ASSESSMENT OF DIGITAL COMPETENCES OF LUBLIN PROVINCE RESIDENTS IN RELATIONAL TERMS

Elena MIESZAJKINA[1*], Paula BOCHEN[2]

[1] Lublin University of Technology, Faculty of Management, Department of Management;
e.mieszajkina@pollub.pl, ORCID: 0000-0002-3449-4059
[2] Lublin University of Technology, Faculty of Management; paula.bochen@pollub.edu.pl
* Correspondence author

Purpose: Digital competences in the modern world play a significant role in people's lives. They are vital for building Society 5.0. They are the subject of research by many scholars as well as research organizations and groups. The objective of the article is to present theoretical considerations and results of empirical research on the assessment of digital competences of residents in relational terms.

Design/methodology/approach: The review of documents and diagnostic survey methods were used to achieve the objective. The first method consisted in a critical analysis of the literature on the subject and was used to develop methodological assumptions. The second was employed to conduct the empirical study among the residents of the Lublin Province. The results enabled the frequency of the use of digital competences to be linked with the significance of the individual areas of life.

Findings: The study confirmed that the residents recognize the importance of digital competences in different areas of life and are ready to develop the competences. The frequency of their use is not high and does not differ significantly in relation to age, education and occupational status. Respondents use the competences the most frequently in the most significant area of life – relationships with their loved ones. The competences are used with the lowest frequency in the least significant areas: religion and civic engagement.

Research limitations/implications: The pilot study enabled research assumptions to be verified. The snowball sampling method proved to be effective in the selection of the sample for exploratory purposes. In the prospective basic research, the sample will be selected in such a way as to ensure its representative character. The online survey technique will be replaced by the CATI to reach respondents who do not actively use ICT. The study showed the need for certain changes to be introduced into the research tool.

Practical implications: The research proved the validity of applying a relational model when assessing digital competences of residents. In this approach, instead of the areas of people's lives, they can also be analyzed in relation to organizations taking into account the spheres of the organizations' activity.

Social implications: The results of the study constitute a valuable source of information concerning Society 5.0 and the significance of digital competences. They confirm that the residents use them with low frequency, which indicates the need for systemic actions to be taken in order to enhance them.

Originality/value: The article is based on existing knowledge regarding Society 5.0 and digital competence research models. The originality of the study consists in the use of the relational approach that allows the frequency of their use to be linked with the areas of life significant for respondents.

Keywords: digital competences, Society 5.0, relational model.

Category of the paper: Research paper

1. Introduction

In recent decades, information and communication technologies (ICT) have significantly changed the way people live and the way organizations, societies and economies function and operate. A new type of economy – the digital economy – has developed under the ICT's influence. The specificity of ICT is determined, among others, by the intangible flow of data and information, the progressing automation of work owing to the use of artificial intelligence, and the cooperation of all participants of the socio-economic life in the virtual world, i.e. producers of goods and services, business environment institutions, households, and representatives of authorities.

The digital economy brings significant benefits into all spheres of people's functioning and is becoming a new driving force for the development of civilization. As a result of the ongoing changes, new spheres of social life transfer to the virtual space. This enables work and daily tasks to be performed in a more convenient, cheaper and faster way, frequently without having to leave one's home. Consequently, online shopping, contacts with friends via social networks, the use of e-services offered by state administration, education and health care sectors are becoming natural activities.

Virtually all areas of everyday life are being digitized. In order to find oneself in the dynamically changing digital reality and to actively function in the society, one needs access to modern technologies and the ability to effectively use them (Carretero Gomez et al., 2017; Larsson-Lund, Nyman, 2020; Radomska, 2019). Opportunities to gain both access to and skills in ICT are constantly expanding. However, there are a number of interrelated personal, environmental, and socio-political factors that hinder the digital participation of certain social groups and increase the risk of greater social fragmentation (Meyerhoff Nielsen, 2022; Anrijs et al., 2020).

The COVID-19 pandemic, on the one hand, has exposed and deepened socio-economic and digital divides (Seah, 2020; Van Deursen, 2020; Ulman, Ćwiek, 2022). On the other hand, it has become a driving force behind faster digital development (Kudyba, 2020; Nguyen et al., 2021). Social visions regarding the introduction of possible solutions into business, educational, scientific, health, administrative and other aspects have changed. It turned out that a variety of

tasks can be carried out in a safer and simpler way, and more efficiently than before. Therefore, it is necessary to shape digital awareness in the society and help to enhance digital competences.

Digitization not only accelerates the socio-economic development of countries and individual regions, but also improves quality aspects (Nair, 2020; Radomska, 2019; Ulman, Ćwiek, 2022; Śledziewska, Włoch, 2020; Van Bon et al., 2021; Vyas-Doorgapersad, 2022). One of the prerequisites for obtaining such beneficial effects is to enhance digital competences of the society. The level of the competences in Poland, despite the growth in recent years, is low. According to the European Commission's Digital Progress Report 2021, Poland ranks 24th out of 27 EU countries in terms of the human capital of the digital society. Merely 44% of citizens possess fundamental digital skills, compared to the EU average of 56% (Digital Economy Index..., 2021). The present pilot study was conducted in the Lublin Province. Statistically, it is one of the least developed and poorest regions of Poland (Lamański, 2022). Therefore, the question arises concerning how its residents evaluate their digital preparedness? The objective of the present study was to assess in which areas of life and how often digital competences are used.

2. Digital competences in Society 5.0

2.1. Society 5.0

The concept of Society 5.0 emerged in Japan in 2016. The idea aims to create a human-centric society model. A characteristic feature that distinguishes Society 5.0 from the information society is a higher level of convergence of digital reality with the real one, facilitating the embedding of cyberspace in the real world. Such a society is also labeled super-intelligent or creative (Medina-Borja, 2017; Nair et al., 2021; Sá et al., 2021).

One of the assumptions of the concept is to solve social problems from a systemic perspective. Different areas of social life are already interconnected via the Big Data technology, the Internet of Things, and artificial intelligence. ICT will continue to evolve so that systems that have hitherto functioned separately are combined in cyberspace into larger, intelligent systems. This is expected to trigger transformational changes in various structures such as manufacturing, logistics, sales, transport, healthcare, finance and public services. The ways people work and live will also be modified. As a consequence, these changes are to lead to economic growth and improve well-being and the quality of people's lives (Report on the 5th Science..., 2015).

The development of Society 5.0 requires the cooperation of the government, businesses, various public institutions and citizens, who need to actively participate in this process. Digital literacy is critical. This concept evolves over time along with the technological progress.

In a broad sense, it denotes the ability to carry out tasks and solve problems in the digital environment. This means that people are able to find, understand, evaluate and apply information from various sources to solve personal, occupational, social, regional and even global problems. Digital literacy is crucial for the harmonious participation of individuals in a conscious, critical and purposeful manner in all spheres of life as users, as well as creators of digital technologies (Garbellan, 2018; Koppel, Langer, 2020; Milenkova, Lendzhova, 2021; Sá et al., 2021). It is closely connected with the process of digital inclusion of the society. S. Reder presented the path of digital integration, which consists of four key stages. The first stage features people who have never had access to or contact with ICT. The second stage encompasses those that use ICT in such a way as to meet their personal needs. The third stage is digital readiness, i.e. the focus on extending the scope of ICT use. The fourth stage includes people who are constantly developing their ICT skills, adapting to the digital reality with full awareness and intent (Reder, 2015).

The report developed by the Digital Poland Foundation emphasizes that we are witnessing digital evolution, and the world as we know it is constantly changing. One of the conditions for building Society 5.0 is to acquire the competences of the future. The interpenetration of the real world with cyberspace offers the opportunity for many global problems to be solved more effectively, and sustainable development goals to be achieved (Technologia..., 2021).

2.2. Definition of digital competences in normative and relational terms

The definition of the term "digital competences" is fuzzy and is being constantly clarified due to the rapid development of the digital world. Until recently, digital competences were considered highly specialized and held by a narrow group of insiders (Kwiatkowski, 2018). Nowadays, they not only begin to be universal. They become competences determining the effectiveness of human functioning in the contemporary society.

Digital competences can be considered under two approaches – normative (catalog) and relational (Analiza doświadczeń..., 2020). The former is consistent with the functional approach in management, the latter with the systemic approach. In the normative model, the reference point is a specific catalog of competences (knowledge, skills and attitudes). It is unchanging and the same for all. Each item from this catalog can be assessed and applied separately (or not) depending on the situation (Analiza doświadczeń..., 2020; Jasiewicz, 2018). One of them is the use of the Internet and ICT. With this assumption, every person, regardless of age, gender and their life needs, should use the computer and the Internet in a similar fashion. The relational model emphasizes that the Internet and ICT are not used by everyone within the same scope and in the same way. Digital competences are present in all areas of people's lives and facilitate functioning in them. Their appropriate level is one that contributes to the improvement of the quality of life of an individual in an area relevant to the person, and one that takes into account the individual's style of functioning (Analiza doświadczeń..., 2020; Jasiewicz, 2018).

According to the Council of Europe, digital competences constitute one of the eight key competences needed for active functioning in a sustainable society. They include "the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking" (Council Recommendation…, 2018). This constitutes the normative approach.

As part of the Operational Programme Digital Poland 2014-2020, the application of the relational approach described in the Framework Catalog of Digital Competences was offered. Competences are defined as a set of skills, knowledge and attitudes that allow the effective use of digital technologies. Three levels of competences were distinguished: IT, information-related and functional. IT competences are necessary to acquire information-related competences, which in turn support the mastery of functional competences. Each individual acquires and supplements them to meet their own needs and gain benefits in various areas of life (Jasiewicz et al., 2021).

Despite certain differences, these approaches complement each other. Regardless of how digital competences are defined and analyzed, they should be considered much more broadly than digital literacy. The cultural and critical dimensions are closely related to the operational dimension (ELINET, 2022; Joint Research Centre, 2012; Koppel, Langer, 2020). In order to build a digitally-aware society, the language of benefits should be used to show the impact of individual digital competences on all spheres of people's lives.

3. Digital competence and digital literacy research models

Citizens' digital competences are examined at levels ranging from local to global. Studies exploit both normative and relational approaches, depending on the purpose of the work and the intentions of researchers.

In the EU, the DIGCOMP model defining the Digital Competence Framework for Citizens constitutes a reference point for the development and strategic planning of digital competence initiatives. The model presents a description of the competences needed for challenges posed by digitalization in the modern society to be met. Since 2013, when the first version of the model was developed, DIGCOMP 2.0 (2016), and DIGCOMP 2.1 (2017) iterations were developed. In 2022, the DIGCOMP 2.2 framework emerged. It identifies new examples of knowledge, skills and attitudes related to the acquisition of digital competences by citizens. It describes five areas of digital competences at different levels: information and data literacy, communication and cooperation, digital content creation, safety and problem solving.

They encompass a total of 21 framework competences. The first three areas are linear in character and concern competences that can be linked to specific activities and applications. The latter two are more cross-cutting and pertain to all activities carried out using digital tools. Although each area has its own specificity, they are complementary and interrelated. Unlike previous iterations, the DIGCOMP 2.2 model places great emphasis upon the relational model of digital competence acquisition (Vuorikari et al., 2022).

In Poland, the reference point for activities aimed at ensuring and enhancing digital competences is the Framework Catalog of Digital Competences. In line with the relational approach, digital competences are related to the needs of users and benefits they can gain in key areas of life. The catalog lists eight such areas: work and professional development, relationships with loved ones, hobbies and leisure, health, finance, religion and spiritual needs, day to day affairs, civic engagement (Jasiewicz et al., 2021).

The Digital Poland Foundation's research identified strategic challenges Poland faces in six areas: demography, education, economy, infrastructure, climate and environment, and health. In line with the relational approach, in order to solve problems related to the formation of Society 5.0, the development of citizens' digital competences is necessary. In the third edition of the Report, the model of the competence assessment covers eight key areas, the same as the Framework Catalog (Technologie..., 2021).

The above models pertaining to digital competences are exploited on a large scale – in the international and domestic dimension. The literature on the subject also describes models tailored to the needs of individual social groups or spheres, most frequently concerning education at various levels.

H. Jenkins' model makes a premise that digital competences are required to develop such cultural and social competences as play, performance, simulation, appropriation, multitasking, distributed cognition, collective intelligence, judgment, transmedia navigation, networking, negotiation (Jenkins et al., 2006).

In his model, D. Bawden distinguished four levels of digital literacy: underpinnings (literacy *per se,* ICT literacy), background knowledge (the world of information, nature of information resources), central competences (reading and understanding digital and non-digital formats, creating and communicating digital information, evaluation of information, knowledge assembly, information literacy, media literacy), attitudes and perspectives (independent learning, moral/social literacy). He emphasized that simply having digital competences is insufficient. They should be embedded in a certain moral, cultural and social framework (Bawden, 2006).

I. Koppel and S. Langer developed the Model of Basic Digital Literacy consisting of three elements: background knowledge (the world of information, nature of information resources), central competences: (information/media literacy, reading/understanding, knowledge assembly, communicating, evaluation, creating, ability to learn how to deal with technological innovation processes), attitudes and perspectives (independent learning, moral/social literacy).

The level of digital competence is determined by human needs and interests, access to equipment and ICT, as well as skills and confidence in their use (Koppel, Langer, 2020).

S. Osuna-Acedo et al. present a holistic model of TRIC (technology + relationship + information + communication) digital literacy. They put emphasis upon the dimension of social, cognitive and emotional relationships, whose enhancement requires ICT (Osuna-Acedo et al., 2018).

When analyzing a number of concepts of digital competences, G. Ptaszek distinguished four main approaches depending on the skills on which the emphasis is placed: technical, information-related, socio-cultural, and holistic which integrate all the listed skills (Ptaszek, 2019).

In conclusion, it can be stated that in the contemporary hybrid reality, approaches dealing with digital competences autonomously have no reason to exist. They are of specific and strategic character as they directly determine the process of acquiring other key competences.

4. Research methodology

The present study exploited a research procedure employing a sequentially ordered number of tasks. A critical analysis of numerous important publications was carried out in two thematic areas: Society 5.0 and digital competences. The results are presented in the first part of the present article. Subsequently, the following research problem was formulated: In which areas of life do the residents of the Lublin Province use their digital competences the most frequently? This geographic area was selected for several reasons. The Lublin Province is the third largest province in Poland. The eastern border with Belarus and Ukraine also marks the eastern border of the European Union. As on 31.12.2021, the number of inhabitants was 2,076.4 thousand, which constituted 5.4% of the Polish population (GUS, 2022). The regional economy faces a number of structural problems, which negatively affects the situation of the local community (Mieszajkina, 2018). In 2021, 90.3% of households had Internet access at home (the average in Poland was 92.4%). The percentage of Internet users was 86.3% (88.9%), and the percentage of people who go online regularly was 80% (83.6%). The provinces of Eastern Poland, including the Lublin Province, are characterized by the lowest rates of ICT use (Społeczeństwo informacyjne..., 2021).

The present research constitutes a pilot study. For that reason, it was carried out on a relatively small scale. The authors' intention was to verify the state of knowledge concerning the surveyed environment and to test the research tool. The main objective was to assess the digital competences of the Lublin Province residents in a relational perspective. The following hypotheses were posed:

H1: The residents recognize the significance of digital competences in different areas of life and are willing to enhance them.

H2: The frequency of using digital competences is not high and varies depending on age, education and professional/industry-related status.

H3: The residents use digital competences the most frequently in those areas of life that are the most significant to them.

In order to achieve the objective of the research and verify the hypotheses, two research methods were employed. In the framework of the document testing method, numerous scientific sources and reports drafted by organizations and research groups regarding digital competences, their components and methods of assessment were analyzed. The results were used to specify the research problem and assumptions and to develop the research tool. The diagnostic survey method, the CAWI approach, served to collect data from respondents. The questionnaire was disseminated online, primarily via social media. Due to the pilot nature of the research, non-probability sampling was performed using the snowball sampling method (Babbie, 2021). Initially, the survey questionnaire was disseminated among respondents representing different age and social groups. After that, they were requested to share links to the form with other people. The questionnaire consisted of a substantive (16 questions) and personal information parts (5 questions). The five-point Likert scale was used as a measure.

The study was conducted in May 2022. The authors received 155 valid questionnaires. Characteristics of the research sample (in % in relation to the total number of respondents):

- gender: women – 71%, men – 29%,
- age: under 18 – 5.2%, 18-25 – 60.5%, 26-35 – 14.8%, 36-49 – 14.2%, over 50 – 5.2%,
- education: primary – 7.1%, vocational – 7.1%, secondary – 46.4%, higher – 39.4%,
- place of residence: village – 31%, city up to 50,000 – 11.6%, city 51-150 thousand – 16.8%, city above 151 thousand – 40.6%,
- occupational status/industry: student – 55.4%, work in industry – 3.9%, work in services – 26.5%, work in commerce – 4.5%, work in education and science – 9.7% (in other listed industries – 0%).

5. Research results and analysis

Given that the survey was conducted online, the respondents were not queried whether they had Internet access and the necessary equipment. However, they were asked whether they used them in their work/studies. The answer was positive for the vast majority of respondents – 97.4%. The answers to further questions were given on the Likert scale where 1 – "to a minimum extent", 5 – "to a maximum extent". The respondents assessed the significance of digital competences: 5 – 70.3%, 4 – 26.5%, 3 – 3.2% (ratings 1 and 2 were

not recorded). Does the Covid-19 pandemic affect their development? The rating of 5 was given by 24.5% of respondents, 4 – 30.3%, 3 – 18.7%, 2 – 12.9%, 1 – 13.5%.

The next question concerned the areas of life that are the most significant to the respondents. Table 1 outlines the results.

Table 1.
The significance of the individual areas of life for the Lublin Province residents (in %)

Area of life	Rating (1 – min, 5 – max)					Weighted average
	1	**2**	**3**	**4**	**5**	
Health	0	3.2	5.2	22.6	69.0	4.57
Finance	0	3.9	19.4	40.6	36.1	4.09
Day to day affairs	0	3.9	27.1	41.9	27.1	3.92
Relationships with loved ones	0	2.6	3.2	14.8	79.4	4.71
Work and professional development	0	0	12.3	51.6	36.1	4.24
Hobbies and leisure	0.6	4.5	15.5	36.8	42.6	4.16
Education and personal development	0	3.9	7.7	41.3	47.1	4.32
Civic engagement	10.3	21.9	27.1	31.6	9	3.07
Religion	18.1	9.7	16.8	14.2	41.3	3.51

Source: own research.

The hierarchy of the significance of the nine areas of life for the respondents is as follows: 1) relationships with loved ones, 2) health, 3) education and personal development, 4) work and professional development, 5) hobbies and leisure, 6) finance, 7) day to day affairs, 8) religion, 9) civic engagement. In the further part of the study, respondents were requested to indicate the frequency with which they use digital competences in the particular areas of life. For each area, several activities were proposed which the respondents may perform by means of digital tools. Due to the extensive character of information, two activities in each area with the highest average frequency (the average rating is given in brackets) will be listed:

1) relationships with loved ones: use of social networks (4.21), use of video chats (3.53),
2) health: finding medical facilities (3.86), registering an appointment with a doctor /in a clinic (3.58),
3) education and personal development: finding websites containing issues of interest (3.88), using online educational materials on issues of interest (3.64),
4) work and professional development: use of ICT in the workplace / place one studies, e.g. cloud solutions, online invoicing (3.38), using tools enabling online professional communication, e.g. Skype, Teams, Etherpad (3.28),
5) hobbies and leisure: finding the right form of online entertainment, e.g. games, films, music (4.14), checking the listings and showtimes of cinemas and theaters online (4.05),
6) finances: checking the state of one's finances by means of an online account or mobile application (4.6), making bank transfers via an online account or mobile application (4.51),

7) day to day affairs: use of the GPS functionality (4.1), use of mobile applications for urban and intercity transport, e.g. checking routes, timetables, purchase of tickets (4.08),

8) religion: finding websites devoted to spiritual development (2.51), finding information about groups and communities, contacting them online (2.19),

9) civic engagement: using information services with local, national, global coverage (3.38), finding information about legal acts at a local and central level (2.3).

Subsequently, respondents were requested to indicate the areas where their digital competences needed development. Table 2 outlines the results.

Table 2.
Areas of life of the Lublin Province residents where their digital competences require development (in %)

Area	%	Area	%	Area	%
Work and professional development	45.8	Civic engagement	36.8	Hobbies and leisure	16.8
Education and personal development	45.2	Health	25.8	Religion	14.8
Finance	40.0	Day to day affairs	18.1	Relationships with loved ones	7.7

Source: own research.

Among the areas with the strongest need for digital competence enhancement, the respondents mentioned work, education and finance. This is probably due to the fact that the digitization of these areas is the strongest and fastest, and at the same time they are significant for the respondents. The growing role of digital competences in almost all industries and specializations makes them play an increasingly vital role in the labor market. They have become extremely important in education. On the one hand, distance learning has become a necessity during the consecutive phases of the pandemic. On the other hand, it offers new opportunities for education and development of one's interests for people of different ages by means of various learning forms and methods, and with the possibility of selecting a place, time, and at a lower cost. Many finance-related matters are much easier and faster dealt with over the Internet. New forms of digital payments are emerging. In order to settle taxes, to operate a bank account, one needs not only computer and smartphone digital skills, but also knowledge in the field of digital security.

Are respondents ready to improve digital competences? The answers differ depending on whether they are to allocate their own financial resources to this purpose or whether they can benefit from external financing (Tab. 3).

Table 3.
Readiness of the Lublin Province residents to develop digital competences depending on the source of financing (in %)

Funding Source	Definitely not	Rather not	I do not know	Rather yes	Definitely yes
Financing from own resources	6.5	23.2	31	34.8	4.5
Financing from external sources	0.7	9	20	54.2	16.1

Source: own research.

Almost 40% of respondents declare their willingness to enhance the digital competences at their own expense. With the possibility of external financing, the percentage rises to over 70%. One third of the respondents will not invest their own money, while only one in ten will not pursue the improvement of the competences with external financing. Such a high percentage of the undecided is somewhat surprising. As a consequence, a question will be added to the questionnaire for basic research concerning the causes behind the choice of a specific answer.

As stated above, 96.8% of respondents consider digital competences to be very significant or significant (ratings 5 and 4). Moreover, none of the respondents considered them to be invalid and unimportant (scores 1 and 2). At the same time, respondents show a need to improve them in every area of life, which means they are aware of certain deficiencies. They are very likely to take advantage of the opportunity to develop in this area by allocating their own financial resources or (much more willingly) by using external financing. This means that there are no grounds to reject hypothesis 1 stating that the inhabitants of the Lublin Province recognize the significance of digital competences in various areas of life and are ready to develop them.

Are there differences in the use of digital competences depending on the age group? In order to answer this question, average frequencies of use for individual age categories were calculated. The frequency in this question and the following ones was assessed on a five-point Likert scale, where 1 – "never", 5 – "very often". Table 4 outlines the results.

Table 4.
Frequency of digital competence use in the individual areas of life depending on the age of the respondents

Area of life	Age					Weighted average rating
	< 18	18-25	26-35	36-50	> 50	
Health	2.8	3.34	3.65	3.8	3.9	3.45
Finance	2.29	3.4	3.4	3.4	3.81	3.36
Day to day affairs	2.98	3.68	3.9	3.9	3.61	3.70
Relationships with loved ones	4.0	3.85	4.0	3.77	3.9	3.87
Work and professional development	2.18	2.75	3.04	3.19	2.75	2.82
Hobbies and leisure	3.4	3.5	3.6	3.5	3.2	3.49
Education and personal development	3.5	3.5	3.2	3.2	3.1	3.39
Civic engagement	2.1	2.04	2.8	2.8	2.95	2.31
Religion	2.8	3.34	3.65	3.8	3.9	3.45
Average value	2.94	3.14	3.34	3.27	3.26	

Source: own research.

In the areas of "health", "finance", "religion" and "civic engagement", the frequency of digital competence use grows with respondents' age. In the area of "education and personal development" a reverse trend can be observed. In the areas of "day to day affairs" and "work and professional development", there is a growing trend in the first four age groups and a decrease in the case of the oldest group. For the areas of "relationships with loved ones" and "hobbies and leisure", a higher frequency of use occurs in the first three age groups. If all areas are taken into account, the average frequency of digital competence use increases in the first three age groups, and decreases slightly in the next two.

The study also examined whether the frequency of digital competence use is affected by the type of education. Average frequency values for the variable "education" in each of the nine areas of life were calculated (tab. 5).

Table 5.
Frequency of digital competence use in the particular areas of life depending on the education of respondents

Area of life	Education				Weighted average rating
	primary	vocational	secondary	higher	
Health	2.76	3.4	3.39	3.67	3.46
Finance	2.45	4.54	3.85	3.78	3.77
Day to day affairs	3.15	3.78	3.74	3.84	3.74
Relationships with loved ones	4.09	3.27	3.88	3.93	3.87
Work and professional development	2.09	2.58	2.76	3.03	2.81
Hobbies and leisure	3.22	3.15	3.54	3.46	3.46
Education and personal development	3.27	2.82	3.14	3.36	3.21
Civic engagement	2.12	2.06	2.01	2.71	2.30
Religion	3.2	3.2	2.24	2.15	2.26
Average value	2.93	3.20	3.17	3.33	

Source: own research.

Respondents with higher and secondary education use digital competences the most frequently in the areas of "relationships with loved ones", "day to day affairs" and "finance". Respondents with vocational education – in the areas of "finance", "day to day affairs" and "health". As far as respondents with primary education are concerned, these are the areas of "relationships with loved ones", "hobbies and leisure" and "education and personal development". Globally, the digital competences are used the most frequently by respondents with higher education, at a comparable level – by those with secondary and vocational education, and the least frequently – by those with primary education.

Next, the frequency of digital competence use by the Lublin Province residents in the individual areas of life was compared for the variable "occupational status/industry". Table 6 presents the average values for each area of life.

Table 6.
Frequency of digital competence use in the particular areas of life depending on the occupational status/industry respondents represent

Area of life	Employment					Weighted average rating
	pupil / student	work in industry	work in services	work in commerce	work in education and science	
Health	2.76	3.4	3.39	3.67	3.64	3.08
Finance	3.72	3.72	3.31	3.67	3.36	3.57
Day to day affairs	3.6	3.9	3.9	3.8	3.8	3.71
Relationships with loved ones	3.9	4.25	3.87	3.29	3.87	3.88
Work and professional development	2.6	3.3	3.2	2.7	2.9	2.82
Hobbies and leisure	3.44	3.88	3.57	3.39	3.12	3.46
Education and personal development	3.21	3.25	3.32	2.93	3.03	3.21
Civic engagement	3.2	2.89	2.76	2.24	2.53	2.30
Religion	2.33	2.17	2.11	2.39	2.2	2.26
Average value	3.06	3.42	3.27	3.12	3.15	

Source: own research.

In the field of "health", digital competences are used the most frequently by employees representing the fields of commerce, education and science. In the areas of "finance" and "relationships with loved ones" – respondents working in industry and learners. In the area of "religion" – trade workers and learners. In the remaining five areas – those working in industry and services. Representatives of these two fields are also leaders in the frequency of using their digital competences in all areas of life.

Data in Tables 4, 5, and 6 show that the frequency of digital competence use is at an average level. In no area did its weighted average rating exceed 3.88. Respondents indicated ratings 4 and 5 very rarely. In the areas of "relationships with loved ones" and "work and professional development", the frequency of digital competence use is almost the same for all variables: "age", "education" and "occupational status / industry" (differences in the weighted average do not exceed 0.01). The largest discrepancy occurs in the sphere of religion (differences in the weighted average amount to 1.19). There is also a greater variation in the areas of "finance" (0.41), "health" (0.37) and "education and personal development" (0.18). In the remaining areas, the frequencies differ slightly (differences in the weighted average do not exceed 0.04). Therefore, hypothesis 2 can be deemed verified in its entirety in the first part: the frequency of digital competence use is not high, and partly verified in the second part: it varies depending on age, education and occupational status/industry.

In order to verify hypothesis 3, which assumed that the Lublin Province residents use digital competences more frequently in those areas of life that are the most significant to them, rankings were developed for variables "importance of the area of life for respondents" (based on data from Tab. 1) and "frequency of digital competence use" depending on age, education, occupational status/industry (based on data from Tab. 4-6). The results are outlined in Table 7.

Table 7.
Place in the ranking of individual areas of life in relation to the significance of the area and the frequency of digital competence use

Area of life	Position of the area in relation to:			
	significance of the area of life	frequency of digital competence use		
		age	education	occupational status/industry
Relationships with loved ones	1	1	1	1
Health	2	4	4	6
Education and personal development	3	6	6	5
Work and professional development	4	8	7	7
Hobbies and leisure	5	3	4	4
Finance	6	7	2	3
Day to day affairs	7	2	3	2
Religion	8	4	9	9
Civic engagement	9	9	8	8

Source: own research.

The first position in all rankings was occupied by the area of "relationships with loved ones". The two least significant areas for respondents, i.e. " religion" and "civic engagement" in all other rankings also occupy the final position, except for the fourth position for "religion"

for the variable "age". In these three areas, the majority of respondents do not consider the development of digital competences as necessary. The greatest difference in positions in the rankings was recorded in the "day to day affairs" area: in terms of importance, it occupies the seventh position, and in the others, the second and third. This may be due to the fact that the majority of respondents have sufficient digital competences in this area – 18.1% of them declare the need to enhance them. "Education and personal development" and "work and professional development" constitute areas that rank higher in the importance ranking than in the digital competence use rankings. At the same time, in these two areas, over 45% of respondents indicate the need for the digital competence development. The area of "health" also ranks higher in the ranking of importance than in the others. However, only one in four respondents indicate the need to improve their competences in the area. In the basic research, the authors intend to assess whether this results from the residents' preference for traditional contact with the health service, or from the low availability of online medical services or other factors. The areas of "hobbies and leisure" and "finance" rank lower in the importance ranking than in the others, with the exception of the variable "age" for the sphere of finance. The respondents frequently use ICT in the area of "hobbies and leisure", perhaps due to the fact that it does not require any special skills and equipment. This is also confirmed by the fact that few respondents declare the need to enhance digital competences in this area (less than 17%). It is somewhat surprising that the area of "finance" is so insignificant for respondents compared to other areas. Although digital competences in this area are used quite frequently, over 40% of respondents want to develop them. The above considerations allow to conclude that hypothesis 3 was partly confirmed.

6. Conclusions

The present study allows several conclusions to be formulated. One of the most important of those concerns awareness. Over 70% of respondents indicate that digital competences are important in their lives. However, this does not translate into their use in various areas of life. A change in the way one acts commences with a change in one's mindset. Therefore, measures should be taken to enhance the digital awareness of citizens in such a way as to increase the widespread use of ICT in everyday life.

The majority of respondents participating in the study are young people. The survey was conducted online, mainly by means of social media. The small number of older respondents is determined by the fact that the questionnaire could not reach them. They are simply absent online. They are driven by concerns and fear of novelties. Such persons are particularly at the risk of being digitally excluded. Due to their digital handicap, they may fall victim to digital

scamming more frequently. Therefore, taking action to support older people in the development of digital competences seems of vital importance.

When undertaking training initiatives related to the improvement of digital competences of residents, attention should be paid primarily to those areas of life which are the most important for individual social groups. People are more willing to acquire information which bears importance to them. Moreover, acquired competences in one sphere will gradually be used in others. Effective encouragement of full participation in digital reality requires the use of the language of benefits. It is important to show what a person can gain from specific knowledge, skills and digital technology, how it will improve their functioning and make life easier.

Development of Society 5.0 requires not so much broad access to modern ICT as social acceptance of digitization processes and citizens' possession of sufficient digital competences. There is a need for support, appropriate regulations and solutions from public administration and cooperation between the central government, local governments, businesses and non-profit organizations. The digital revolution has brought about changes and thus challenges in people's daily lives. The use of ICT is inevitable. For that reason, digital competences are becoming crucial. Having them facilitates access to knowledge and information needed in all areas of life, supports the implementation of professional, educational and hobby-related goals. They have a significant impact on the development of a knowledge-based economy that is more innovative and competitive.

Individuals should develop holistically. This means that, as in the case of an organization, their lives should be considered in a systemic way. A system is a set of elements among which mutual relations and interactions occur. Each element is connected to the others by a feedback mechanism. In human life, the individual areas of life constitute such elements. Digital competences are the link that ensures their interaction and obtaining synergy effects, and thus the efficiency of the system. In the modern digital reality, they become a prerequisite for full participation in the social and professional life. Because they are subject to constant changes, they require lifelong learning.

References

1. *Analiza doświadczeń oraz identyfikacja dobrych praktyk w obszarze wspierania rozwoju kompetencji cyfrowych w kontekście przygotowania szczegółowych zasad wdrażania programu operacyjnego Polska cyfrowa na lata 2014-2020 oraz koordynacji celu tematycznego. Raport końcowy*. Retrieved from https://9lib.org/document/4yr1d17q-doswiadczen-identyfikacja-kompetencji-przygotowania-szczegolowych-operacyjnego-koordynacji-tematycznego.html, 13.09.2020.

2. Anrijs, S., Ponnet, K., De Marez, L. (2020). Development and psychometric properties of the Digital Difficulties Scale (DDS): An instrument to measure who is disadvantaged to fulfill basic needs by experiencing difficulties in using a smartphone or computer. *PLoS ONE, Vol. 15, No. 5,* e0233891, doi: 10.3886/E118021V1.

3. Babbie, E. (2021). *Badania społeczne w praktyce*. Warszawa: PWN.

4. Bawden, D. (2008). Origins and Concepts of Digital Literacy. In: C. Lankshear, M. Knobel (Eds.), *Digital Literacies. Concepts, Policies and Practices* (pp. 17-32). New York: Peter Lang.

5. Carretero Gomez, S., Vuorikari, R., Punie, Y. (2017). *DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use*. Luxembourg: Publications Office of the European Union. Retrieved from https://publications.jrc.ec.europa.eu/repository/handle/JRC106281, 15.07.2022, doi: 10.2760/38842.

6. Council Recommendation of 22 May 2018 on key competences for lifelong learning (Text with EEA relevance). (2018). *Official Journal of the European Union C 189/1, 4.6.2018.* Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.C_. 2018.189.01.0001.01.ENG, 10.05.2022.

7. *ELINET (European Literacy Policy Network).* Retrieved from http://www.eli-net.eu/about-us/digital-literacy/, 19.07.2022.

8. Garbellan, S. (2018). *Da Industria 4.0 a Società 5.0: la via del Giappone alla digitalizzazione*. Retrieved from https://www.academia.edu/35809134/Da_Industria_ 4_0_a_Societ%C3%A0_5_0_La_scelta_del_Giappone, 22.07.2022.

9. Główny Urząd Statystyczny: Ludność w gminach według stanu w dniu 31.12.2021 r. Retrieved from https://demografia.stat.gov.pl/BazaDemografia/Tables.aspx, 25.07.2022.

10. *Indeks gospodarki cyfrowej i społeczeństwa cyfrowego (DESI) na 2021 r. Polska*. Retrieved from https://ec.europa.eu/newsroom/dae/redirection/document/80596, 19.07.2022.

11. Jasiewicz, J. (2018). Relacyjny model kompetencji cyfrowych i jego implikacje metodologiczne. *Studia Medioznawcze, Nr 2,* pp. 117-128.

12. Jasiewicz, J., Filiciak, M., Mierzecka, A., Śliwowski, K., Klimczuk, A., Kisilowska, M., Tarkowski, A., Zadrożny, J. (2015). *Ramowy katalog kompetencji cyfrowych*. Retrieved from https://mc.bip.gov.pl/rok-2015/ramowy-katalog-kompetencji-cyfrowych.html, 22.06.2021.

13. Jenkins, H., Clinton, K., Purushotma, R., Robison A.J., Weigel M. (2006). *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century (Occasional paper on digital media and learning)*. Chicago, Illinois: The John D. and Catherine T. MacArthur Foundation. Retrieved from https://www.macfound.org/media/article_pdfs/ JENKINS_WHITE_PAPER.PDF, 20.08.2020.

14. Joint Research Centre, Institute for Prospective Technological Studies, Ferrari, A. (2012). *Digital competence in practice: an analysis of frameworks.* Publications Office. https://data.europa.eu/doi/10.2791/82116, 23.07.2022.

15. Koppel, I., Langer, S. (2020). Basic digital literacy – Requirements and elements. *Revista Práxis Educacional, Vol. 16, No. 42,* pp. 326-347.

16. Kudyba, S. (2020). COVID-19 and the acceleration of digital transformation and the future of work. *Information Systems Management, Vol. 37, Iss. 4,* pp. 284-287, doi: 10580530.2020.1818903.

17. Kwiatkowski, S.M. (2018). *Kompetencje przyszłości.* Warszawa: FRSE.

18. Lamański, F. *Warszawa najbogatszym regionem w Polsce. Ściana wschodnia zamyka stawkę.* Retrieved from https://obserwatorgospodarczy.pl/2022/01/19/najbogatsze-i-najbiedniejsze-wojewodztwa-w-polsce-roznice-sa-wyrazne/, 18.07.2022.

19. Larsson-Lund, M., Nyman, A. (2020). Occupational challenges in a digital society: A discussion inspiring occupational therapy to cross thresholds and embrace possibilities. *Scandinavian Journal of Occupational Therapy*, *Vol. 27, No. 8*, pp. 550-535, doi: 10.1080/11038128.2018.1523457.

20. Medina-Borja, A. (2017). Smart human-centered service systems of the future. In: *Future Services & Societal Systems in Society 5.0*. Tokyo, Japan: Center for Research and Development Strategy, Japan Science and Technology Agency, pp. 159-175.

21. Meyerhoff Nielsen, M. (2022). *Monitoring and Measurement of Digital Inclusion: A Critical Analysis of Key Global Frameworks*. Retrieved from https://scholarspace.manoa.hawaii.edu/items/da2b7a7a-59b1-43b6-8ac4-a2dc5349b8a9, 16.07.2022.

22. Mieszajkina, E. (2018). *Zarządzanie przedsiębiorcze w małych firmach*. Lublin: Wydawnictwo Politechniki Lubelskiej.

23. Milenkova, V., Lendzhova, V. (2021). Digital Citizenship and Digital Literacy in the Conditions of Social Crisis. *Computers, Vol. 10, Iss. 4*, doi: 10.3390/computers10040040.

24. Nair, M., Pradhan, R.P., Arvin, M.B. (2020). Endogenous dynamics between R&D, ICT and economic growth: Empirical evidence from the OECD countries. *Technology in Society, Vol. 62, Iss. C,* 101315, doi: 1016/j.techsoc.2020.101315Ndubuisi.

25. Nair, M.M., Tyagi, A.K., Sreenath, N. (2021). *The Future with Industry 4.0 at the Core of Society 5.0: Open Issues, Future Opportunities and Challenges*. 2021 International Conference on Computer Communication and Informatics (ICCCI)*,* pp. 1-7, doi: 10.1109/ICCCI50826.2021.9402498.

26. Nguyen, M.H., Hargittai, E., Marler, W. (2021). Digital inequality in communication during a time of physical distancing: the case of COVID-19. *Computers in Human Behavior*, *Vol. 120,* pp. 1-10, doi: 10.1016/j.chb.2021.106717.

27. Osuna-Acedo, S., Frau-Meigs, D., Marta-Lazo, C. (2018). Educación Mediática y Formación del Profesorado. Educomunicación más allá de la Alfabetización Digital.

Revista Interuniversitaria de Formación del Profesorado, *Vol. 32, Iss. 1, No. 91,* pp. 29-42. Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=6441410, 25.07.2022.

28. Ptaszek, G. (2019). *Edukacja medialna 3.0. Krytyczne rozumienie mediów cyfrowych w dobie Big Data i algorytmizacji.* Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego.

29. Radomska, E. (2019). Rozwój gospodarki cyfrowej i społeczeństwa cyfrowego w aspekcie dynamicznych zmian w otoczeniu zewnętrznym na przykładzie Wielkiej Brytanii. *Myśl Ekonomiczna i Polityczna, Nr 1(64)*, pp. 113-146, doi: 10.26399/meip.1(64).2019.05/ e.radomska.

30. Reder, S. (2015). *Digital inclusion and digital literacy in the United States: a portrait from PIAAC's Survey of Adult Skills.* Retrieved from https://static1.squarespace.com/static/ 51bb74b8e4b0139570ddf020/t/551c3e82e4b0d2fede6481f9/1427914370277/Reder_PIAA C.pdf, 21.07.2020.

31. *Report on the 5th Science and Technology Basic Plan. Council for Science, Technology and Innovation* (2015). Cabinet Office, Government of Japan. Retrieved from https://www8.cao.go.jp/cstp/kihonkeikaku/5basicplan_en.pdf, 22.09.2021.

32. Sá, M.J., Santos, A.I., Serpa, S., Miguel Ferreira, C. (2021). Digitainability – Digital Competences Post-COVID-19 for a Sustainable Society. *Sustainability, 13, 9564*, doi: 10.3390/su13179564.

33. Seah, K.M. (2020). COVID-19: Exposing digital poverty in a pandemic. *International Journal of Surgery, Vol. 79*, pp. 127-128, doi: 10.1016/j.ijsu.2020.05.057.

34. *Społeczeństwo informacyjne w Polsce w 2021 r.* (2021). Warszawa-Szczecin: Główny Urząd Statystyczny, Urząd Statystyczny w Szczecinie.

35. Śledziewska, K., Włoch, R. (2020). *Gospodarka cyfrowa. Jak nowe technologie zmieniają świat.* Warszawa: Wydawnictwa Uniwersytetu Warszawskiego.

36. Technologia w służbie społeczeństwu. Czy Polacy zostaną społeczeństwem 5.0? (2021). *Digital Poland. Raport z serii #Tech4Society.* Retrieved from https://digitalpoland.org/ publikacje/pobierz?id=137bd447-2eac-4147-813d-d53369fdd5ec, 25.07.2022.

37. Ulman, P., Ćwiek M. (2022). Nierówności w rozwoju cyfrowym w krajach Unii Europejskiej. *Nierówności Społeczne a Wzrost Gospodarczy, Iss. 66*, pp. 33-51, doi: 10.15584/nsawg.2021.2.3.

38. Van Bon, N. (2021). The Digitalization – Economic Growth Relationship in Developing Countries and the Role of Governance. *Scientific Annals of Economics and Business, Vol. 68, Iss. 4*, pp. 481-493, doi: 10.47743/saeb-2021-0028.

39. Van Deursen, A.J. (2020). Digital Inequality During a Pandemic: Quantitative Study of Differences in COVID-19–Related Internet Uses and Outcomes Among the General Population. *Journal of Medical Internet Research, Vol. 22, Iss. 8,* e20073, doi: 10.2196/20073.

40. Vuorikari, R., Kluzer, S., Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens – With new examples of knowledge, skills and attitudes, EUR 31006*

EN. Luxembourg: Publications Office of the European Union, doi: 10.2760/490274, JRC128415.

41. Vyas-Doorgapersad, S. (2022). The Use of Digitalization (ICTs) in Achieving Sustainable Development Goals. *Global Journal of Emerging Market Economies, Vol. 14, Iss. 2,* pp. 265-278, doi.org/10.1177/09749101211067295.