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DIGITAL TRANSFORMATION OF THE LABOR MARKET – A CHALLENGE FOR YOUNG POLES

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Purpose: The purpose of the article is to assess the level of digital competence of young Poles against the background of selected European countries in the context of changes occurring in the labor market.
Design/methodology/approach: The level of digital competence of young people from 30 selected European countries was diagnosed on the basis of the development pattern method by Z. Hellwig. To develop a synthetic Z. Hellwig measure, 23 diagnostic characteristics that reflect the level of skills of young Europeans in creating digital content, using databases, communicating and collaborating online, using ICT in different types of online activities, and protecting privacy and personal data online were selected. The study covered a group of young people aged 16-24, representing a potential labor supply that is particularly relevant to the development of the digital economy.
Findings: In the light of the characteristics adopted for the study, the level of digital competence of young Poles is low. Young Finns, Maltese, Dutch, Spanish and Icelanders have the highest levels of digital competence. In contrast, particularly low levels of these competences are seen among young Bulgarians and Romanians.
Research limitations/implications: The presented research can contribute to further in-depth analysis of the impact of the digital competency deficit on the economic development of the countries included in the analysis in the long term, including Poland in particular.
Practical implications: The results of the research can provide guidance to public authorities in creating and evaluating strategies for the development of digital competences in Poland and the other countries covered by the study.
Originality/value: The article indicates the changes that the labor market is undergoing as a consequence of the digital transformation of the economy. A synthetic indicator of digital competence was constructed, taking into account the diagnostic characteristics selected by the author of the article, which in their opinion are particularly relevant to the development of the digital economy. Leaders in the level of digital competence of young people have been identified. The distance between them and Poland was also diagnosed. The findings are addressed to the public authorities of the European countries surveyed. They can provide guidelines for the creation and evaluation of strategies for the development of digital competences in Poland and the other countries covered by the study.

Keywords: digital competences, labor market**,** Z. Hellwig's method, digital transformation.

Category of the paper: Research paper.

1. Introduction

The Internet of Things, 5G, big data, blockchain, artificial intelligence are just some examples of the application of digital technologies, transforming the economy and labor market rapidly and radically. The Covid-19 pandemic intensified this process, but at the same time revealed a deficit in digital competence. Surprisingly, it also applies to young people, who, after all, are referred to as the generation of two parallel worlds – the real and the virtual one. Hence, for many of them, exclusion from the primary segment of the labor market, which offers high-paying jobs with opportunities for advancement and career fulfillment, becomes a real threat.

The purpose of the article is to assess the level of digital competence of young Poles against the background of selected European countries in the context of changes occurring in the labor market.

The level of digital competence of young people from 30 selected European countries was diagnosed on the basis of the development pattern method by Z. Hellwig. To develop a synthetic Z. Hellwig measure, 23 diagnostic characteristics that reflect the level of skills of young Europeans in digital content creation, online communication and collaboration, and online privacy and data protection were selected. The study covered a group of young people aged 16-24, representing a potential labor supply that is particularly relevant to the development of the digital economy.

When considering the effects of implementing new digital technologies, reference was made to international research and analysis conducted in this area.

2. Substitutability and complementarity of labor in the digital economy

A 2018 report by the International Monetary Fund highlighted that digitalization encompasses a wide range of new information technology applications in business models and products that are transforming economies and social interactions (IFM, 2018). The digitalization of economic processes is fundamentally transforming the labor market. In addition, the Covid-19 pandemic clearly accelerated this process by spreading ICT-based remote work, among other things.

Automation and digitization of work are occurring in three overlapping waves – algorithms, enhancements and autonomy (PricewaterhouseCoopers, 2018), and the specificity of the changes they bring with them determines the necessary adjustments on the supply side of the labor market.

The wave of algorithms manifests itself in the automation of simple tasks in the areas of information processing and communication, as well as the increasing use of analysis of structured statistical data in so-called controlled environments. Subsequently, it is characterized by the use of increasingly sophisticated applications for processing large data sets and running machine learning algorithms (Frey, Osborn, 2013).

The wave of improvements entails a more dynamic change in the way many tasks are carried out than was the case in the wave of algorithms. It especially applies to work of a routine and repetitive nature. The physical transfer of information is increasingly becoming supported by technology. On the other hand, further development of robotics makes the emerging solutions economically applicable and operational, not yet fully autonomous, but in cooperation with humans (PricewaterhouseCoopers, 2018).

The wave of autonomy is associated with the large-scale introduction of artificial intelligence and robotics, which are intensifying the process of automating routine tasks that require manual labor or dexterity. More importantly, however, analytical modeling of structured data creates the opportunity to solve complex problems in the dynamic real world (Frey, Osborn, 2013; PricewaterhouseCoopers, 2018).

Currently, there are changes characteristic of the wave of algorithms and the wave of improvements, however, the culmination of the changes brought by the latter wave is predicted for the second half of the 2020s. The autonomy wave, on the other hand, includes technologies currently undergoing testing that are expected to be deployed on a large scale in the 2030s (PricewaterhouseCoopers, 2018).

Economists point to three particularly significant stages of labor market perturbations arising in the wake of the waves of automation and digitization of work outlined above (del Rio-Chanona et al., 2021; Acemoglu, Restrepo, 2019; Brynjolfsson., McAfee, 2014).

The first stage is the substitution of human labor by technology, mainly concerning routine work, where workers are replaced by autonomous devices and AI algorithms. As a result, job cuts are occurring in many sectors of the economy.

The second and third stages – based on the recognition of the complementarity of human labor to new technological solutions – assume a successive increase in employment. What distinguishes these two stages is the distinctly different mechanism for creating new jobs and the nature of the jobs created.

For stage two, it is assumed that employment growth is the result of an increase in demand for goods and services following a drop in their prices, achieved by improving productivity and reducing production costs. As a result, this brings an extensive increase in labor demand, mainly for jobs where work has not been automated.

In the case of the third stage, it is assumed that new jobs will be created in the implementation of tasks, functions, jobs that previously played a marginal role or did not exist at all, while the demand for them is generated by the increasing processes of automation, digitalization and digital development.

However, it should be emphasized that new jobs, as the experience of previous technological revolutions shows, are being created with some delay. In the short term, the effect of substitution of human labor with objectified labor based on new technological solutions is more evident, as reflected in the growing structural unemployment. The increase in labor demand, characteristic of the second and especially the third of the stages outlined above, raises the need for radical changes in the qualifications of the workforce. The context raises questions – Will the rapid and radical changes occurring in labor demand be in sync with qualitative changes in labor supply? Is it possible to avoid skill gaps?

Research conducted between 2000 and 2018 in the United States confirmed the phasing of changes in the labor market outlined above (del Rio-Chanona et al., 2021). In the first period, companies cut jobs, leading to an increase in unemployment, while in the second period there was a growing demand for labor in the operation and service of new technology and the new services created after its application. At the same time, the study's authors point out that despite the 19-year period they included in their analysis, the labor supply in qualitative terms has not fully adjusted to the changed demand for labor, which was reflected in the occurrence of a clear skills gap. Despite relatively high unemployment, it has been impossible to fill the growing number of vacant jobs due to a lack of adequate workforce competence.

This is confirmed by McKinsey Global Institute research showing that current technological potential already enables automation of about 50% of current work activities worldwide. However, its use is not possible, due to the lack of adequate professional skills on the part of the workforce (Manyika, Chui et al., 2017). The authors of the study forecast that the adjustment of labor supply, allowing full use of new technologies, will be possible around 2037 according to the so-called early scenario, and according to the so-called late scenario – as late as 2055(Manyika, Chui et al., 2017).

Given that the research presented above was conducted during a period of moderately intensified automation processes and the implementation of new advanced digital technologies, there is a legitimate concern that in the digital transformation of the economy, the 4.0 revolution taking place, the desired qualitative changes on the supply side of the labor market will not be synchronized with the rapid, even sudden qualitative changes on the demand side of the labor market. The competency gap cannot be completely avoided, but it can be reduced through strategic efforts to develop digital competences.

3. Methodology of own research

The aim of own research is to try to assess the level of digital competence of young Poles against the background of selected European countries. The study covered the 16-24 age group, assuming that they are the ones who will be primarily affected by changes in the labor market

following the digital transformation of the economy. The level of their current digital competences will determine the adaptability of the labor supply to the already observed and steadily intensifying changes in labor demand.

For the purposes of this study, it was assumed that digital competency is "a set of information competences that includes the ability to search for information, understand it, and assess its reliability and usefulness, and digital competences that consist of the ability to use a computer and other electronic devices, use the Internet, and use various types of applications and software, as well as create digital content" (Ministry of Administration and Digitization, 2014).

A synthetic Z. Hellwig indicator was used to determine the level of digital competence of young people from 30 European countries, developed on the basis of 23 diagnostic characteristics. They form three groups illustrating digital competences from three areas: 1) creation of digital content, 2) use of the Internet for communication and collaboration, and 3) protection of privacy and personal information online (Table 1).

Table 1.
Diagnostic characteristics adopted in the study of digital competence of young people

Feature no.	Name of the diagnostic feature
Digital content creation skills	
x_1	People who write code in a programming language.
x_2	People who copy or move files between folders, devices or in the cloud.
x_3	People who download or install software or applications.
x_4	People who change the settings of a software, application or device.
x_5	People who use word-processing software.
x_6	People who create files that integrate elements such as text, images, tables, charts, animations, sound.
x_7	People who use spreadsheet software.
x_8	People who use the advanced characteristics of spreadsheet software to organize, analyze, structure or modify data.
x_9	People who edit photos, video or audio files.
Skills related to the use of the Internet for communication and collaboration purposes	
x_{10}	People using the Internet for participation in social networks (creating a user profile, posting messages or other posts on facebook, twitter, etc.).
x_{11}	People using online materials for learning.
x_{12}	People taking online courses.
x_{13}	People selling goods or services over the Internet.
x_{14}	People using the Internet to participate in online consultation or voting for specific civic or political issues (e.g., urban planning, signing a petition).
x_{15}	People using the Internet to communicate with instructors or students via educational websites/portals.
Online privacy and data protection skills	
x_{16}	People who know that cookies can be used to track people's movements on the Internet.
x_{17}	People changing the settings on their web browser to prevent or restrict cookies on any of their devices
x_{18}	People who use software that limits the ability to track their online activities.
x_{19}	People who read privacy policy statements before providing personal information.
x_{20}	People who have restricted or denied access to their geographic location.

Cont. table 1.

x_{21}	People who have restricted access to their profile or content on social networks or data stored online.
x_{22}	People checking whether the site where they provide personal information is secure.
x_{23}	People who check the veracity of information or content found on online news sites or social media.

Source: Own elaboration.

The selection of diagnostic variables meets three basic criteria: substantive, formal and statistical (Strahl, 2006). It is both a product of data availability and the arbitrary decisions of the researcher. The choice of diagnostic characteristics was also inspired by the European Commission's Digital Economy and Society Index study (European Commission, 2020).

The own study used diagnostic features from the Eurostat database entitled "Youth in the digital world". The study includes statistics from Eurostat databases primarily for 2021. In the absence of data for that year, 2020 data was used.

Z. Hellwig's synthetic measure was used for identifying four groups of European countries with different levels of digital competences of youths. These are accordingly:

- group I – countries with the highest level of digital competence index, where $d_i \geq \overline{d_\iota} + S_{di}$,
- group II – countries with an average level of digital competence index, where $\overline{d_\iota} \leq d_i < \overline{d_\iota} + S_{di}$
- group III – countries with a low level of digital competence index, where $\overline{d_\iota} - S_{di} \leq d_i < \overline{d_\iota}$
- group IV – countries with the lowest level of digital competence index, where $d_i < \overline{d_\iota} - S_{di}$,

where:

d_i– value of the synthetic indicator,

$\overline{di}$ – average value of the synthetic indicator d_i,

S_{di}– standard deviation of the indicator d_i.

4. Study results

4.1. Ranking of European countries in terms of the level of digital competence of young people

Own study showed a moderate degree of variation in diagnostic characteristics. The coefficient of variation ranged from 6.9% to 56.5%. Young Europeans are particularly characterized by similar levels of competence related to Internet use in terms of participation in social networks (creating a user profile, posting messages or other posts on facebook, twitter, etc.). For this diagnostic characteristic, the coefficient of variation reached the lowest value.

The highest number of young people using the Internet for these purposes was in Iceland (98%), while the lowest was in France (71%). In Poland, the coefficient was 91%.

The spreads in this regard are, among others**,** the result of differences in preferred forms of contact. In the case of the French, they are more often direct. On the other hand, Icelanders have a much harder time finding this form of contact, if only due to geographic conditions. Hence the importance of on-line communication there. In this context, one should also pay attention to the negative attitude of the government towards Fecebook, which is observed, especially in France. It could also have an impact on the value of the diagnostic feature adopted in the research

The percentage of young people who said they used the Internet to sell goods and services was the characteristic that most differentiated Europeans. The highest number of young people declaring the above activity was in Malta (64%), while the lowest were in Greece (3%) and Cyprus (3%). In the light of the diagnostic characteristics adopted for the study, the highest level of digital competence of youths was characteristic of five countries, namely Finland, Malta, the Netherlands, Spain and Iceland (Table 2). Another group of nine countries (Estonia, Norway, Austria, Latvia, Croatia, Lithuania, Switzerland, Portugal, Denmark) are characterized by the average level of digital competence of its young citizens (Table 2). The largest group of countries, which included Poland, are those with low levels of digital competence (Table 2). Poland ranked 18th in terms of the value of the synthetic Hellwig indicator. It was more than 1.5 times lower than that of ranking leader Finland. Young Poles represent a level of digital competence most similar to the French, Greeks and Czechs.

Analyzes of activities undertaken by leaders in the field of development of digital competences prove that the key factor in the success of their activities is a systemic approach to their development (Tarkowski, Majdecka et al., 2018). Finland owes its advantage to the consistent implementation of coordinated and long-term activities developing digital competences They are undertaken as part of the socio-economic development strategy and implemented public policies). The other ranking leaders approach the development of digital competences in a similar way.

Table 2.
Ranking of European countries in terms of the level of digital competence of young people (16-24 years old), 2021

No.	Country	Hellwig's synthetic measure value
Countries with the highest indicator of digital competence of young people		
1.	Finland	0.708
2.	Malta	0.612
3.	Netherlands	0.597
4.	Spain	0.576
5.	Iceland	0.572

Cont. table 2.

Countries with an average indicator of digital competence of young people		
6.	Estonia	0.550
7.	Norway	0.508
8.	Austria	0.508
9.	Latvia	0.500
10.	Croatia	0.497
11.	Lithuania	0.491
12.	Switzerland	0.487
13	Portugal	0.469
14	Denmark	0.429
Countries with a low indicator of digital competence of young people		
15	Czech Republic	0.418
16	Greece	0.417
17.	France	0.414
18.	Poland	0.411
19.	Hungary	0.371
20.	Italy	0.369
21.	Sweden	0.369
22.	Slovakia	0.353
23.	Luxembourg	0.353
24.	Belgium	0.338
25.	Slovenia	0.302
Countries with the lowest indicator of digital competence of young people		
26.	Serbia	0.265
27	Germany	0.256
28.	Cyprus	0.241
29.	Bulgaria	0.124
30.	Romania	0.096

Source: Own research.

Young people in Serbia, Germany, Cyprus, Bulgaria and Romania have the lowest level of digital competences (Table 2). However, it should be emphasized that there is a wide variation in the level of digital competences in this group. Bulgarians and Romanians show significantly lower levels of digital competences than Serbs, Germans and Cypriots. Hellwig's synthetic index for Romania is more than 2.5 times lower than for Serbia and Germany.

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The reasons for the poorly developed digital competences in Romania are primarily the low level of socio-economic development of the country and the relatively low demand for these competences in the labour market. In addition, general assumptions of the "National Digital Strategy. Agenda for Romania 2020" regarding the development of digital competences perpetuate the demonstrated disproportions.

4.2. Digital competences of young Poles in the light of a self-study

In the rest of the article, attention is focused on a detailed analysis of the digital competences of Poles, diagnosing skills with relatively low and high levels. For this purpose, synthetic Z. Hellwig indicators were also calculated (d_{i1}, d_{i2}, d_{i3},) for the three groups of diagnostic

characteristics included in the study (Table 1), and the corresponding rankings were developed (Tables 3-5). The first group includes digital competences in the creation of digital content (d_{i1} Indicator – Table 3), the second group includes digital competences in the use of the Internet for communication and collaboration (d_{i2} – Table 2), and the third group includes digital competences in the protection of privacy and personal data online (d_{i3} – Table 3).

Young Poles are characterized by a relatively *high level of digital competences in creating digital content*. In a ranking that included 30 countries, Poland ranked 14th, while the synthetic d_{i1} index reached 0.549 for this range of competences, 1.4 times lower than that of the ranking leader Finland. The majority of young Poles say they have basic skills in creating digital content, i.e. copying and moving files between folders, devices or in the cloud (87%); downloading and installing software, applications or devices (79%); using word-processing software (77%); creating files that integrate different elements, i.e. text, image, chart, animation, etc. (73%). Despite the relatively high percentage of Poles declaring the first two of the skills indicated above, there is still a significant distance between our young people and the leaders in this regard. As many as 100% of Croatians and 91% of Maltese were characterized by their ability to copy and move files. In contrast, the highest number of youths handling installing software or applications was in Malta (93%) and Finland (91%).

Far fewer Poles, but also young people from the other countries surveyed, are characterized by more advanced skills tied to the use of spreadsheet software and coding in a programming language.

The highest number of young people with spreadsheet software skills was in Croatia and Iceland. The rate in this case was 86% and 71%, respectively. Against their background, Poland fared far less well, with skills in this area pertaining to 55% of young people. Attention is further drawn to the fact that the disparity increases if one takes into account the possession of the ability to use advanced functions of spreadsheet software to organize, analyze, structure or modify data. This type of skill characterizes only 18% of Poles. In Croatia and Iceland, such skills characterized 59% and 54% of people, respectively. Given that today's organizations need to store increasing amounts of data and subject it to analysis in order to operate more effectively in a turbulent environment and intensifying competition, the low level of skills in the above area is worrisome. As observation of management practice shows that the advanced use of spreadsheet software is only the first step on the road to using complex databases of various types. Economic processes are subject to datafication and networking. There is increasing and intensive use of data from various repositories (individual, institutional) and their integration is increasingly automatic (Śledziewska, Włoch, 2020).

Coding, enabling the storage of information in digital form, is one of the key skills of Economy 4.0. The results of own study, however, show a relatively low percentage of young Europeans with such skills. The Danes and Austrians are the leaders in this regard, with 21% and 20% of youths, respectively, having the ability to code in a programming language. In Poland, it is 14% of youths.

Compared to the countries surveyed, Poles fare significantly worse in terms of using the Internet *to communicate and cooperate*. In this case, Poland is ranked 23rd (Table 4). Again, the Finns and the Maltese are the leaders in this regard. The synthetic Hellwig indicator (d_{i2}) for Poland is 0.310, more than 2 times lower than for Finland.

Young Poles are good at using the Internet for personal, entertainment purposes, as evidenced by the fact that 91% declare participation in social networks and related skills – creating a user profile, posting messages or other posts on facebook, twitter, etc. The leader in this regard is Iceland, where 98% of young people declare such activity.

Attention is unfortunately drawn to the relatively poor use of the Internet's potential for educational purposes by Poles. Studies show that 55% of young people use online materials for learning. Poland is particularly far behind the leaders in this field – Iceland, Sweden, Finland, where 83%, 78%, 75% of young people, respectively, used online learning materials. The situation is similar for Poles' participation in online courses, with only 26% of young people declaring this. In this case, the leaders are the Dutch and the Maltese, where the percentage was 78% and 70%, respectively. Own study confirms the fact also perceived by other researchers (Głomb, Kniaź, 2019) that Poles are unable to use the vast educational resources of the web effectively. In order to intensify the possibilities of using the Internet for teaching purposes, an Integrated Education Platform was established in 2019. It contains more than 8,000 e-materials in the form of interactive tasks, teaching videos, virtual journeys, experiments, etc. The Platform's resources are constantly being expanded.

Relatively few Poles know how to take care of *privacy and personal data protection on the Internet* by taking appropriate measures in this regard. This is reflected in Poland's 21st position in the ranking compiled for this type of skills (Table 5). The largest number of youths representing the above skills was in Croatia and Estonia. For these countries, the synthetic Hellwig indicator (d_{i3}) was 0.871 and 0.843, respectively, while for Poland it reached 0.566.

The majority of Poles (89%) are aware that cookies can be used to track a person's movements on the Internet, however, less than half are able to prevent or limit their functioning on various mobile devices (41%). This compares with 96% and 62%, respectively, in Finland, where such people are most numerous.

The ability to track online activities is limited by relevant software. Its use is declared by 27% of young Poles, while in Norway, the leader in this regard, it is 49%.

The relatively low level of knowledge among young Europeans, including Poles, about the dangers of the Internet is reflected in the next three diagnostic characteristics adopted in own study.

The youths relatively rarely read privacy policy statements before providing personal information. This is confirmed by the arithmetic mean value for this characteristic for all countries surveyed, which is 37%. Such actions are taken by 34% of Poles. The most active in this regard are the Greeks, where 59% have read the above statements.

Table 3.
Ranking of European countries in terms of the level of digital competences in digital content creation (I group of characteristics in Table 1)

No.	Name of the country	Synthetic Hellwig indicator (di_1)
1.	Finland	0.781
2.	Malta	0.725
3.	Spain	0.703
4.	Iceland	0.654
5.	France	0.645
6.	Netherlands	0.640
7.	Lithuania	0.632
8.	Croatia	0.608
9.	Latvia	0.582
10.	Austria	0.582
11.	Norway	0.580
12.	Estonia	0.568
13.	Switzerland	0.568
14.	**Poland**	**0.549**
15.	Czech Republic	0.538
16.	Italy	0.473
17.	Greece	0.470
18.	Serbia	0.458
19.	Portugal	0.448
20.	Luxembourg	0.433
21.	Slovakia	0.425
22.	Denmark	0.411
23.	Sweden	0.392
24.	Cyprus	0.378
25.	Slovenia	0.357
26.	Hungary	0.355
27.	Belgium	0.336
28.	Germany	0.302
29.	Romania	0.098
30.	Bulgaria	0.091

Source: Own research.

Table 4.
Ranking of European countries in terms of the level of digital competence in the use of the Internet for communication and collaboration (II group of characteristics in Table 1)

No.	Name of the country	Synthetic Hellwig Indicator (di_2)
1.	Finland	0.652
2.	Malta	0.591
3.	Netherlands	0.578
4.	Iceland	0.564
5.	Estonia	0.496
6.	Austria	0.489
7.	Switzerland	0.479
8.	Spain	0.475
9.	Norway	0.442
10.	Lithuania	0.438
11.	Latvia	0.434
12.	Hungary	0.431
13.	Slovakia	0.425
14.	Denmark	0.408
15.	Czech Republic	0.405
16.	Belgium	0.404
17.	Portugal	0.381
18.	Sweden	0.370
19.	Slovenia	0.362
20.	Italy	0.334
21.	Luxembourg	0.334
22.	Greece	0.311
23.	**Poland**	**0.310**
24.	Croatia	0.278
25.	Cyprus	0.276
26.	Bulgaria	0.264
27.	France	0.191
28.	Serbia	0.185
29.	Germany	0.181
30.	Romania	0.118

Source: Own research.

Table 5.
Ranking of European countries in terms of the level of digital competence in terms of online privacy and data protection (III group of characteristics in Table 1)

No.	Name of the country	Synthetic Hellwig indicator (di_3)
1.	Croatia	0.871
2.	Estonia	0.843
3.	Spain	0.828
4.	Denmark	0.811
5.	France	0.801
6.	Greece	0.797
7.	Latvia	0.788
8.	Czech Republic	0.761
9.	Italy	0.741
10.	Lithuania	0.740
11.	Belgium	0.728
12.	Germany	0.724
13.	Malta	0.696
14.	Luxembourg	0.683
15.	Netherlands	0.680
16.	Hungary	0.672
17.	Bulgaria	0.669
18.	Cyprus	0.651
19.	Austria	0.624
20.	Portugal	0.586
21.	**Poland**	**0.566**
22.	Finland	0.518
23.	Slovenia	0.406
24.	Romania	0.400
25.	Slovakia	0.377
26.	Sweden	0.340
27.	Iceland	0.329
28.	Norway	0.278
29.	Switzerland	0.246
30.	Serbia	0.133

Source: Own research.

Young people also rarely take steps to check whether the site they are using is secure. On average, 40% of Europeans do so. Only 28% of Poles are taking action in this direction. Against this backdrop, the Maltese definitely stand out, with 85% declaring such activites.

On the Internet, practically anyone can be the creator of information, rendering its users "inundated" with information of varying degrees of reliability and credibility (Witczak-Roszkowska, 2020). Being critical of them often gives rise to the need to check information in multiple sources. Are young people characterized by the ability to be critical of content presented online? Unfortunately, indirectly on the basis of another diagnostic characteristic adopted in the study, it can be concluded that the percentage of such people is low. Just over 36% of Europeans check the veracity of information or content found on online news sites or social media. Only 28% of young Poles undertake such activities. The Dutch – 59%, and Norwegians – 56%, are the most likely to check online content.

Nowadays, it is already a natural part of the daily functioning of young people to be present on various types of social networks, where they publish detailed accounts of their private and professional lives. Unfortunately, they often lose control over both the quantity and quality of the information provided there. By indulging in social exhibitionism online (Borzucka-Sitkiewicz, Leksy, 2017), they expose themselves to a number of risks. Actions to restrict access to profile and content on social networks reflect awareness and knowledge of these risks. They are taken up by more than half of young Europeans. In the case of Poland, it is 49% of youths. The Czechs take the most "prudent" approach to content presented online, with 76% declaring such actions.

5. Conclusion

Digital processes are transforming the labor market. It increasingly requires not only skills related to the use of devices, platforms and applications that have a variety of purposes, but also the creation of digital content and the critical evaluation of information presented online, distinguishing truth from falsehood, resisting the risks associated with functioning in the virtual space.

In light of the studies conducted, it is rightful to conclude that the relatively low level of digital competence of young Poles constitutes, in macroeconomic terms, a barrier to the effective and efficient implementation of modern technological solutions in economic practice and the development of the digital economy. On the other hand, at the microeconomic level, it exacerbates the risk of young people being excluded from the primary labor market that offers high-paying, secure jobs and career opportunities.

Poles are separated by a significant distance in the level of digital competence, especially compared to the leaders in this field, i.e. the Finns, the Maltese and the Dutch. There is optimism in the fact that young Poles, perform relatively well in the creation of digital content (14th in the ranking of skills of this type), which indicates their development potential in this area. Therefore, it is worth to take advantage of it and ensure the formation of more advanced skills of young people in this area, especially related to the use of spreadsheets, databases, programming. Poles fare less well in their ability to use the Internet for communication and collaboration (ranked 23rd) and to protect privacy and personal data online (ranked 21st). It therefore seems reasonable to give these two areas of digital competence special attention in the strategic and operational plans for digital education of the younger generation.

Closing the gap in the level of digital competences of young Poles in relation to leaders raises a number of challenges. Among them, an important place is occupied by the need to implement a plan for the development of digital competences, strategic in nature, where areas of digital competences that require particularly intensive action related to the need to eliminate and prevent competence gaps between labor demand and labor supply would be diagnosed. Gaps already revealed and potential ones, conditioned by the further development of the digital economy. So far, the development of digital competences is supported by two programs developed by the Ministry of Digitization, i.e. the Program for Integrated State Informatization for 2019-2022 and the Program for IT Talent Development for 2019-2029, but they are not strategic and comprehensive.

Raising students' digital competences is included in the basic directions for the implementation of the state's educational policy and in the core curriculum for general education in various subjects, especially information technology education and computer science. In particular, children and young people learn to use modern information and communication technologies. In this case, however, it would be important to note that these students represent the Z and Alpha generations, for whom the virtual world is as obvious and common an area of functioning as the real world. Hence, usually most of them acquire the ability to use information and communication technology, especially the computer, use basic programs and the Internet at home, often before they start formal education. In this context, it is worth considering diagnosing digital skills in children and adolescents and creating learning paths for digital competence with differentiated levels of proficiency. In this way it will be possible to avoid a situation where children and young people are being taught what they already know perfectly well. In addition, it would be possible to identify, at the very beginning of education, such children who have exceptional abilities in this area and offer them individualized digital competence training plans. This would prevent the waste of their talents.

It also seems important to draw attention to the fact that when it comes to children and adolescents, despite the fact that they are very active online, this activity is generally of a passive, entertaining nature (playing games, listening to music, using social networks). It seems reasonable, therefore, to give this activity a creative, analytical, educational character,

but this requires the formation of digital competence not only in classes like computer education or computer science, but in all other subjects, including those of a humanistic nature. This requires a reorganization of education in Polish schools, backed by significant support for teachers to acquire relevant skills. In this way, there is a growing opportunity to reduce the deficits in the digital competences of young Poles revealed, including in own study, in terms of taking a critical approach to content presented online and distinguishing true from false information, as well as countering the risks associated with functioning in the virtual space, including by protecting privacy and personal data online.

In the context of the discussed issues, it is worth recommending the following activities undertaken within the educational systems of countries with a high level of digital competences of young people:

1. Development of cooperation between schools and universities, enterprises, especially those creating and using digital technology, public administration bodies (promoting good practices, joint implementation of projects, internships for students and teachers).
2. Using the potential of business entities to improve teachers' digital competences, especially those more advanced in coding and programming.
3. Emphasizing the use of digital work tools by students and teachers as part of the team implementation of interdisciplinary projects, including cooperation in the network.
4. Developing digital competences with particular emphasis on the ability to analyze and critically evaluate information provided on the web.
5. Emphasis on education in the field of safe use of digital technologies.

To a large extent, it will depend on the scale and type of measures currently being taken to develop the digital competences of young Poles, whether they will be the “elite” of the labor market creating digital innovations or merely passive users of these innovations.

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