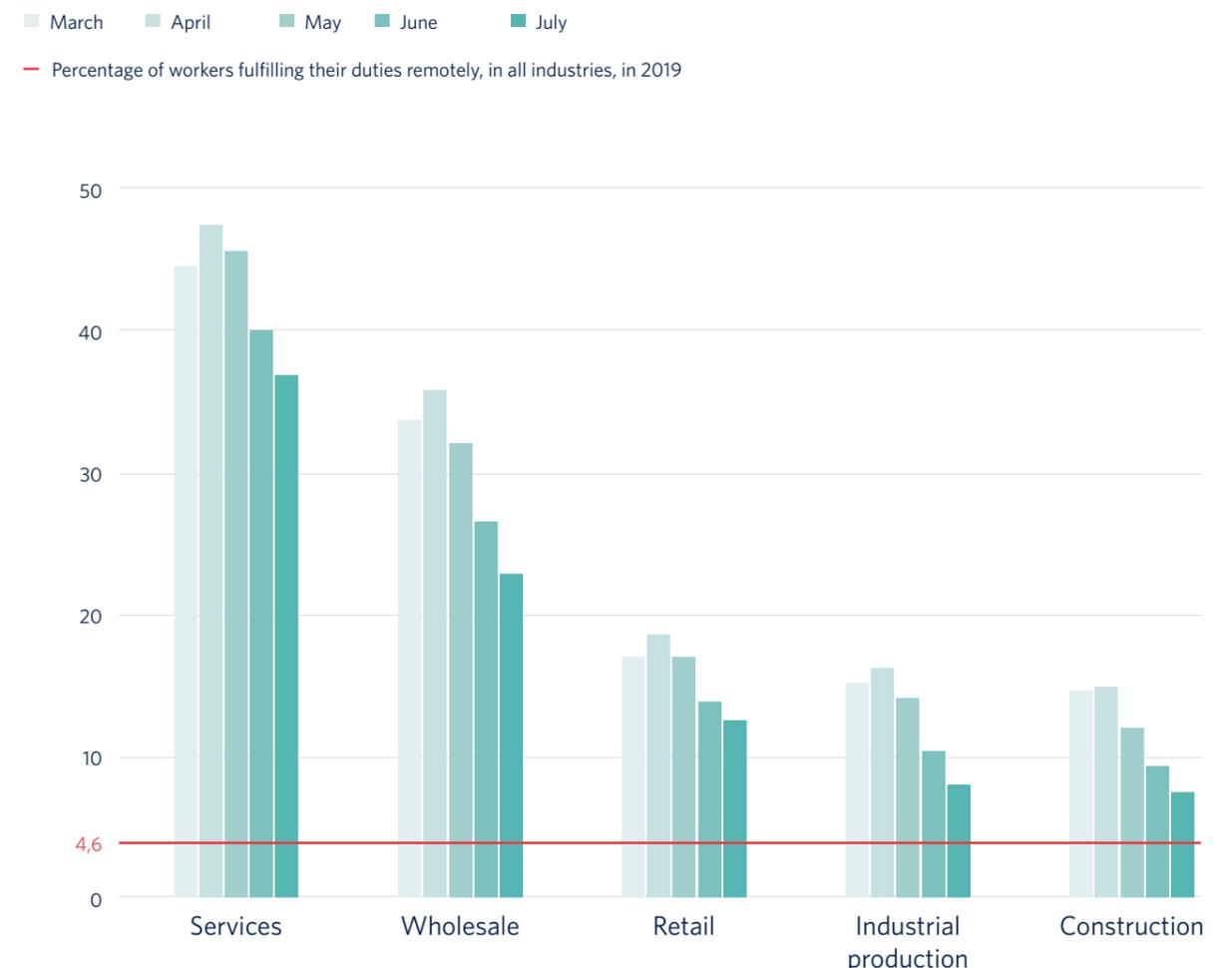
king schemes impaired productivity levels. Added to this was poor-to-modest experience in performing tasks from home – in 2019 just 1.5 per cent of Polish executives opted for telework, a figure that has not changed over the past decade.

Coronavirus has sparked a remote working revolution. Data compiled by the Statistics Poland showed that 14.2 per cent of Poles worked remotely in the least two weeks of March, up 9.4 per cent from Q1

2019. An increase in these figures was noted more in urban areas (16.9 per cent, or a rise of 12.8 per cent) than rural ones (10.2 per cent, up 4.3 per cent). As of late March, office workers fulfilled their tasks remotely more often, among whom there were 38 per cent of teachers, 37 per cent of ICT employees, and 28 per cent of researchers and tech specialists. On the other side of the “barri- cades” were blue collar workers, including miners (2 per cent), hotel and restaurant workers (3 per cent), and industrial workers

(4 per cent). In each branch, remote working was most popular in large businesses, while smaller ones were least likely to take up the scheme. Quite interestingly, micro-businesses seemed keener to use remote working models far more often than small companies with 10 – 49 workers.

» GRAPH 7. REMOTE WORK DURING THE PANDEMIC BY INDUSTRY



Percentage of workers fulfilling their duties remotely in the third week of the month. Source: Statistics Poland.

It is worthwhile adding that there were more women working remotely during lockdown (16.5 per cent) than men (12.3 per cent). In this respect the gender gap originates from the already-observed phenomenon (4.9 per cent against 4.3 per cent prior to the outbreak), perhaps having its roots in traditional household gender roles, with women needing to take care of children who stayed at home during the pandemic (Dolot 2020).

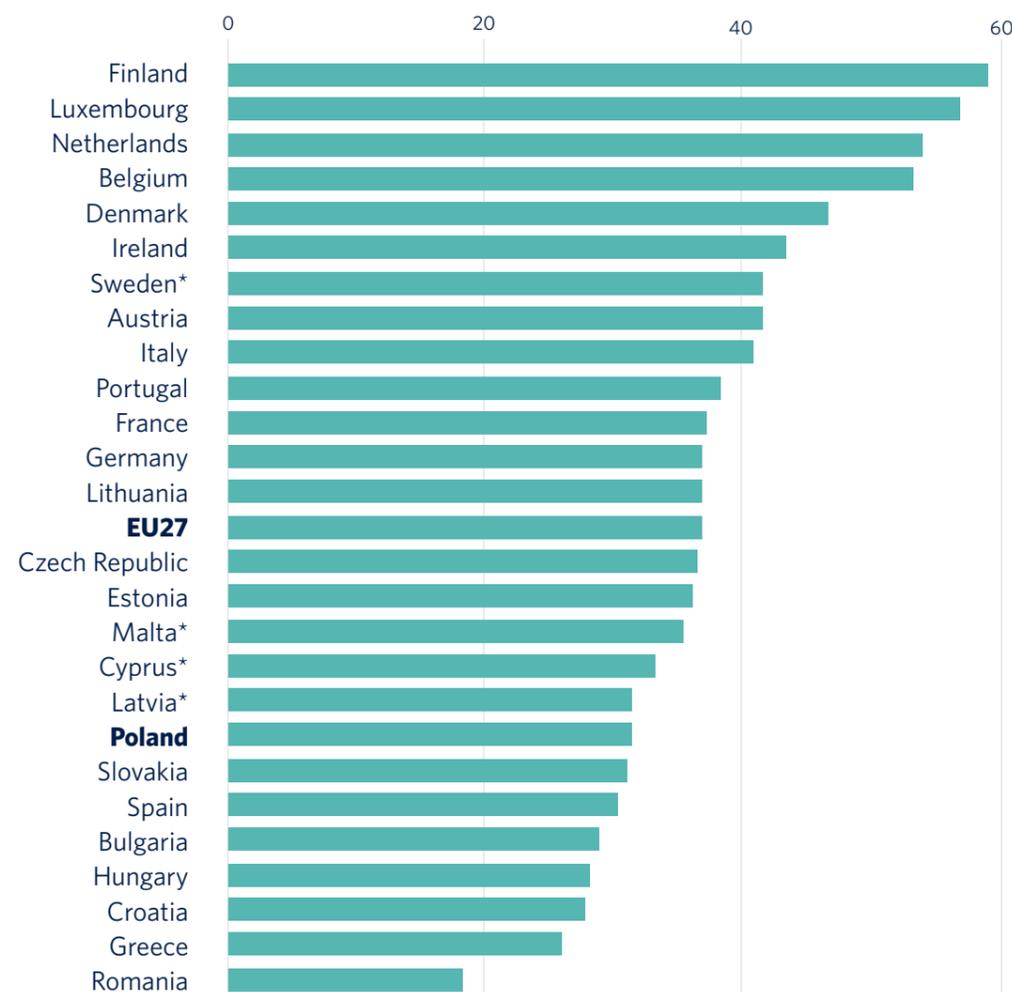
The biggest revolution took place in how large business managers and specialists fulfilled their tasks. The poll (Dolot 2020) found

that 94.8 per cent of workers undertook their duties remotely for more than half a week whilst 5.9 per cent had done so before the pandemic. Just 0.6 per cent of people said they had worked from office all week. A comparable phenomenon was also noted in other countries (Bick, Blandin, Mertens 2020) so the lion's share of management staff could gain first-hand experience in remote working in what could help reshape effectiveness and help highlight the best methods to manage home-working personnel.

Amongst the benefits of remote work are better work-life balance, greater flexibility in planning, more time, and reduced stress. There are also a number of pitfalls to remote working, like the need to organise tasks, isolation, and limited access to resources such as office supplies, IT equipment or the software required for teleworking despite having no appropriate skills (how to install and use

remote communication tools) or funds to afford a portable computer, high speed internet or a webcam. These led to a drop in job productivity, according to employees (Dolot 2020). A decrease in productivity came in top of the key drawbacks of remote work, according to executives who did not have full control either of their whole team or individuals during working hours.

» GRAPH 8. THE REMOTE WORK DURING THE PANDEMIC BY COUNTRY



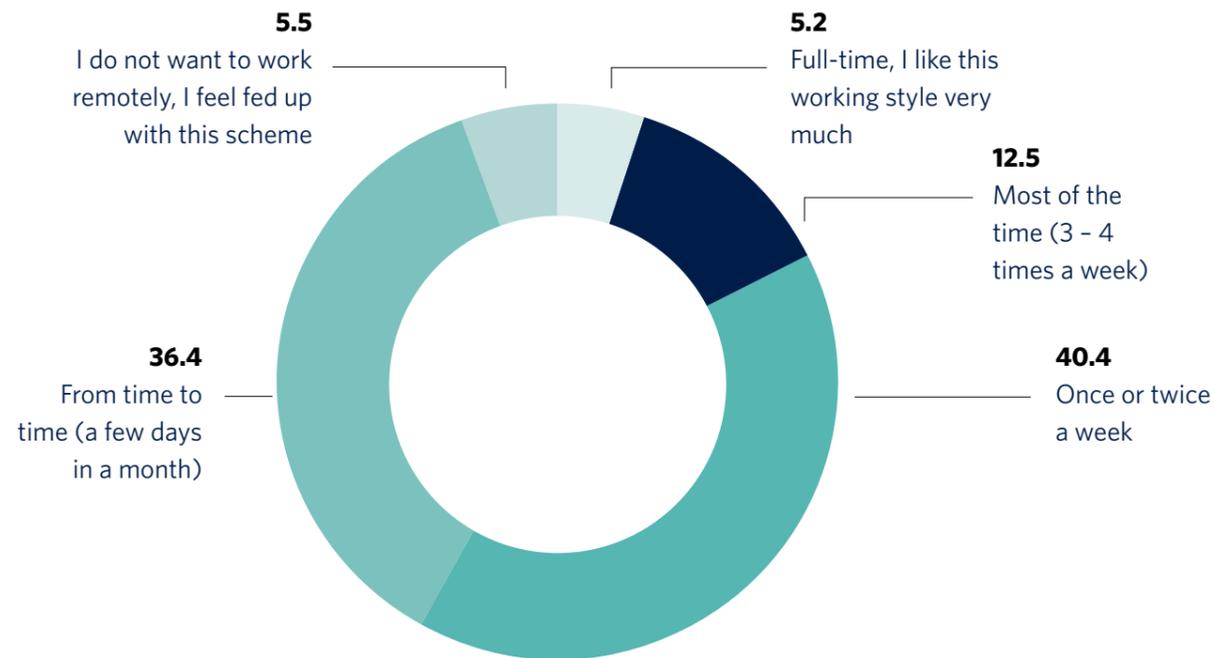
Percentage of people who started remote work during the COVID-19 pandemic. Notes: *low data reliability. Slovenia did not take part in the research. Source: Eurofound 2020.

The biggest revolution took place in how managers and specialists of large businesses fulfilled their tasks. 94.8 per cent worked remotely for more than half a week, whilst only 5.9 per cent of them had done so before the pandemic. Just 0.6 per cent of people said they had worked from office all week.

Despite these pitfalls, the benefits of telework outweighed drawbacks. Many employees expressed their satisfaction with telework, saying they would like to continue it in the future. The survey found 82 per cent of respondents positive about remote working in contrast to just 3 per cent of employees who were negative. Likewise, 79 per cent of Poles said they would be more likely to take up a job in a company that allows them to fulfil some tasks remotely. This does not yet mean that remote workers would like to keep

working in this way full-time. Just 10 per cent of respondents feel ready to do so, 40 per cent opt to come into the office once a week, whilst 11 per cent of people said they would rule out telework schemes all together once the pandemic is over (Pracuj.pl 2020). Some 55 per cent of businesses said that they are ready to offer remote working to their staff members. Nonetheless, most hope to put into practice a blend of offline and telework, with one business in twenty planning to implement a fully remote work plan (ManpowerGroup 2020).

» **GRAPH 9. ARE WORKERS EAGER TO CONTINUE REMOTE WORKING AFTER THE PANDEMIC?**



Percentage of respondents.
Source: Dolot 2020.

Widespread remote working schemes exerted a positive impact on the overall level of digital skills. Many of those who had not used computer devices prior to the pandemic outbreak had to acquire basic communication skills to carry out their job or stay in touch with their loved ones. This refers to people born in or after 1970 whose digital skill level had been by far the poorest, as exemplified by data collected amongst teachers, the most affected by the remote working revolution, with 54 per cent aged between 46 and 60. Most teachers had to integrate new skills and learn how to use telecommunications tools (87 per cent) or a webcam and microphone (48 per cent). The pandemic witnessed 13 per cent growth in the number of educators publishing instructional materials on websites and blogs (43 per cent against 29 per cent prior to the COVID-19 outbreak). There was a rise

in the use of social media – earlier this year one teacher in five used them to contact students, whilst this rose to one in three during the pandemic (zdalnenauczanie.org 2020).

One widespread telework area that saw a spectacular breakthrough has been the place of work becoming detached from the head office. While intuitively obvious, this does in fact have a far-reaching impact on the job market, unlocking the possibility to hire staff living far from the business's location – with no need to relocate them. All a potential employee needs is full access to high-speed internet.

In what could be dubbed a „Copernican revolution” in the job market, work possibly becoming far more mobile, as has capital-. An employee in Bielsko-Biala might perform duties for a Warsaw-based company one day, whilst „moving” to Silicon Valley the next, while maintaining a modest cost of living.

With this might come reduced pressure to increase wages in remote work-based jobs, a solution to the liking of staff members and bridging income gaps between people living throughout the country, thus in turn also favourable to Poland's social and economic cohesion.

As Poland eased lockdown measures, there were fewer people working remotely, but many experts argue that there will be no going back to the pre-pandemic world, whilst solutions aligned to maintaining economic activity during the COVID-19 period are poised to morph into an integral part of

business processes in the next decade (Strzelecki, Lewandowski 2020). According to International Monetary Fund research estimates (IMF 2020), between 15 per cent and 30 per cent of remote work jobs are unlikely to switch to their previous form in the post-pandemic world (Strzelecki, Lewandowski 2020). This is in line with what other businesses said – such as Siemens, whose representatives seek to maintain 140,000 remote jobs worldwide.

Work will become more like capital. It will become highly mobile, even internationally. An employee in Bielsko-Biala might perform duties for a Warsaw-based company today and work for a Silicon Valley firm tomorrow, retaining his or her low costs of living in Southern Poland. This will lower the pressure to increase wages in professions that can be performed remotely, what will benefit employers and reduce regional income inequalities at the same time.

The exact percentage of remote workers will hinge on how long the pandemic might last, the economic structure, the level of state development, and that of future skills, notably soft ones, within society. Many people feel increasingly fed up with new technologies, notably those that was

improperly implemented. In nations like Poland, thus with low future skill levels and where the offline-to-online shift came suddenly and somewhat haphazardly, the post-pandemic world might bring a temporary retreat from anything digital.

The pitfalls of technological progress during the pandemic

Some pundits argue that the pandemic has shortened the length of digitalisation processes to just a couple of months, compared with what would normally take years. People locked in their homes around the globe are reliant only on digital technology. Whole

industries moved online: educational services, and for many also work, shopping, leisure, and even sports and culture. Many people also tend to spend free time with family and friends online.

Some pundits argue that the pandemic has shortened the length of digitalisation processes to just a couple of months, compared with what would normally take years.

But for large-scale tech development, these activities would simply not be attainable, whilst both the social and economic consequences of lockdown measures would be hard to imagine. Despite the civilisational achievements that opened up the possibility to get in touch with other people online, many people have reported negative mental health effects resulting from lockdown isolation. Societies across the globe have experienced loneliness, declines in individual well-being, disorganisation, loss of meaning, as well as the sense of both fear and threat stemming from the absence of physical contact with others. Children were reported to have coped slightly better amid lockdown measures, with 48 per cent of them quoting worse mental well-being compared to 54 per cent of adu-

Its. Yet this does not exclude negative mental consequences for children. During remote learning courses roughly one pupil in three felt anxious (28.9 per cent), lonely (27.4 per cent), or depressed (28.4 per cent). Interestingly enough, teachers felt most affected by the general confinement, with as many as two-thirds of them declaring a decrease in mental (65.3 per cent) and physical (67.7 per cent) health. Prior to the study, just 26 per cent of educators did not experience sleep problems during the week. This might have had its roots in the extra duties as teachers had to quickly prepare online teaching handouts (zdalnenauczanie.org 2020).

Added to that came sensory overstimulation whilst working remotely as the new modality proved to be far more exhausting

than it had been in the pre-pandemic time. As it turned out just after the first few weeks of remote work and distance learning schemes, an hour of telework is more mentally exhausting than a three-hour meeting in a conference room or classroom. The reason for online fatigue were monotonous, static pictures during online meetings and looking at a video image of oneself in what is said to strain the nervous system.

Becoming resistant to these digital pitfalls is now a long-neglected soft skill, and this could bring long-lasting consequences, too. Issues like being unable to cope with emotions, developing sensory overstimulation or challenges of self-organisation are barriers that – once they persist long enough – might induce a withdrawal from the labour force, aversion to things digital, and even the rise in self-destructive tendencies.

These intensified notably in families with children aged below 12 whose parents followed a remote working style. A poll found that 22 per cent of respondents said they encountered enormous difficulties whilst focusing on work and managing free time to achieve work-life balance. As far as emotions and mental health were concerned, the pandemic has taken its toll on children and adolescents, notably in preschool and early school age, when regular contacts with peers are of utmost importance and are irreplaceable by even the best-tailored remote education schemes or telecommunications apps. Social research witnessed 49 per cent of children saying their peer ties worsened amid the

pandemic, whilst just 6 per cent of them saw a change for the better (zdalnenauczanie.org 2020).

The pandemic brought to the fore a raft of social inequalities, with the education system being the top victim. Children whose parents could not afford computer equipment were unable to take part in online classes and in fact stopped attending them. The same was true for children's care homes where young people could not receive educational help from their parents. Though there is no official data on this, children „disappearing” from the education system became a significant problem. According to our research, in the 2019-2020 school year thousands of pupils were excluded from their class throughout the whole country.

IT infrastructure shortcomings materialised both in low-income households as well as those where children had to attend classes whilst parents worked remotely. It turned out that just one computer in the family is not enough and a household needs both access to electricity and water, as well as broadband coverage, available to nearly 50 per cent of rural homes (European Commission 2019).

The pandemic brought to the fore a raft of social inequalities, with the education system being the top victim. Children whose parents could not afford computer equipment were unable to take part in online classes and in fact stopped attending them.

As a consequence, the pandemic wielded less powerful influence on children living in computer-equipped households where they had comfortable learning-from-home conditions, compared to their less wealthy peers living in multi-child families with no access to education and teachers without proper equipment. What is now glaring is that once improperly prepared, a process of digitalisation that fails to offer access to infrastructure only widens income gaps. With access to education and telework, the rich will grow even richer, while the poor will suffer from social exclusion and might in the worst-case scenario become invisible in the digital universe. It is all the more important that the rise in telework prompts income equalities between people displaying digital skills, no matter where they live, while widening chasms between those having access to IT infrastructure and those digitally excluded. In an extreme scenario, the job market might split into low-paid „analogue” and highly paid „digital” jobs.

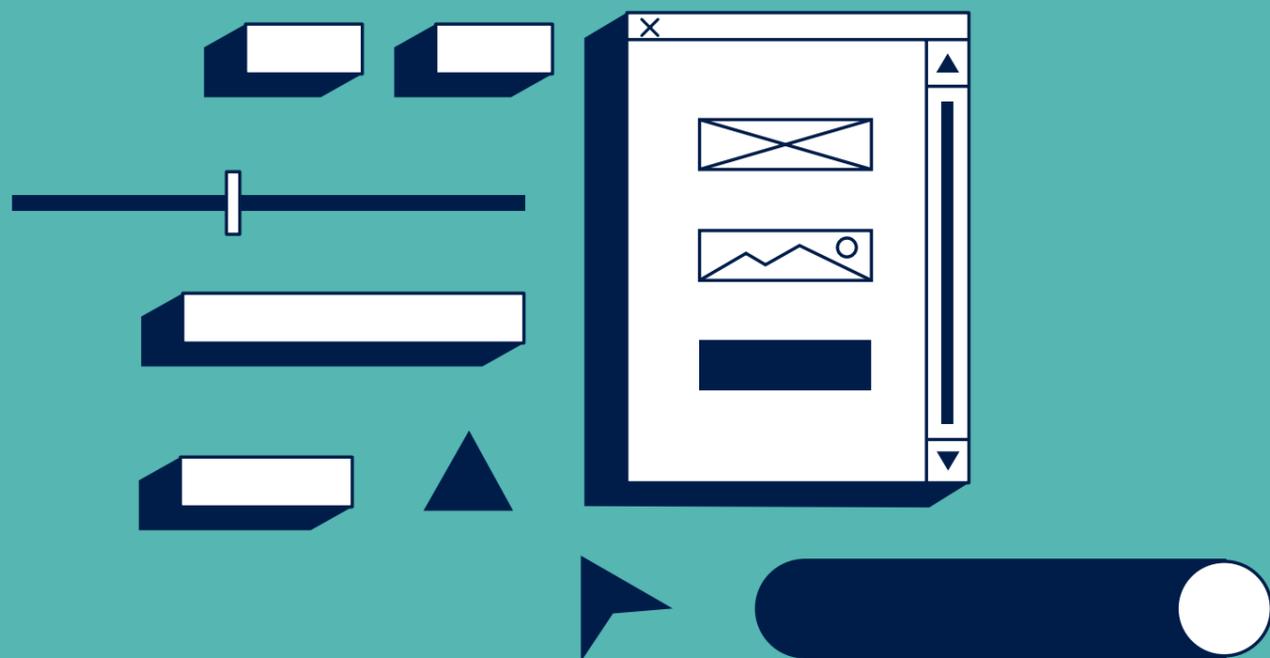
The level of professional activity mirrors this duality, too, according to Oxford University scholars who studied the dynamics of the job market in developed countries. As they argued in the study, since early March there has emerged a strong link between the possibility of remote work and the probability of being made redundant. Besides, people who had fulfilled remotely

at least 10 per cent of tasks prior to the outbreak were said to have experienced heavier workload since it started. In domains like management, state administration, IT solutions, or mathematical analyses, the increase stood at 16 per cent (Adams-Prassl et al. 2020). Both phenomena put into spotlight the situation of the poor and employees in poorly digitised sectors. Some of them were made redundant whilst those who retained their jobs now struggle with fewer tasks. Another group that received a severe blow in the pandemic were women, notably those bringing up preschool and school-aged children. In addition to work duties, they shouldered many household responsibilities as well as children care, including remote lessons. Some women could no longer carry on with their job-related duties, forcing many to quit the job market. What is known as women’s invisible labour intensified during the pandemic, with widening gender inequalities. As digitalisation sidelined women, it renewed old social patterns with the man having both the space and the right to work and the woman being primarily devoted to childcare and the household.

Lastly, what some saw as a blessing of telework, others recognised as a curse. People who tended not to express their social needs at work and channeled them onto other domains got some extra time and greater flexibility when working remo-

tely. Quite conversely, those for whom job-related social interactions were of utmost importance felt more isolated and lonely. All in all, the process of digitalisation must also involve people who suffer from social exclusion, and those who failed to adapt to new working conditions amid emotional issues, not only for financial or demographic reasons.

The rise in telework might prompt income equality between people with digital skills, no matter where they live, while widening chasms between those having access to IT infrastructure and those digitally excluded. In an extreme scenario, the job market might split into low-paid „analogue” and highly paid „digital” jobs.



05

State policy
and future skills

The pandemic has starkly pointed to the spheres that need urgent public actions like infrastructure, education, support for lifelong learning, and bringing digital solutions to state offices. The conclusions above are nothing new to experts, aware of them well before the pandemic (see Poland 2030 Strategy by the country's Ministry of Administration and Digital Affairs, 2013). Nonetheless, with the COVID-19 outbreak came a bigger-than-ever drive to speed up digitalisation processes, and thus bolster any actions to introduce the digital revolution whilst mitigating its negative effects.

5.1 Infrastructure

In the sphere of infrastructure the role of the state is both obvious and basically similar everywhere across the globe. The mission of the government is to provide broadband coverage, including wireless technologies like LTE and 5G. Besides, it should earmark some funds for personal computers containing proper software to officials and people working in the public sector, whether these be kindergarten teachers, border guard officers, or veterinary inspectors.

EU policies have been of great help for Poland in achieving this goal; for many years by now, they have been crucial in building

The following chapter offers an insight into government actions in other countries, with their systemic and universal character the common denominator. They might serve as the role model for Poland. It is worthwhile adding that Poland has seen a package of initiatives, tools, and state programmes with their mission to shape future skills, collect data, and generate knowledge. They facilitate the building of evidence-based policy yet throughout the country there are neither coordinated nor universal efforts (read more in conclusions and recommendations).

and reinforcing the future skills of European citizens. Furthermore, the COVID-19 turmoil unlocked the European Parliament's New Skills Agenda for Europe, a plan including twelve lifelong learning-oriented actions, alongside steps to develop future skills, including digital ones. According to the scheme's objectives by 2025, more adults and the unemployed should be taking up job training courses.

The pandemic has starkly pointed to those spheres that need urgent public action. Amongst them are infrastructure, education, support for lifelong learning, and bringing digital solution into state offices.

5.2

5.2. School education

Yet to come to the fore are rapid shifts in primary education. Poland's education system requires a thorough change: for the time being, it is centered around the essential curriculum, tests, and knowledge conveying rather than teaching pupils how to acquire knowledge, work in teams, and construct self-esteem and inner poise. At this stage of education it is indispensable to shape social, cognitive, and emotional skills. Within this must come digital competences, allowing children to develop digital thinking from the outset.

Building these two pillars of future skills amongst the youngest should be run in parallel, as teaching children how to code without allowing them to develop soft skills does not encompass the full set of skills. This is all the more so given that scholars believe the offer of ubiquitous coding programmes for children leave much to be desired, not fully meeting market demands, while bidders lack proper know-how on providing high-quality training schemes.

The problem also persists in classifying people as „humanists” and „scientific minds,” which is quite common in many societies. As the-pandemic experience has revealed, it is not possible to be a good humanist while not grasping how machines function or to label oneself a „scientific mind” without understanding how human psychology works in the digital world. The drive for interdisciplinary education will grow as technologies develop, and Poland's system needs to get ready for that.

The digital-era education system should be coherent. Just as curriculum are set and with textbooks at the core of teaching

methods, there must be coherent guidelines on remote learning methods, content and form. The pandemic pinpointed the lack of a coherent strategy for digital learning schemes. Challenges like preparing online classes, selecting a proper tool for meeting and contacting students, spotting the right teaching resources to be shown online to draw students' attention quickly made educators realise that online learning goes beyond merely moving from a classroom to the digital world. Though education pundits praise Polish teachers for their eagerness to learn quickly, initiative, and openness, and the whole teaching milieu for its never-before-seen mobilisation, solidarity, and cooperation – as they shared free tools, resources, and content – they still point to a striking lack of cooperation of nationwide activities, while arguing three of Poland's ministries – of education, science and higher education, and digital affairs – need to cooperate closely in this respect.

Finland has enjoyed a reputation for having an inspiring and already-tested solution. It is both subject-based and uses cross-curricular approaches. By late 2020 Finland is planning to ditch traditional subjects by replacing them with project-based teaching methods to teach children how to gain both knowledge and a set of skills in intertwining domains, cooperation, and problem-solving.

Primary education is oriented towards three areas – reading, mathematics and science. Pupils in Finland are inspired to explore the world on their own, as the basis for critical thinking skills, and delve into the analysed phenomena. The zeal to acquire knowledge goes hand in hand with building

stamina and fitness as more than half of Finnish students take part in extra sports classes. Not only do students build up muscles, but they also increase teamwork capabilities to pursue common goals, a much-needed skill both in life and in the job market. Unlike many other countries, Finland does not have a system of standardised testing or test-based accountability. With such testing students tend to learn by heart some formulae and definitions while teachers opt for traditional but low-interest methods. This is contradictory to the idea behind the Finnish teaching style, so elementary school pupils receive descriptive assessments containing feedback, allowing students to catch up on the backlog where necessary. Besides, maths and science curricula focus primarily on their practical dimension. Maths exercises try to refer to daily challenges whilst science is

taught by observations and experiments. In Finland the higher education approach mirrors that typical of the lower grades. Universities are pushing through more and more solutions based on divergent team thinking to encourage high-risk research and experiments whilst blending various skills and problem-solving approaches. Students are motivated to tackle real challenges using the knowledge and resources they receive and are not punished for failures. This sends positive waves to both creativity and critical thinking while boosting the innovativeness of the Finnish economy as a support for other state policies (Czujko-Moszyk 2018).

Across the globe Finland's educational system has become a role model, prompting the country to introduce Education Finland, a state agenda tasked with promoting Finnish educational know-how and helping other

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countries put in place similar techniques.

Upgrading Poland's education system is impossible if there is no support or job training courses for teachers while also providing them with equipment and changing the way they are instructed how to teach. The existing schemes date back several dozen years or so and need to look forward.

At issue is yet another remote education-related challenge for both schools and parents: how to secure data protection and privacy online. Millions of children have

been thrown in at the deep end of the digital universe – with neither prior preparation nor parental control of devices they used amidst still-limited public awareness. Schools picked remote working tools without being well aware of them, thus somewhat overlooking data and personal protection themes. Both educational facilities and three of Poland's ministries – education, digital affairs, and development – still have much to do to upgrade in this respect.

Upgrading Poland's education system is impossible if there is no support or job training courses for teachers while also providing them with equipment and changing the way they are instructed how to teach. The existing schemes date back several dozen years or so and need to look forward.

Higher education

Higher education schemes need to better respond to what the job market needs. Though universities have at their disposal business data sets on most sought-after skills in the job market, and when these might attract the biggest demand, Polityka Insight's in-depth interviews conducted for the purpose of this report show that higher education facilities do not sufficiently translate know-how into systemic solutions and curricula. What might serve as an inspiring example here is Estonia's *System of Labour Market Monitoring and Future Skills Forecasting*, or OSKA. It serves as a tool for analysing and forecasting labour supply and demand within the next five or ten years, trying to determine how many employees will be needed in key jobs for various industries and for qualitative research, thus what anticipated skills profiles might arise in top key jobs. Besides, the system submits recommendations for key changes in the country's educational and training courses.

At the heart of the OSKA scheme lie sector-related analyses compiled by Estonia's Ministry of Economic Affairs and Communications, nationwide statistical information, and expertise, with similar schemes already operating in Finland and the United Kingdom.

Each year, the OSKA Coordination Council selects a list of sectors to be analysed. All economic sectors are analysed once every five or six years. Furthermore, an annual OSKA general report on changes in labour requirements, labour market developments and the dominant trends over the next 10 years is prepared. Sector-related reports are compiled with hybrid methods. They contain data on both the size and needs of the job market, both quantitative – like the number of graduates from facilities related to a particular

domain or sector-related forecasts compiled by the economy ministry – and qualitative – with employee and group interviews. Interviews with educators are helpful to determine skills required for some jobs.

Widely available to the public, reports come in handy for job market newbies, employers, and educators. Estonia's Unemployment Insurance Fund also uses them to pursue an active job market policy.

The OSKA Coordination Council gives an overview to the government once a year about the main developments in labour market skills, makes recommendations about training and retraining needs, as well as submits qualitative skills needs assessment and a forecast document for each economic area and sector.

Between 2015 and 2020 its activities cost a total of EUR 4,400,000, of which 85 per cent comes from the European Cohesion Fund whilst the remaining 15 per cent comes from the country's government funding. The EU's financing expires in December 2020 though Estonia's skills anticipation system is poised to continue anyway.

The OSKA scheme serves as an inspiring example of both efficient and effective supra-ministerial cooperation also involving other stakeholders. The programme is governed by the Coordination Committee. The members of this Committee are representatives of principal stakeholders (the Ministry of Education and Research, the Ministry of Social Affairs, the Ministry of Economy and Communications, the Ministry of Finance, the Estonian Unemployment Insurance Fund, the Estonian Chamber of Commerce and Industry, the Estonian Confederation of Employers, the Estonian Employees' Unions' Confederation (TALO) and the Confederation of Estonian Trade Unions).

Lifelong learning

In line the European Commission's guidelines on the European Skills Agenda (2020), future skills education schemes encompass lifelong learning that include people aged 16 and over, the elderly, and the unemployed. An effective tool for mobilising society for systematic and structured learning is financial incentives.

It is also worth demonstrating a set of schemes used in Singapore as a role model. The country's education ministry offers to all Singaporeans aged 25 and above an opening credit of SGD 500 to enrol in skills development courses, e.g. to learn web development. The financial incentive to take up courses has the goal of backing citizens in pursuing job training and acquiring new skills in the lifelong learning process. A total of 285,000 Singaporean residents have taken part in courses in the past two years. The SkillsFuture movement refers to skill profiles, built in cooperation with industry experts and educators, as well as to career pathways and job descriptions. With these descriptions, government officials determine whether job training courses are tailored to one's individual needs and once assessed positively, grant the funding (Tan 2017, Usher 2019). As part of the SkillsFuture scheme, Singaporeans have

access to a career guidance online portal that enables them to chart their own career and lifelong learning pathways throughout life, as well as spot further training opportunities (Tan 2017). Courses are either work-oriented or help people to adopt self-improvement lifestyles. Though SkillsFuture credit cannot be used to purchase courses abroad, Singaporeans are allowed to take Coursera or Ude-my-powered courses (Tan 2017, Usher 2019). An extra one-off credit at a rate of SGD 500 has been available to citizens since 2016 and gets regular renewals. People between the ages of 40 and 60 receive an extra SGD 500 to cover education-related expenses. Also businesses are allowed to get funds to offer job training courses to their workers. From the beginning of the scheme until late 2019, a total of 533,000 Singaporeans benefitted from skills development programmes, whereas the working adult training participation increased to 48.5 per cent in 2019 from 35 per cent (skillsfuture.sg 2019).

An effective tool for mobilising society for systematic and structured learning is financial incentives.

Public administration

Also, the Canadian government introduced measures to provide enhanced student financial assistance. The Canada-Ontario Job Grant is a government funding programme that offers training grants to employers covering up to CAD 10,000 in training costs in areas like comprehensive data analysis or boosting workplace processes.

Canada's federal government has recently added to its 2019 budget scheme the Canada Training Benefit that allows a credit balance at a rate of CAD 250 per year, up to a lifetime limit of CAD 5,000. The credit can be used to refund up to half the costs of taking a course or to enrol in a training programme.

Canadian officials offer financial assistance to people who lost their jobs in the Skills Boost pilot. Introduced back in the 2018 – 2019 school year, the programme is targeted at adults looking to upgrade their skills, offering a possible CAD 1,600 more in grants

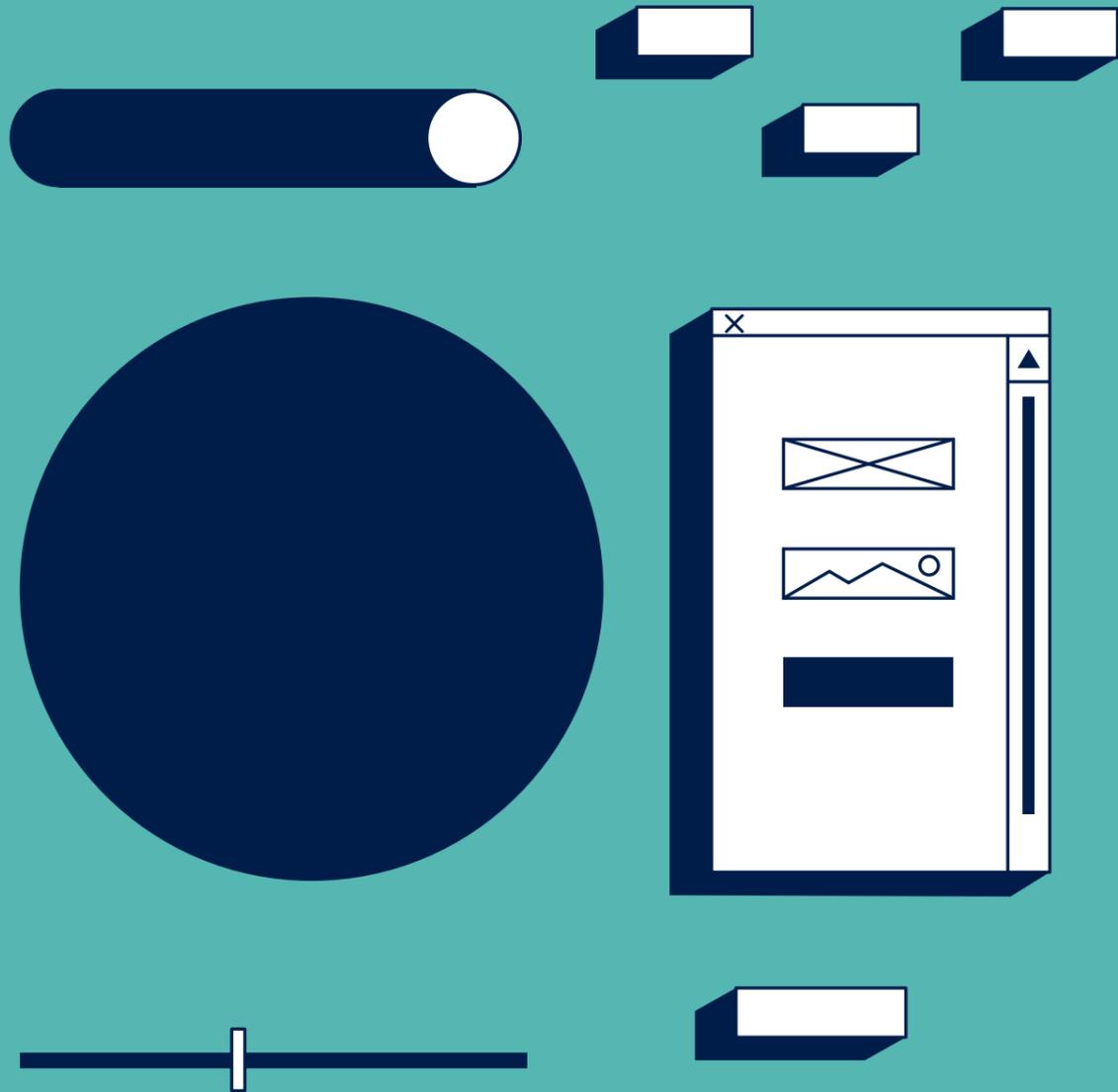
per year. People eligible for the scheme are those who have been out of high school for at least 10 years and get enrolled in a full-time study programme of at least two years. Also, their family income cannot score beyond the defined threshold.

In 2018, Poland's Ministry of Science and Higher Education in partnership with Fundacja Młodej Nauki (Foundation for Youth Science) and other partners kicked off a MOOC (Massive Open Online Course) platform offering free online courses to anyone willing to learn new skills as part of the lifelong learning pathway. The National Centre for Research and Development also sustains the development of the platform by co-financing new online course ideas as part of the *Kurs na MOOC* competition. In 2019, the Centre earmarked nearly PLN 20 million for this purpose.

Educating citizens is a process that consists of formal and extracurricular schooling as well as skill adaptation occurring as people carve out a place in the demanding digital job market while forging a relationship with the digital state administration. The bigger the tech advancement in both the public and private sector allowing people to be served in-office in a modern and digital manner, the higher is their motivation to improve skills that thus become more widespread in society. Thus the process of digitalisation in the public sector is of topmost importance, but it often takes place like it does in the private sphere – or even less effectively. New technologies in the public sector are not intuitive and user-friendly enough, which makes them difficult to receive and use for both officials and customers alike. Often, due to multiple and separate solutions, also incompatible one with each other, civil servants often face extra work to obtain hard copies of digital forms as required under law. According to one of our respondents, in extreme-case scenario this means that civil servants need to print out the forms they get in a digital version before submitting to other colleagues who sign them. Then hard-copy files are digitised before being sent back to either an individual or a business.

Besides, the lion's share of state administration processes are wholly transferred into the digital sphere without any attempts to optimise them or verify whether they are safe, necessary, and useful in the digital universe. As a consequence, there emerge pompous and costly online platforms that attract little attention.

In addition to how to digitalise the public sector at issue is also how to maintain a coherent strategic approach to socio-economical digitalisation. Ministries and government agencies are now pushing through a raft of projects aimed at shaping future skills. However, in our in-depth interviews, experts unanimously agree that there are no uniform and supraministerial strategic actions in this respect. Initiatives and programmes tend to come in bulk yet are sometimes little effective as there is no synergy or communication between ministries or other state bodies that sustain the development of digitalisation processes in Poland. Only with a joint effort of all stakeholders, going far beyond departmental fissures, it is possible to bring about a scale effect while contributing to real and noticeable shifts.



06

What future
for skills –
opportunities,
threats, challenges

Building future skills of citizens, whether those at the dawn of education or the elderly, is a complex process that encompasses a set of factors that might either slow down or speed up the whole thing. Some are centered in state administration bodies whilst others could be just stimulated or stopped by them, and there are also those – like cultural factors – that are largely independent of the public sector, albeit of crucial importance when designing the future institutional order.

The research we have thoroughly described in the previous chapters pinpointed a number of factors – defined as both opportunities and threats – that state authorities ought to take into account while planning how to handle digital transformation. Once included, it will be possible to shape state public policies so as to use to the fullest both social and economic opportunities and potential when either reducing or mitigating possible risks.

Opportunities

» A speed-up in the digitalisation of the economy and society due to the pandemic.

Now is the best time for supporting the development of future skills in Poland and maintaining practice-based learning processes. Businesspeople have changed their mentality while Poles have opened up to cutting-edge technologies ranging from online shopping to remote working to digital state offices and distance learning schemes. This is the right time to forward a series of key shifts via legislation and state authorities and draft wide-ranging digitalisation schemes.

Many entrepreneurs have realised that digitalisation is not merely an alluring oddity to boost business competitiveness, but a must to survive in the market place. At issue is the rising tendency to automate business processes and to search for helpful solutions. This affords an opportunity to companies tasked with developing leading-edge tools to look for new clients while giving the green light to state agendas to draft innovation standards and model adequate data exchange platforms for business, education, and administration – like those intertwining state offices, businesses, and their representatives.

» A favourable direction in European policy.

Following the outbreak of the pandemic, EU authorities turned their attention to boosting the future skills level as a top key priority of state policy and earmarked extra funds for this purpose. The EU's New Skills Agenda for Europe includes lifelong learning-oriented actions, alongside steps to develop future skills, also digital ones.

» Declining importance of place of residence in the job market.

The pandemic has showed that labour can be as mobile as capital. An employee can be based anywhere in the world and offer their services to businesses operating in Warsaw, London, or San Francisco. This opens up the opportunity for both employees living in small towns or poorer countries to find a good job offer, and for companies to reduce operating costs. A positive outcome is that income inequalities between the poorer and richer regions of the country are levelled out, and in the long run also between the world's more and less wealthy regions.

» High digital skills of Polish IT specialists.

Polish technical school graduates get regular credits in what opens up massive potential for development, which might be used to introduce friendly legal and tax conditions for workers in Poland. As a consequence there might be more Poland-based tech businesses. What might be conducive for this are global business investments in Poland and state digital schemes that offer required tech facilities and lead to the scale effect needed to develop the domestic IT sector. This affords a perfect opportunity for thousands of tech-related jobs and builds Poland's image as a country offering many highly trained digital specialists.

» Centralisation of public services.

The past few years have showed that state agencies have had the function of delegating a growing number of responsibilities to central authorities. With this, it is possible to better handle the tech revolution in Poland, as exemplified by successful digitalisation efforts in the Polish justice system. How digital solutions are being introduced into Polish courtrooms could serve as model for other public services, serving as a perfect example of how to conduct digital transformation in the public sector.

Threats

» Making technology a top priority of the process of digitalisation.

Being overtly focused on tech solutions rather than on the human element – whether this be as citizen, employee, customer, teacher, student, or official – and their needs boils down to a failure in digitalisation efforts. Citizens may tend to feel bewildered amid the array of new tech solutions, customers refuse to deploy them, workers become less effective, depressed, lonely and discouraged, whereas schooling excludes some pupils from the digital world and boosts social gaps in lieu of building future skills. This poses the biggest threat to the whole process of socio-economic digitalisation, bringing it to a halt for many years to come or even reversing its achievements.

» A one-to-one approach in digitising the analog reality.

Another threat is to see technology both as its user, and insert digital solutions to the world as we know it. Digitalisation consists of building up a new approach to business processes, customer service or teaching methods in what might help technological solutions and bring to the fore new opportunities. To achieve this, it is of crucial importance to master future skills of both technology users and developers. Another key to success are appropriate legal solutions that suit the digital world, while shielding tech users and being open to new ways of delivering services.

» **The inside-outsider phenomenon in the IT sector.** IT specialists working for businesses often balk at digitalisation processes despite being best fitted to the task. They tend to be fearful of shouldering responsibility for the outcomes of system changes and have no management and communication skills. As a consequence, external IT specialists carry out the process of digitalisation, often at the request of the management board, who fail to understand workers and customers buying company products and services. Technology solutions are implemented improperly while the whole project might be doomed to failure. This is a grave threat that is still easy to reduce by adopting and strengthening the future soft skills of IT specialists and management staff.

» **No business process schemes.** To introduce automation into business, it is prerequisite to be familiar with the business process. Many companies, notably small and medium-sized family businesses, do not map them. Employers or workers take ad hoc decisions whilst the firm's business style varies after personnel reshuffles. Thus they fight an uphill battle to digitise their companies since it is impossible to digitise unsystematised processes.

» **Low business propensity to invest in digital skills.** The IT sector sits comfortably among the best-paid career paths, which in turn discourages businesses to upgrade their skills. No workers boasting high digital skills intensifies what is known as the insider-outsider phenomenon and hampers the process of digitalisation since there is no-one to whom companies developing new business-linked technologies might submit their offer. It is possible to indirectly mitigate this risk by encouraging entrepreneurs to inject money into the digital skills of their employees and make them aware that a digitally literate person is not only one with a major in IT engineering.

As business processes automate rapidly in a process that reduces demand for

unskilled workers while increasing that for digitally skilled ones, it is vital to change business mindsets. Executives tend to dismiss people in eliminated jobs and hire those boasting highly developed digital skills. There is a cheaper and more effective solution that fits all: offer digital skills training schemes to workers to equip them with know-how to take up technology jobs.

» **Siloed activities in the public sector.** Recent years have seen a slew of digitalisation process being introduced into areas like state administration, economy, and society. None of these processes, however, occurs in a vacuum, with many of them intertwined in what might result in high-level synergy. In addition, the siloed approach to building future skills might see its outcomes interfering with one another and reinforce the feeling of being baffled by digitalisation policy.

» **Education system unable to teach future skills.** For state education agencies, the biggest threat to future skills building is an inappropriate schooling approach, with inadequately selected teaching and testing methods. Students are taught how to pass tests, learn by heart, and compete with their peers. Students who demonstrate „humanistic“ skills are not thrown into the same basket with those good at sciences, and this lays the groundwork for constructing separate education paths detaching social and ethnical knowledge from quantitative and analytical know-how. Schools curricula fail to focus on soft skills like human psychology, communication, and teamwork. Students are taught to obey authority, which narrows their critical thinking abilities and fact-checking tendencies. Once combine, this composes a picture of an old-style education system that does not sustain future skills, and sometimes even diminishes them. The absence of skills like critical thinking, teamwork, and openness to failure presents the biggest long-lasting threat to digital transformation.

» **Infrastructure underinvestment.** Though much has been done in this respect, there still exist some blank spots on Poland's digitalisation map. In schooling, the pandemic has widened digital gaps between teachers who did not receive laptops and students being highly literate in tech innovations, as well as between rich and less wealthy students, the latter of whom might even „disappear“ from the education system. During the pandemic there have been whole regions that have dropped out of social and economic life – notably those with the low population density or where there is no fiber optical or 4G (LTE) internet coverage.

» **It is vital to coordinate public service activities when bankrolling new IT projects.** While state authorities have the decisive voice while purchasing infrastructure items, notably due to the project value, these are heads of departments who decide what software to buy for offices or educational facilities. This leads to inequalities in access to infrastructure, inability to achieve economies of scale and, in extreme cases, low compatibility of solutions and, consequently, failed digital data transfer between different state authorities.

» **Excessive red tape.** According to our interviewees, who all have hands-on expertise in digitalisation, Polish legal solutions might be a threat to developing future skills as they often insist that analogue solutions be wholly transferred into the digital sphere while attempting to regulate nonexistent

technology solutions. This puts on hold innovative solutions in areas like artificial intelligence, digital tools for the public service, and the digitisation of the healthcare industry. Thus in the era of digitalisation, legal solutions ought to shield new tech users against cyber-attacks and misuse of personal data while keeping the greatest possible flexibility in putting new solutions, including paperless ones, into practice.

» **The threats above also have some far-reaching consequences.** Once improperly conducted, the process of socio-economic digitalisation – which is speeding up regardless of state actions or business approach – might even amplify the slew of existing social threats. There might be a rise of income and cultural gaps as technology materialises as a financial obstacle pushing some out of the job market or the culture industry and even barring them from gaining reliable information. Children, women and the elderly are amongst those at high risk of digital exclusion. Society could grow polarised even more than before as technology provides any information that, once not fact-checked, might exacerbate the already existing chasms in Poland. The structural unemployment rate could rise as employees without digital skills will be made redundant instead of getting enrolled on courses, which could result in their dropping out of the job market, a problem that could mirror that of people who had lost their jobs during Poland's democratic transition.



07

Appendix
Methodology
References

» **TABLE 4. OVERVIEW OF POLISH PUBLIC SECTOR INITIATIVES AIMED AT DEVELOPING FUTURE SKILLS**

	ORGANIZATION	NAME	INFORMATION	TIMEFRAME
1	Ministry of Digital Affairs	Digital Skills Development Programme	The new scheme is orbital around digital skills needed by citizens, ICT professionals, public sector workers, and employees in small and medium-sized enterprises.	2020-2030
2	Ministry of Digital Affairs	Operational Programme Digital Poland	The programme encompasses the development of broadband coverage, electronic services (public services and electronic health care), digital skills, up- and re-skilling, and future skills courses. Project co-funded by the European Regional Development Fund.	2021-2027
3	Ministry of Digital Affairs	National Broadband Plan	This mirrors the goals set by what is known as the gigabit society and embraces activities needed to implement 5G wireless technology within the "5G Strategy for Poland."	2020-2026
4	Ministry of Digital Affairs	IT Talent Development Program	Its purpose is to manage the IT talent pool and fill in IT staff shortages. The scheme consists in two paths: (i) coding and arithmetics contest, and (ii) game design competition.	2019-2029
5	Ministry of the Interior and Administration	Efficient State 2030	Poland kicked off the artificial intelligence development policy in Poland for the years 2019 - 2027. The goal is to become part of an exclusive group of countries (20 - 25 per cent) involved in developing artificial intelligence (AI) schemes, boost the number of projects, coordinate the project funding, and monitor the impact of AI solutions on the job market.	2021-2030
6	Inter-ministerial working group	Cybersecurity Strategy of the Republic of Poland	Boosting the state resilience to cyber-attacks and improving personal data protection. The development of a national cyber security system, increasing the exchange of information on threats to cyber security and improving coordination are key elements of the new strategy.	2019-2024
7	National Centre for Research and Development	POWER competitions (Operational Programme Knowledge Education Development)	There are a number of initiatives financed by the Operational Programme: NAVOICA platform offering massive open online courses (MOOCs), digital schemes for Polish universities, also to boost the digital skills levels among academic staff, researchers, and students; the University's Integrated Development Programme (ZPU) orbital around making Polish universities digital and internationalised, as well as Universities of Young Explorers and Universities of the Third Age under what is known as the "third mission of the university."	2014-2020
8	Ministry of Development Funds and Regional Policy	Code with POWER	In its portfolio there is a basket of 455 dedicated software developer loans of up to EUR 4,250 per participant, offered to fund workshops and training courses.	2018-
9	Ministry of Digital Affairs	National Integrated Informatisation Programme (PZIP)	Following some recent updates, the National Integrated Computerisation Programme focuses more attention to boosting the quality of interactions between the public sector and society.	2019-2022
10	Ministry of Digital Affairs	Common State IT Infrastructure Programme	It will consist of developing, maintaining, and managing the government cloud to facilitate the adoption of cloud computing services.	2019-
11	Ministry of Digital Affairs	Open Data Plus	It aspires to build up both the quantity and quality of public open data and increase its re-using schemes.	2018-2023
12	National Centre for Research and Development	CyberSecIdent - Cybersecurity and e-Identity	CyberSecIdent is a research and development programme aimed at improving security of Poland's cyberspace by increasing availability of hardware and software solutions (by 2023).	2017-2023

Methodology

We added qualitative research data to desk research and official statistics. As part of it, we contacted people with first-hand expertise in business, the public sector, and future skills. In-depth interviews were usually focused on leading-edge technologies, the job market, primary, secondary, and higher education, as well as public services although the themes depended upon the interviewee. We conducted a total of sixteen in-depth interviews, of which one was a dyad, whilst the remaining fifteen consisted of individual talks, of which three were in English. Their duration varied from 40 to roughly 120 minutes per person.

Polityka Insight interviewed the following experts:

1. **Michał Boni** former Minister of Administration and Digitalisation (former Member of the European Parliament, Centrum HumanTech SWPS),
2. **Dominika Bettman** (Siemens Poland),
3. **Jadwiga Emilewicz** (Deputy Prime Minister, Minister of Economic Development),
4. **Piotr Marczuk** (Honeywell),
5. **Joanna Mazur** (DELab UW, Faculty of Law and Administration University of Warsaw),
6. **Jowita Michalska** (Digital University),
7. **Yngve Rosenblad i Urve Mets** (OSKA),
8. **Marcin Smoliński** (Toolbox for HR),
9. **Dan Schawbel** (Workplace Intelligence),
10. **Leesa Soulodre** (R3i Ventures General Partner),
11. **Anna Streżyńska**, former Minister of Digital Affairs (CEO, MC2 Innovations),
12. **Przemysław Szrunder** (Amazon),
13. **Cecylia Szymańska** (Education Sector, Microsoft),
14. **Aleksandra Trapp** (infuture.institute),
15. **Tomasz Wesołowski** (Edward.ai),
16. **Izabela Żmudka** (National Center for Research and Development).

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