



## THE ASSESSMENT OF DIGITAL INTELLIGENCE OF RESIDENTS OF MUNICIPAL HOUSING RESOURCES IN CZESTOCHOWA

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**Abstract:** In the modern world, information and communication technologies (ICT) are tools for general use. The ability to navigate in the digital world is a development requirement in the 21st century. An insufficient level of digital skills entails serious social problems, including e-exclusion and exposes network users to a number of threats related to data security. The article presents the results of a survey conducted in February 2018 on a group of 300 tenants of the housing resources managed by ZGM TBS Sp. z o.o. in Czestochowa. The aim of the study was to diagnose the level of digital competences and the needs of the studied group in this field. The vast majority of respondents use the Internet and consider the network as a tool to make life easier. However, it is clearly visible that the level of digital skills is insufficient, particularly in the area of recognizing secure websites, proper security of web browsers, improving protection against phishing, increasing knowledge of consumer rights, knowledge of the principles of creating good internet passwords and understanding the essence of personal data protection as well as adequate security of the internet connection. The study indicated further steps that should be taken to increase the level of skills in safe use of the Internet. The conclusions formulate guidelines for the manager of the housing resources to plan activities related to improving digital competences.

**Keywords:** digital intelligence, digital competences, technologies, the Internet, skills, threats

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### Introduction

We live in a society of dynamic changes affecting many areas of human activity. We can observe a wide range of changes occurring in economic, social and technological spheres, which are related to transformations towards an information society (Rozkrut, Rozkrut 2015, p. 76). These changes have a long-term nature and digital technologies, with an increasing force, are affecting the economic, social, political, and cultural spheres as well. In particular, it concerns phenomena such as: the universality of digitization, development of the Internet in version 2.0 (Web 2.0); the increased popularity of mobile and wireless technologies, big data, cloud computing, Internet of things and 3D printing (Gonciarski 2017, p. 38). Thus, the Internet is not just another technological gadget, but an innovation of significant social consequences (Drabowicz 2014, p. 208).

The ongoing digitization shapes development in three areas: society, economy and the state. In the area of society, digital technologies contribute to the development of intellectual and social capital by offering information and communication tools. In the economic dimension, it is possible to increase the effectiveness, innovativeness and competitiveness of companies, and thus the entire economy on the global market, as well as to facilitate communication and cooperation between companies through the use of information and communication technologies. On the other hand, in the state dimension digital technologies enable greater accessibility and efficiency of public administration services, through the use of information and communication technologies to rebuild internal administration processes and the manner of providing services (MAiC 2014, p. 7).

In this study, attention will be primarily focused on the social dimension of digital technologies development. For the needs of Zakład Gospodarki Mieszkaniowej "TBS" Sp. z o.o. in Czestochowa (i.e. Department of Housing Management, Social Housing Association in Czestochowa LLC), a study was carried out, the purpose of which was to determine the level of tenants' digital competence and to determine the needs in terms of their improvement. The reason for taking up this problem is to counteract digital exclusion and increase user security in the virtual world. The growing use of technologies and their expanding possibilities, and often also their necessity in everyday life - communication, learning, work, access to information and knowledge - means that people who do not use them are increasingly more socially excluded. The concept of digital exclusion concerns differences between people who have regular access to information and communication technologies and are able to use them effectively, and those who do not have this access. These differences are related to both physical access to technology as well as to the skills and resources needed to use them. The problem of digital exclusion does not concern the use of technology itself, but rather the differences in life chances, the situation on the labor market, as well as opportunities to participate in social and cultural life, which appear among people using modern technology and people who do not use them, also due to insufficient skills (Batorski, Płoszaj 2012, p. 8). According to Eurostat data, Poland has the third highest percentage of people that do not have any digital skills (42%) in the EU, while the EU average is fourteen percentage points lower. Poland has a similar position in the category of the lowest percentage of citizens with the most advanced level of computer skills (21%) (MAiC 2015, p. 16-17).

The lack of proper skills concerning the use of technology also increases the risk of cyber threats. According to the PwC report *In defense of digital borders*, published at the beginning of 2016, the number of detected incidents violating information security (cyber-attacks) increased in the world in 2015 by 38% (compared to 2014), and by 46% in Poland (PwC 2016). Issues related to cyber-security are gaining importance at all levels - public administration, financial institutions, international corporations, small and medium-sized enterprises as well as individual users (Pieriegud 2016, p. 26).

The study of the level of digital skills in the local community, which is the housing community, is therefore justified and the TBS initiative in order to support the development of digital skills of its tenants meets current social problems.

### **Digital intelligence – definition**

The necessity to develop digital intelligence is being underlined by the World Economic Forum, indicating it as a critical factor for individual development and the well-being of societies (<https://www.weforum.org/>). The correct definition and understanding of this concept is crucial. Contrary to appearances, digital intelligence does not mean the ability to use a smartphone or computer. It is not just about balancing time spent with and without a digital device. According to the DQ Institute, digital intelligence is "the sum of social, emotional and cognitive skills that allow individuals to face challenges and adapt to the requirements of digital life" (DQ Institute: [https://www.dqinstitute.org/...](https://www.dqinstitute.org/)). The Institute distinguishes eight areas that create digital intelligence: digital rights, digital literacy, digital communication, digital emotional intelligence, digital security, digital safety, the use of digital devices and digital identity.

Within the digital rights term, the right to freedom of expression, the right to privacy or intellectual property, the ability to use digital technology without losing privacy or limiting freedom of speech should be understood. Digital literacy means computational and critical thinking and the ability to create content. This area of digital intelligence focuses on the ability to distinguish between real and untrue information and to classify sources in the network as reliable or unreliable. Digital communication, as the name suggests, is related to communication and networking. Nevertheless, it also includes the awareness of leaving traces in the network. Therefore, the main challenge in this area is to develop awareness that using the network involves leaving digital traces, which can be used in a variety of ways and for various purposes. Empathy, emotional awareness and the possibility of regulating them are digital emotional intelligence. Among the major problems in this respect, the DQ Institute points out the lack of the ability to be empathetic and to recognize emotions on the web. Digital security is an issue of mobile security, Internet security and password protection. A very important skill in this area is creating strong passwords, managing them and building barriers against cyber-attacks. In order to develop this skill, it is also necessary to make users aware of the need to protect passwords. Another area is digital safety, in which the main emphasis is put, among others, on the ability to recognize dangerous or risky behaviors in the network, e.g. persecution or harassment, and learning how to deal with them. The use of digital devices is associated with the ability to develop a healthy balance in the use of digital devices. The last area is associated with digital identity, i.e. mainly digital citizenship and digital creativity. The most important thing here is the ability to build and manage in a healthy way an identity in the network and beyond.

Digital skills are closely related to digital intelligence, through which the bundle of skills, knowledge and attitudes that allow effective use of digital technologies

are understood (Jasiewicz et al. 2015, p. 6). Digital competences are most often divided into three categories - IT, information and functional competences. Skills related to the proper use of computer hardware and software as well as use of the Internet constitute IT competences. Information competences are defined as the ability to find information, understand it, as well as assess its credibility and usefulness (Siadak 2016, p. 371). On the other hand, the ability to use digital technologies in various areas of everyday life, private and professional life comprise the last - the functional category of digital competences.

### Characteristics of the research group

The purpose of the research was to determine the level of digital competences of municipal housing residents in Czestochowa. In order to fulfill this goal, a survey questionnaire was distributed among all the residents of municipal housing.

The minimum sample size to estimate the probability of success  $p$  in a general population was calculated on the basis of the formula for a sample size with a very large population:

$$n = \frac{u_{\alpha}^2 pq}{d^2}$$

where:

$n$  = minimum sample size,

$u_{2\alpha}$  = value acquired from the table of normal distribution for the adopted level of significance,

$p$  = structure index,

$q = 1 - p$ ,

$d$  = highest accepted level of error.

This formula allows one to obtain a predetermined accuracy of estimating the population structure ratio. After substituting the adopted values into the formula, the following equation was received:

$$n = \frac{1,96^2 * 0,25}{0,06^2} \approx 267$$

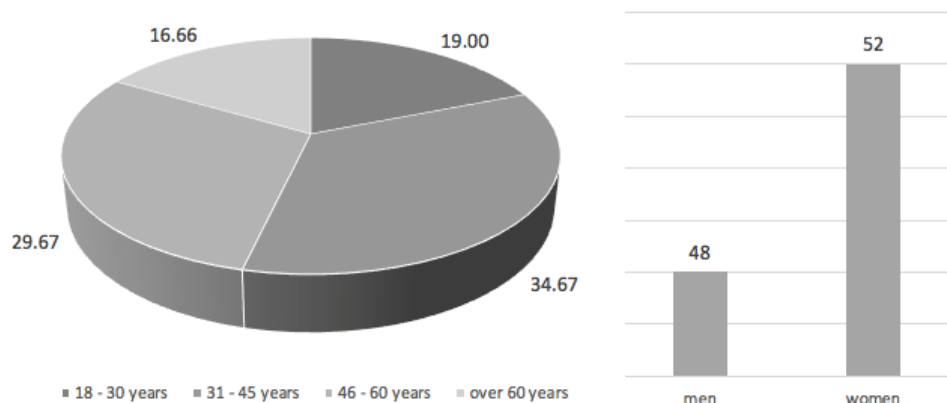
As is evident from the calculations, the minimum sample size, with the adopted confidence level  $1-2 = 0.95$ , and the accepted level of highest error  $d = 6\%$ , should be 267 questionnaires. Due to the fact that the study involved 300 questionnaires, it can be assumed that this condition was met. Thus, it can be also assumed that the selected sample size was legitimate and the obtained results were reliable.

The research was carried out in February 2018, among 300 tenants of the housing community, of which the majority were women (52%). Nearly 35% of the respondents were people aged between 31 and 45, another 30% between the ages of 46 and 60, while 19% are seniors (*Figure 1*). The research tool was a survey questionnaire consisting of 5 parts:

- age, gender, occupational and material situation,
- use of the Internet - frequency, purpose, length of use,

- use of available IT solutions,
- desire to broaden digital literacy,
- digital security issues.

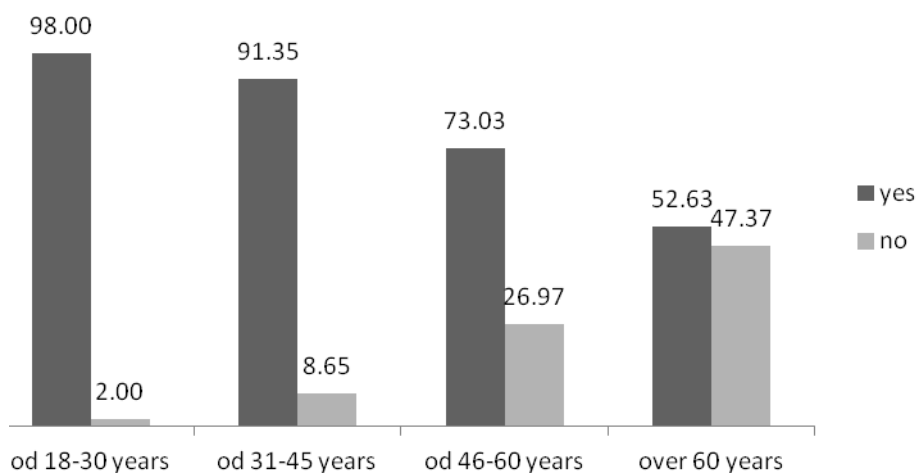
All 300 questionnaires qualified for further research as not one was incorrectly completed or not returned.



**Figure 1. Gender and age of respondents (%)**

Source: Authors' own compilation from study data

The vast majority of respondents - nearly 80% - consider the Internet as a tool to make life easier, of which 98% of people aged 18 to 30 have this opinion. The relationship between this opinion and age is not surprising - the older the respondents, the higher the percentage of negative answers. However, in the case of seniors, this opinion is divided, i.e. more than 52% consider the Internet as a tool to facilitate life and more than 47% think differently (*Figure 2*).



**Figure 2. Internet as a tool to make life easier in respondents' opinion (%)**

Source: Authors' own compilation from study data

46% of the surveyed group declare "regular" and 29% "daily" use of the Internet. "Once a week" was the answer selected by 7.67% respondents, "less than once a week" - 2.33% and "several times a month" - 2.67%. Only 12% of the respondents declared not using the Internet at all. The highest percentage in this group are people over 60 years of age. Interestingly, 35% of seniors declare daily use of the network. Of course, the youngest respondents, i.e. 18 to 30 years old, use the Internet regularly and on a daily basis (*Table 1*).

**Table 1. Frequency of using the Internet (%)**

Age	Regularly	Every day	Once a week	Less than once a week	Several times in month	Do not use
18-30	74.00	24.00	-	-	-	2.00
31-45	59.61	29.81	3.85	1.92	0.96	3.85
46-60	37.10	28.11	14.61	2.25	4.45	13.48
More than 60	10.53	35.09	10.53	5.26	5.26	33.33

Source: Authors' own compilation from study data

The Internet is primarily used for entertainment and for the purpose of obtaining information. It is used to the smallest extent to download computer software, publish one's own works and create or modify websites. This would indicate a low level of digital competence among the respondents (*Table 2*).

**Table 2. Purpose of using the Internet (%)**

	Very often	Often	Rarely	Very rarely
Browsing websites for entertainment	30.67	28.33	11.00	5.00
Organizing and collecting information	23.00	31.67	8.33	4.00
Checking weather or traffic conditions	22.00	27.00	8.67	6.00
Internet shopping	18.67	21.33	10.67	10.00
Selling goods and services	17.00	19.33	12.33	13.00
Dealing with official matters	14.43	15.00	13.67	13.67
Seeking a job	12.33	8.67	9.00	19.00
Making phone calls	11.67	12.33	6.67	17.67
Listening to Internet radio	10.67	15.67	10.00	17.67
Downloading music	10.67	10.67	10.67	20.33
Reading books/newspapers	9.33	16.67	11.33	17.66
Downloading movies	9.33	9.67	11.67	20.00
Downloading computer software	8.33	6.33	11.00	24.33
Publishing one's own work	8.00	10.67	7.67	25.67
Creating/modifying websites	5.67	5.33	5.67	27.00

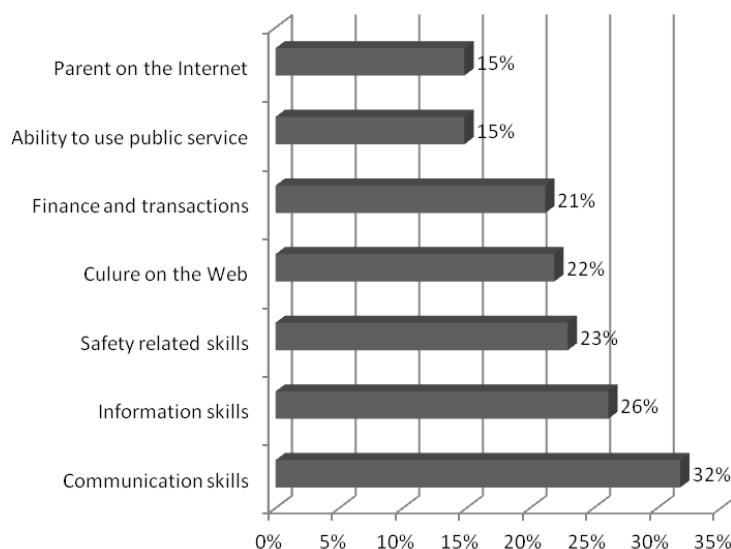
Source: Authors' own compilation from study data

In the next step, the respondents were asked if they would be interested in the possibility of enhancing their competences in the field of using the Internet. In this case, the distribution of responses may be astonishing, as almost half of them (41%) chose the negative answer, but the remaining 59% indicated the affirmative answer. Among the respondents who chose the negative answer were people from the age group 18 to over 60, characterized by various states of professional activity, most of them also stated that the Internet is treated as a tool to make life easier. However, almost all these people use the basic tools of the Internet - sending e-mails and browsing websites. They do not use any additional tools in the form of an Electronic Inbox or e-government. Therefore, the next step in the conducted research should be research on the lack of respondents' interest in connection with expanding their range of digital skills.

Due to the wide variety of digital competences that an Internet user can improve, they have been grouped as follows:

- **Information skills** in the form of copying or moving files, use of disk space on the Internet, searching for information on public administration websites, searching for information about goods, services and health-related information;
- **Communication skills** in the form of sending, receiving e-mails, using social networking sites, telephoning and video calls over the Internet;
- **Safety related skills** in the form of using anti-virus programs, safe shopping and financial transactions, protection of passwords and personal data;
- **The ability to use public services** in the form of e-government services;
- **The ability to "Parent on the Internet"** in the form of recognizing harmful and dangerous content, safe use of the Internet by children, supervising the child's activity on the web, submitting a Family 500+ application or obtaining a Large Family Card;
- **Skills related to financial and monetary transactions** in the network in the form of assessing the credibility of a contractor, purchasing and selling via the Internet, managing a bank account, electronic payments and safe management of privacy on the network;
- **Skills related to "Culture on the Web"** in the form of information retrieval, placing one's own creations on the web, using digital cultural resources, watching, listening, downloading digital movies, music, literature, radio broadcasts, images, press, games or comics from legal sources of culture.

The respondents showed the greatest interest in acquiring communication skills, as indicated by 32% of them. Information skills (26%) were on the second place, followed by skills related to security (23%) and related to searching for or publishing content classified as broadly understood culture (22%) (*Figure 3*).



**Figure 3. Willingness of respondents to enhance particular competences (%)**

Source: Authors' own compilation from study data

On the other hand, the smallest interest was shown by the respondents in the case of broadening competences increasing their skills in using public services (15%) and those related to parental control (15%). Such a low percentage of interest in using digital public services may be caused by ignorance, resulting from insufficient information about the availability of such services, as well as the benefits resulting from them - time savings or the quickness of dealing with official issues. On the other hand, in the case of parental control, this may be due to the lack of children or the fact that their children are adults. Nonetheless, the respondents also believe that their parenting skills in this area are sufficient and do not need to be expanded. Additional issues from the conducted research directly concerned safety and protection of the computer against external attacks. A computer with access to the Internet, on the one hand, is a useful tool to facilitate life, but on the other hand it is very often exposed to external attacks that may result in the deletion of information stored on the computer, disclosure of private or sensitive information, physical damage to the computer or stealing money from bank accounts. Therefore, it was reasonable to carry out research in this area because it will allow further directions of activities to be set to raise awareness of security on the Internet as well as acquire practical skills to protect against external attacks.

The necessity to increase safety related skills is signaled by the structure of the answers to the question regarding installed anti-virus programs - only half of respondents confirmed the installation of such programs (51%), among the remaining half, 17% said they did not install antivirus software and 32% indicated "I do not know". However, already 74% of respondents chose the answer admitting that their computer had been infected by a virus. 14% of respondents chose the negative answer and 12% indicated the answer "I do not know". As the structure of



the received answers shows, among the group of people who confirmed infection of the computer by a virus, it can be assumed that there are people who do not have an antivirus program or do not know anything about it. Notwithstanding, the obtained results indicate that despite having an anti-virus program installed, computers still fall victim to viruses. This may be due to insufficient protection in the form of a too-old anti-virus program which is not able to identify new viruses and effectively get rid of them, or its inappropriate configuration, also due to insufficient skills in this area. In another issue, the respondents were asked about the desire to broaden their safety-related skills in relation to the type of Internet activity (*Table 3*).

**Table 3. Willingness to acquire Internet skills (%)**

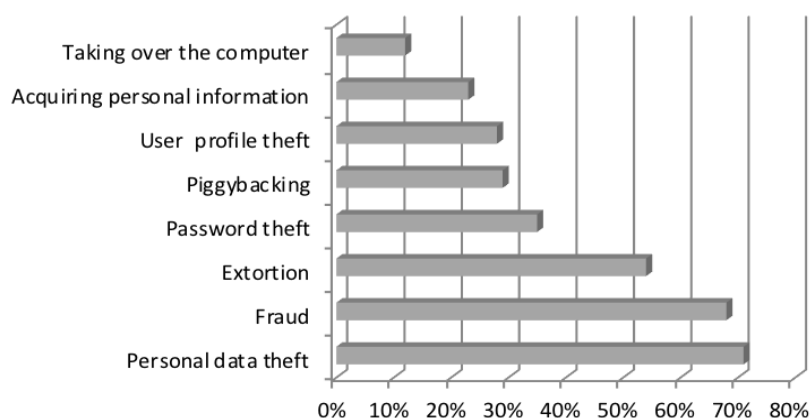
Browsing websites for entertainment			
Skill to recognize secure pages		Skill to secure Internet browser	
Yes	24%	Yes	19%
No	76%	No	81%
Organization and collecting information			
Skill to protect against phishing			
Yes	32%		
No	68%		
Internet shopping			
Skill to use the price comparison engine		Consumer rights knowledge	
Yes	67%	Yes	24%
No	33%	No	76%
Dealing with official matters			
Knowledge of principles of creating good passwords		Personal data protection	
Yes	12%	Yes	47%
No	88%	No	53%
Making phone calls			
Correct Internet security			
Yes	48%		
No	52%		

Source: Authors' own compilation from study data

With regard to web browsing, only 24% of respondents indicated that they had the ability to recognize secure websites, while the remaining 74% indicated a negative answer. A similar distribution of responses can be observed in the case of the ability to adequately secure an Internet browser - this skill was indicated by only 19% of respondents and the remaining 81% do not have this ability. A little better results were obtained in the case of phishing protection skills, as indicated by

32% of respondents, but still almost  $\frac{3}{4}$  of them (68%) indicated that they do not have this skill. In the aspect of online shopping, almost  $\frac{3}{4}$  of respondents (67%) indicated the ability to use price comparison websites that not only provide information on the prices of given products, but also direct to proven and trusted online stores. The reverse answers can be observed in the case of knowledge of consumer rights because more than  $\frac{3}{4}$  of respondents (76%) declared that they know these rights. When dealing with official matters, they were asked about the ability to create good internet passwords and protect personal data. In this case, there are visible deficiencies among the respondents regarding safe use of the Internet - 88% of them indicated a lack of the ability to create good passwords and more than half (53%) do not understand the issues related to the protection of personal data. In addition, the currently binding GDPR<sup>1</sup> has introduced even more confusion for the moment. On the one hand, it consists in conscious consent to the processing of personal data and is intended to protect the rights of Internet users, on the other hand, most users do not have sufficient knowledge about the GDPR. Again, the results in terms of the ability to secure internet connections are a bit better - 48% said yes, but it still means that more than half of the respondents cannot adequately secure their internet connections, which may result in an unauthorized user connection and crime by means of this connection.

In the last issue, the respondents were asked what their greatest concerns are regarding the risks associated with using the Internet (*Figure 4*).



**Figure 4. Main threats connected with Internet use (%)**

Source: Authors' own compilation from study data

As the figure shows, the respondents are most concerned about the theft of personal data (71%), which can be used to steal money or make purchases on credit. Fraud was on the second place, as indicated by 68% of respondents. In the next place was extortion, indicated by 54% of respondents. The respondents are also afraid of

<sup>1</sup>GDPR – The General Data Protection Regulation (GDPR), agreed upon by the European Parliament and Council in April 2016, replaced the Data Protection Directive 95/46/ec in Spring 2018 as the primary law regulating how companies protect EU citizens' personal data (source: ec.europa.com).

the theft of access passwords (35%), piggybacking (29%), theft of a user profile (28%) or the acquisition of personal information (23%). On the other hand, the slightest concern was raised by the risk of a hacker taking over the computer (12%).

## Conclusions

The purpose of the research conducted among the tenants of the ZBS TBS housing community was to determine the level of digital competences they possessed and to determine the needs in the area of increasing safety related skills on the Internet. The reason for this study was the fact that the digital world has a stronger presence in our reality. The computer, together with the Internet, has been an inseparable element of almost every household for some time and the use of the Internet is part of people's everyday activities. Unfortunately, most users still do not have sufficient skills to ensure safe use of the Internet. Although nearly 80% of respondents consider the Internet as a tool to help their lives, at the same time a large percentage of them is characterized by a lack of basic skills related to safe use of the Internet. This fact can be supported by conclusions drawn from analysis of the obtained research data:

- only a little more than half of the respondents confirmed the installation of an antivirus program, but almost  $\frac{3}{4}$  indicated that their computer had been at least once infected by a virus,
- over  $\frac{3}{4}$  of the respondents is unable to recognize secure websites or to properly protect the web browser they use on a daily basis, is not familiar with their consumer rights and cannot set a password that is difficult to break,
- fewer than  $\frac{3}{4}$  of respondents cannot provide sufficient protection against phishing, cannot protect their personal data and has no knowledge about proper security of the Internet connection they use on a daily basis.

It is clearly visible that the respondents should increase their safety by improving their skills in: recognizing secure websites, properly protecting the web browser, improving protection against phishing, increasing consumer awareness, knowing how to create good internet passwords as well as understanding the essence of protecting personal data and adequate security of the Internet connection. However, they are the most afraid of threats in the form of theft of personal data, online fraud and extortion.

To sum up, it can be concluded that the digital competences of the community tenants are insufficient to move freely in the digital world and therefore one of the recommendations from the study is to organize training in the field of Internet security. This in the future will translate not only into better protection but will also allow users to increase their freedom of movement on the network.

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## **OCENA KOMPETENCJI CYFROWYCH LOKATORÓW ZASOBU MIESZKANIOWEGO W CZĘSTOCHOWIE**

**Streszczenie:** We współczesnym świecie technologie informacyjno-komunikacyjne stanowią narzędzia powszechnego użytku. Umiejętności poruszania się w cyfrowym świecie są wymogiem rozwoju w XXI wieku. Niedostateczny poziom kompetencji cyfrowych pociąga za sobą poważne problemy społeczne, m.in. e-wykluczenie, oraz naraża użytkowników sieci na szereg zagrożeń związanych z bezpieczeństwem danych. W artykule przedstawiono wyniki badania przeprowadzonego w lutym 2018 roku na grupie 300 lokatorów zasobu mieszkaniowego zarządzanego przez ZGM TBS Sp. z o.o. w Częstochowie. Celem badania było zdiagnozowanie poziomu kompetencji cyfrowych oraz potrzeb w tym zakresie badanej grupy. Zdecydowana większość respondentów wykorzystuje Internet i uważa sieć za narzędzie ułatwiające życie. Wyraźnie jednak widać, że poziom umiejętności cyfrowych jest niewystarczający. Szczególnie w zakresie rozpoznawania bezpiecznych stron internetowych, odpowiedniego zabezpieczenia przeglądarki internetowej, poprawy ochrony przed wyłudzeniem informacji, zwiększenia znajomości praw konsumenckich, znajomości zasad tworzenia dobrych haseł internetowych i zrozumienia istoty ochrony danych osobowych oraz odpowiedniego zabezpieczania łącza internetowego. Badanie wskazało dalsze kroki, jakie powinny być podjęte w celu zwiększenia poziomu umiejętności w zakresie bezpiecznego korzystania z Internetu. Sformułowane wnioski stanowią wytyczne dla zarządcy zasobu mieszkaniowego do planowania działań związanych z doskonaleniem kompetencji cyfrowych.

**Słowa kluczowe:** inteligencja cyfrowa, kompetencje cyfrowe, technologie, Internet, umiejętności, zagrożenia