European Research Studies Journal
Volume XXIV, Issue 2B, 2021

pp. 213-226

Sustainable Remote Work Market – Diagnosis of Digital IT, Information and Functional Competences in the Aspect of Equal Opportunities

Submitted 14/03/21, 1st revision 30/04/21, 2nd revision 18/05/21, accepted 10/06/21

Artur Kwasek[1], Magdalena Maciaszczyk[2], Maria Kocot[3], Adam Depta[4]

Abstract:

Purpose: *The article attempts to diagnose digital competencies to provide equal opportunities in the small work market. The present paper employs the results of research from the project conducted by the same authors.*
Design/Methodology/Approach: *The study was conducted in 2021 on a random sample of 649 adult Poles. The method used in the study was CAWI. In the first stage of the analysis, based on the conducted research, attempts were made to establish which variables affect digital competencies (specifically, IT, information, and functional competencies). For this purpose, a structural model was estimated using the maximum likelihood method.*
Findings: *A thorough analysis of the literature on the topic and the studies demonstrate a close correlation between the strength of influence between endogenous variables, i.e., the discussed competencies.*
Practical Implications: *The research results clearly show that only by maintaining the balance between the specified digital competencies can a smooth functioning of a sustainable remote work market be ensured. Additionally, increasing IT competencies should result in higher digital competencies, and increasing functional competencies will automatically translate into increasing information competencies. Therefore, a good practice would be to monitor digital competencies essential to the use of digital media for professional purposes and organize training for employees from different generations.*
Originality/Value: *A set of endogenous variables that affect digital competencies (specifically, IT, information, and functional competencies) was identified, and the strength of influence between endogenous variables was shown.*

Keywords: *Sustainable remote work market, digital competences, the Internet, enterprise.*

JEL Codes*: J01, M54, N3.*

Paper type: *Research article.*

[1]*Ph.D., Vistula University in Warsaw, Warsaw, a.kwasek@vistula.edu.pl;*
[2]*Ph.D., Lublin University of Technology, Lublin, m.maciaszczyk@pollub.pl;*
[3]*Ph.D., University of Economics in Katowice, Katowice, maria.kocot@ue.katowice.pl;*
[4]*Ph.D., Lodz University of Technology, Lodz, Poland; Medical University of Lodz, Lodz, Poland; adam.depta@p.lodz.pl;*

1. Introduction

In recent years, the labor market has experienced dynamic changes due to advancing globalization, modern technologies, and progressive digitization. According to Lyons, Schweitzer, and Eddy (2015), the functioning of people of different ages in the labor market can be considered one of the practical tools of leadership and innovation. This form of work organization determines the success of the company (Mazur, 2015). At the same time, remote work, which has become widespread in the times of the COVID-19 pandemic, is becoming increasingly popular. At the same time, taking up this type of work requires digital competencies, and these remain very diverse among employees.

The article aims to diagnose digital competencies in terms of equal opportunities in the small work market. The article presents the results of a survey conducted in February 2021 using the CAWI method. The conducted research allowed the authors to estimate a structural model using the maximum likelihood method. It allowed for determining variables influencing digital competencies, in particular IT, information, and functional competencies, and the depiction of the strength of influence between endogenous variables, i.e., the discussed competencies. Determining these relationships will highlight the factors that may prevent digital exclusion in the remote work market and contribute to its sustainable development.

2. Background

2.1 Digital Competences as an Image of the Contemporary Network Society

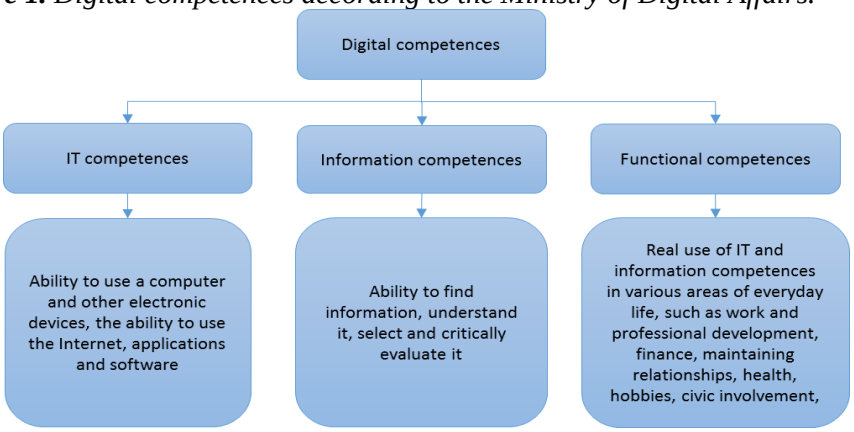
Digital competencies facilitate functioning in modern society. Certainly, therefore, an individual must acquire such competencies not to be digitally excluded (Dwyer and Azevedo, 2016). When defining digital competencies, two approaches to this problem should be presented: the catalog, the so-called traditional approach, and the relational approach (Bawden, 2008; Lorsch, 2010). *Digital competencies* in the "traditional" approach are defined as a specific set of knowledge and skills that the user needs to be familiar with (Mencl and Lester, 2014). It is worth emphasizing that the only category of division of competencies in this approach is the demographic criteria (educational level and age) of users, without considering their expectations, predispositions, and experiences (Reisenwitz and Iyer, 2009; Madera *et al.*, 2011).

A broader understanding of digital competencies was proposed in the document Key Competences for Lifelong Learning - A European Framework. It relates to the competencies of the information society in terms of knowledge, skills, and attitudes (European Communities, 2007). Moreover, this approach does not consider individual differences among users (Lester *et al.*, 2012; Heyns and Kerr, 2018; Zabel *et al.*, 2017). The discussed approach may be considered insufficient in the light of technological progress: the rapid development of operating systems and electronic equipment, software, and the Internet, as well as the increasing diversification of the

way they are used (Mencl and Lester, 2014). The new relational approach has gradually filled this gap. It is an extension of the normative perception of digital competencies in which modern technologies do not constitute a separate space for the activities of individuals but an integral part of each of these activities (Ozkan and Solmaz, 2015). What becomes their role is to streamline all activities undertaken by the individual (Tulgan, 2009). This approach also emphasizes the possibility of adjusting the level of digital competencies to the needs of an individual user without the need to crate generally accepted standards (Tulgan, 2009; Pandita and Singhal, 2017).

This approach is evident in the Framework Catalogue of Digital Competences developed under the Operational Programme "Digital Poland 2014-2020". It recommends using the relational model of digital competencies in the areas of: "education, everyday matters, finance, relationships with others, work and professional development, health, rest, hobbies, civic involvement, religion" (Jasiewicz *et al.*, 2016). According to the Ministry of Digital Affairs (www.gov.pl), digital competencies include IT competences, information competences, and functional competencies. They are specified in detail in Figure 1 below.

Figure 1. *Digital competences according to the Ministry of Digital Affairs.*



Source: *On the basis of* https://www.gov.pl/web/cyfryzacja/kompetencje-cyfrowe.

Some changes in the understanding of digital competencies can be observed. Today's user, in addition to the basic scope of competencies, should also have competencies in the field of co-creating the network environment, i.e., be able to take the initiative to create internet channels and be an "active" recipient of information, who categorizes and selects content (Kranabetter and Niessen, 2017).

2.2 Challenges of Remote Work

Rapid technological development, the Internet and online services being made widely available for citizens, progressive digitization, and widespread computerization have

caused changes in the professional sphere. Remote work, also called telepraca (teleworking) in Polish literature, has become an interesting phenomenon. The concept of remote work is a phenomenon that has not been given one specific definition. Attention should also be drawn to the English nomenclature and equivalents, such as virtual officing, telecommuting, e-work, remote work, work from home, networking (Reisenwitz and Iyer, 2009). However, these terms should not be treated as synonyms because teleworking often refers to work under a contract of employment but carried out from home, while remote work can be performed based on an employment contract, civil law contracts, or self-employment (Lissitsa and Kol, 2016; Reisenwitz and Iyer, 2009).

In the literature on the subject, *remote work* is defined as work outside the employer's office. Depending on the form, this work may be performed at the employee's residence and in other places, sometimes on the move, e.g., while traveling (www.men.gov.pl; Siadak, 2016). The use of remote work in enterprises is a considerable challenge for companies and teleworkers and implies many potential benefits and risks. Indeed, IT and telecommunication technologies are inseparable elements of teleworking (Glass, 2007). It is especially IT tools, software, servers, and network infrastructure that are changing exceptionally dynamically. The use of practical tools and working methods affects the entire process's profitability (Tarkowski *et al.,* 2016). Remote work can be treated as a method of cooperation between the employee and the company (www.oecd.org). Achieving the best effect from the implementation of remote work becomes possible when the technologies and tools used by employees providing remote work and the company are appropriately selected. It is also essential for employees to have digital competencies.

3. Materials and Methods

This article uses research from a project conducted by A. Kwasek, Ph.D., M. Kocot, Ph.D., M. Maciaszczyk, Ph.D., and A. Depta, Ph.D. It aimed to present the image of digital competencies of people covered by the study to shape sustainable development in the small work market. It was hypothesized that digital competences, particularly IT, information, and functional competencies, have a varying influence on specific variables. There is also the strength of influence between endogenous variables, i.e., the discussed competencies.

Secondary and primary sources of information were used to achieve the research goals and verify the hypotheses. Secondary sources comprised Polish and foreign literature on the subject, including non-serial literature and specialist press and materials from the Internet. Primary information was collected using the survey methodology and a questionnaire interview. The obtained empirical data were analyzed using selected statistical methods. The results of these studies will contribute to increasing the digital competencies of employees of all ages and, as a result, will contribute to equalizing opportunities in the small work market. This topic was taken up due to its up-to-date nature and great significance and the existence of a noticeable research gap in this

area. The research process consisted of two phases: the first one was literature analysis, while the second was divided into the following stages: creating the research questionnaire, gathering data, performing statistical analysis, and drawing conclusions. The questionnaire was sent to Polish adults with higher education chosen using purposive sampling (non-random sampling). This sampling method was used because of its utility for obtaining data from different groups of people (Shreder, 2010; Patton, 2002).

The minimum sample size was defined as 385. It was calculated at a confidence level $\alpha = 0.95$ and a margin of error of 5% for the population of adult Poles based on the data provided on Polska w Liczbach (Poland in Numbers).

Sample Size Formula (Sample Size Calculator) used to calculate the sample size was:

$$\mathbf{n} = z^2 * p * (1-p) / e^2$$
$$\mathbf{n} \text{ (with finite population correction)} = [z^2 * p * (1-p) / e^2] / [1 + (z^2 * p * (1-p) / (e^2 * N))] \quad (1)$$

where:
n is the sample size,
z is the z-score associated with a level of confidence,
p is the sample proportion, expressed as a decimal,
e is the margin of error, expressed as a decimal,
N is population size.

The study was conducted in January and February 2021. The questionnaire was completed over the Internet in accordance with CAWI standards, which enabled the researchers to access the results quickly. The statistical analysis of the data obtained from the surveys was performed using the computer package SPSS STATISTICA 21. 649 correctly completed questionnaires were qualified for statistical analysis. The socio-demographic characteristics of respondents are presented in Table 1.

Table 1. *Socio-demographic characteristics of respondents*.

	Variables		Frequency	Percentage N = 649
1	Generation	1946 – 1964	0	0
		1965 – 1976	17	3
		1977 – 1990	106	16
		1991 – 2000	524	81
		Total	649	100
2	Gender	Male	234	36
		Female	415	64
		Total	649	100
3	Level of education	Bachelor's degree	367	57
		Master's degree	282	43
		Total	649	100
4	Employment status	Active full-time	512	86
		Active part-time	0	0
		Self-employed	38	6

		Non-active	53	8
		Total	649	100
5	Professional position held	Not working	53	8
		Intern	9	1
		White-collar	444	68
		Lower management	54	8
		Middle management	56	9
		Top management	33	5
		Total	649	100
6	Expected form of employment	Full-time contract	382	68
		Job order contract	60	11
		Freelancer	8	1
		Self-employment	112	20
		Total	649	100
7	Expected place of employment	Sole proprietorship	196	30
		Small family business - up to 10 employees	64	10
		Middle sized company - up to 100 employees	154	24
		Big company - up to 1000 employees	109	17
		International corporation	126	19
		Total	649	100

Source: *Own study.*

4. Results and Discussion

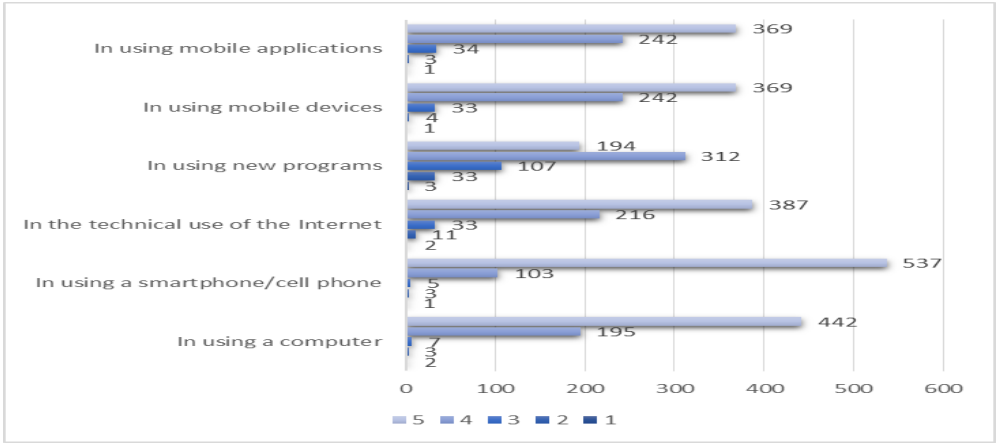
The study was aimed at determining the IT competencies of individual respondents. The following competencies were verified, using a computer, using a smartphone/cell phone, using the Internet, using new programs, using mobile devices, and using mobile applications.

Likert scale 1–5 was used to estimate the level of possessing the questioned competencies, where 1–definitely no, while 5–definitely yes. The review of the respondents' answers is quite optimistic. The vast majority of the respondents possess the competencies mentioned above, although the surveyed group included people who had difficulties using new programs (Figure 2).

Another issue examined in the study was information competence in the following areas: in finding the necessary information, in understanding information and concluding, in the selection and critical evaluation of information, in providing information, and in building relationships. In this case, the respondents also mainly assessed their competencies as high; however, a group of people reported problems in this area (Figure 3). Likert scale 1–5 was used again to estimate the level of possessing the questioned competencies, where 1 – definitely no, while 5 – definitely yes. Distinguishing functional competencies was also important. In this area, digital skills were studied: in the didactic process, in the communication process, in job search, in professional life, in interpersonal relations, in business relations, in remote work, and education. From the analysis of the respondents' answers, it can be concluded that a large part of people included in the study has such competencies.

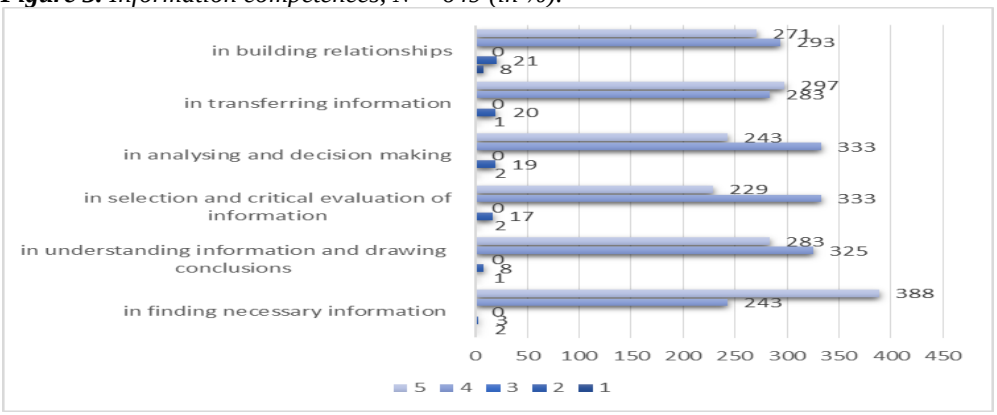
However, quite a large part of the respondents had no opinion on this subject. The data on the level of functional competencies are presented in Figure 4. Likert scale 1 – 5 was used to estimate the level of possessing the questioned competencies, where 1 – definitely no, while 5 – definitely yes.

Figure 2. *IT competences, N = 649 (in %).*



Source: *Own study.*

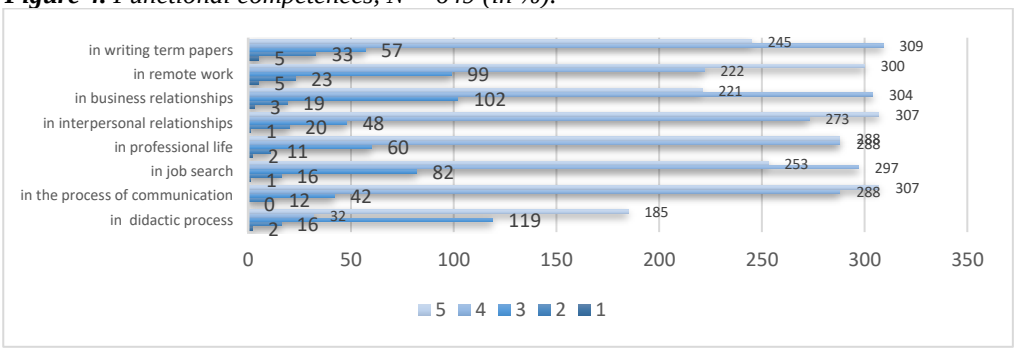
Figure 3. *Information competences, N = 649 (in %).*



Source: *Own study.*

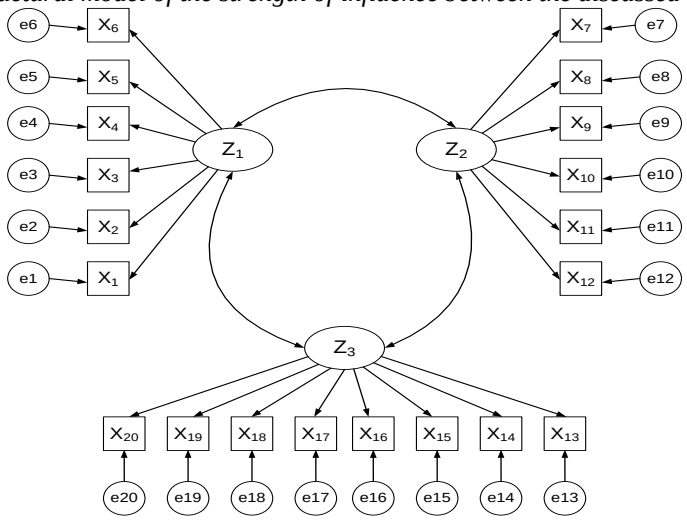
Based on the conducted research, attempts were made to determine which variables affect digital (IT, information, and functional) competencies. An attempt was also made to illustrate the strength of influence between the discussed competencies. For this purpose, a structural model was estimated using the maximum likelihood method (Figure 5). There was no reason to reject the null hypothesis that the residual values of the empirical and theoretical matrices are zero ($\chi 2 = 1195.29$; $p = 0.001$). Root mean square approximation error (RMSAE) = 0.097 indicates that the model fits the data well.

Figure 4. *Functional competences, N = 649 (in %).*



Source: *Own study.*

Figure 5. *Structural model of the strength of influence between the discussed competences.*



Source: *Own study.*

The structural model estimated with the maximum likelihood method includes:

- observable endogenous variables: X1 - using a computer, X2 - using a smartphone / cell phone, X3 - technical - use of the Internet, X4 - using new programs, X5 - using mobile devices, X6 - using mobile applications, X7 - finding the necessary information, X8 - understanding information and drawing conclusions, X9 - selection and critical evaluation of information, X10 - analysis and decision making, X11 - transferring information, X12 - building relationships, X13 - didactic process, X14 - communication process, X15 - job search, X16 - professional life, X17 - interpersonal relationships, X18 - business relationships, X19 - remote work, X20 - writing term papers.
- unobservable endogenous variable: Z1 - IT competences, Z2 - information competences, Z3 - functional competences.

- unobservable exogenous variables: e1, e2, e3, e4, e5, e6, e7, e8, e9, e10, e11, e12, e13, e14, e15, e16, e17, e18, e19, e20.

Unstandardised and standardised model coefficients as well as covariances and correlations between latent variables are summarised in Tables 2, 3 and 4.

Table 2. *Unstandardised model coefficients*

Variables	The estimated value of the parameter	Standard error of the estimate	Critical value	*p* value
X1	1	-	-	-
X2	0.829	0.058	14.351	***
X3	1.232	0.086	14.246	***
X4	1.542	0.105	14.745	***
X5	1.616	0.086	18.875	***
X6	1.575	0.084	18.671	***
X7	1	-	-	-
X8	1.389	0.091	15.315	***
X9	1.606	0.104	15.378	***
X10	1.614	0.104	15.497	***
X11	1.501	0.103	14.577	***
X12	1.295	0.107	12.093	***
X13	1	-	-	-
X14	0.986	0.067	14.775	***
X15	1.115	0.074	14.978	***
X16	1.117	0.072	15.489	***
X17	1.079	0.073	14.716	***
X18	1.139	0.078	14.669	***
X19	1.121	0.084	13.425	***
X20	1.048	0.079	13.194	***

Note: **** means $p < 0.001$.*
Source: *Own study.*

Unstandardized model coefficients are in line with the assumptions of the confirmatory factor analysis, a constant value was adopted for parameters X1, X7 and X13 and it was not estimated. The unstandardized model coefficients inform by how many units the value of the explained variable will change when the value of a given explanatory variable increases by one unit (Konarski, 2010; Osińska, 2008; Osińska *et al.*, 2011).

Table 3. *Standardised model coefficients*

Variables	Estimated parameter value
X1	0.642
X2	0.638
X3	0.632
X4	0.659

Variables	Estimated parameter value
X5	0.911
X6	0.894
X7	0.609
X8	0.773
X9	0.778
X10	0.787
X11	0.719
X12	0.562
X13	0.633
X14	0.698
X15	0.711
X16	0.743
X17	0.695
X18	0.692
X19	0.619
X20	0.606

Note: **** means p < 0.001*.
Source: *Own study.*

The standardized coefficients describe by how many of its standard deviations the value of the explained variable changes when the value of the explanatory variable increases by its one standard deviation (Bollen, 1989).

The above interpretations apply only when the values of the remaining variables remain unchanged. Thus, the values of the coefficients describe the direction (positive/negative) and the strength of the influence of the explanatory variable on the explained variable. The strength of the influence on the explained variable can be compared between the explanatory variables using standardized coefficients. The values of unstandardized coefficients depend on the units in which the variables are measured.

Based on the standardized model coefficients, it was found that variable Z1 - IT competencies were most strongly influenced by the following variables: X5 - using mobile devices and X6 - using mobile applications, and the weakest influence was exerted by variable X3 - technical use of the Internet. Based on the standardized model coefficients, it was found that variable Z2 - information competencies were most strongly influenced by the following variables: X10 - analysis and decision making, and X9 - selection and critical evaluation of information, while the weakest influence was exerted by variable X12 - building relationships.

Based on the standardized model coefficients, it was found that variable Z3 - functional competencies is influenced most strongly by the following variables: X16 - professional life and X15 - job search, while the weakest influence is exerted by

variable X20 - writing term papers.

Table 4. *Covariances and correlations between latent variables*

Variables	Covariance	Standard error of estimate	Critical value	*p* value	Correlation coefficient
Z1 <--> Z2	0.083	0.009	9.428	***	0.641
Z2 <--> Z3	0.115	0.012	9.355	***	0.656
Z1 <--> Z3	0.094	0.011	8.790	***	0.534

Note: **** means p < 0.001.*
Source: *Own study.*

Statistical analyses demonstrated that variable Z1 - IT competencies are most strongly influenced by variable Z2 - information competencies. Variable Z2 - information competencies are most influenced by variable Z3 - functional competencies. In turn, variable Z3 - functional competencies are most strongly influenced by Z2 - information competencies.

5. Limitations of the Study and Further Research

Because the research was conducted among people from different generations of different sex and age, the research sample may be considered to be representing a larger population. However, most of the respondents are young people born after 1991. Therefore, this research sample cannot be considered representative, especially given that none of the respondents belonged to the oldest generation (born in 1946-1964), and it is assumed that such people have the most significant shortcomings in digital competencies.

Therefore, it would be interesting to extend this research in the future and direct it to representatives of different generations (keeping the same numerical proportions) to compare these competencies and improve them among the generation with the most significant problems in this regard. Moreover, because the research took place during the coronavirus pandemic, the research authors did not have the opportunity to meet the respondents in person and conduct a more detailed interview, which can undoubtedly be considered a significant limitation of this study.

6. Conclusions

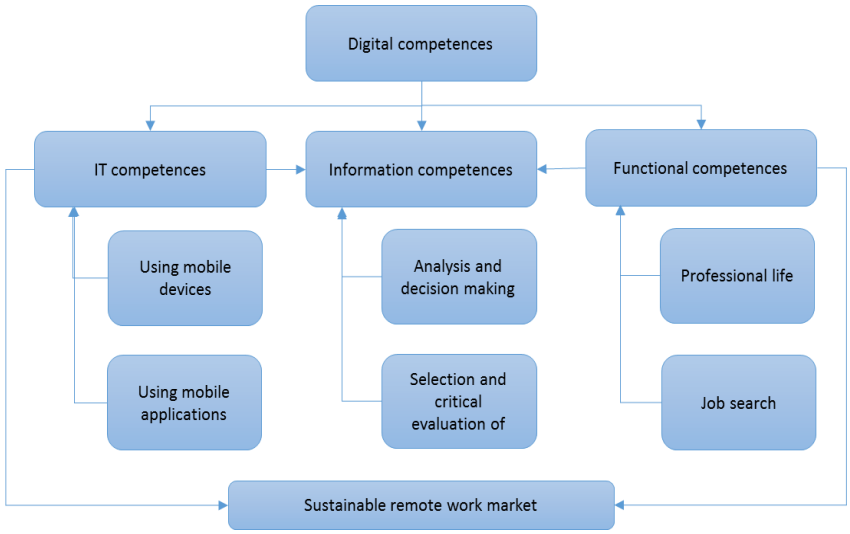
The research and statistical analyses allowed the authors to identify endogenous variables that affect digital competencies (precisely, IT, information, and functional competencies) and illustrate the strength of influence between endogenous variables, i.e., the discussed competencies. The use of mobile devices and mobile applications has the most decisive influence on IT competencies. In terms of IT competencies, the ability to conduct analysis and make decisions and select and critically evaluate information is of crucial significance. On the other hand, functional competencies are influenced mainly by professional life and the willingness to find a job.

Therefore, it can be concluded that maintaining the balance in the small activity market requires emphasizing the improvement of the enumerated variables that affect the three groups of competencies. Only the balance between the specified digital competencies will ensure the smooth functioning of a sustainable remote work market. Thanks to the conducted statistical analyses, it can be determined what factors affect individual competencies and the strength of the influence between the discussed competencies. Therefore, increasing IT competencies will result in higher digital competencies, and increasing functional competencies will automatically translate into increasing information competencies.

Therefore, a good practice would be to monitor the digital competencies necessary to use digital media for professional purposes and organize training for employees from different generations. The topic of multiple generations on the remote work market could therefore provide exciting material for future research.

These considerations are presented in the authors' original theoretical model of the sustainable remote work market (Figure 6).

Figure 6. *Digital competences and their impact on a sustainable remote work market.*



Source: *Own study.*

References:

Bawden, D. 2008. Origins and Concepts of Digital Literacy, In: C. Lankshear, M. Knobel (eds.), Digital Literacies: Concepts, Policies & Practices, 17-32.

Bollen, K.A. 1989. Structural Equations with Latent Variables. Wiley.

Domański, C. 1990. Testy statystyczne. PWE, Warszawa.

Dwyer, R.J., Azevedo, A. 2016. Preparing leaders for the multi-generational workforce. Journal of Enterprising Communities, People and Places in the Global Economy,

10(3), doi:10.1108/JEC-08-2013-0025.
European Communities. 2007. The Key Competences for Lifelong Learning - A European Framework. Official Journal of the European Union, 394.
Glass, A. 2007. Understanding generational differences for competitive success. Industrial and Commercial Training, 39(2), 98-103. doi:10.1108/00197850710732424.
Gov.pl. 2021. Retrieved from: https://www.gov.pl/web/cyfryzacja/kompetencje-cyfrowe.
Half, R. 2015. Get ready for Generation, Business. London.
Heyns, M.M., Kerr, M.D. 2018. Generational differences in workplace motivation. Journal of Human Resource Management, 16(1), 1-10.
Jasiewicz, J., Filiciak, M., Mierzecka, A., Śliwowski, K., Klimczuk, A., Kisilowska, M., Tarkowski, A., Zadrożny, J. 2016. Ramowy katalog kompetencji cyfrowych. Retrieved from: https://cppc.gov.pl/wp-content/uploads/zal.-13-Ramowy_katalog_kompetencji_ cyfrowych. pdf.
Kline, R.B. 2005. Principles and Practice of Structural Equation Modeling. The Guilford Press.
Konarski, R. 2010. Modele równań strukturalnych. Teoria i praktyka. PWN, Warszawa.
Kranabetter, C., Niessen, C. 2017. Managers as role models for health: Moderators of the relationship of transformational leadership with employee exhaustion and cynicism. Journal of Occupational Health Psychology, 22(4), 492.
Lester, S.W., Standifer, R.L., Schultz, N.J., Windsor, J.M. 2012. Actual versus perceived generational differences at work an empirical examination. Journal of Leadership & Organizational Studies, 19(3), 341-354.
Lissitsa, S., Kol, O. 2016. Generation X vs. Generation Y: A decade of online shopping. Journal of Retailing and Consumer Services, 31, 304-312.
Lorsch, J. 2010. A contingency theory of leadership. Handbook of leadership theory and practice. Harvard Business Review Press, 411-429.
Lyons, S.T., Schweitzer, L., Eddy, S.W. 2015. How have careers changed? An investigation of changing career patterns across four generations. Journal of Managerial Psychology, 30, 8-21.
Madera, J.M., Kapoor, C.E., Solomon, N. 2011. Understanding and managing generational differences in the workplace. Worldwide Hospitality and Tourism Themes, 3(4), 308-318. doi:10.1108/02632771211220086.
Mazur, B. 2015. Sustainable human resource management. The attempt of holistic approach. Ekonomia i Zarządzanie, 7(2), 7-12.
Men.gov.pl. 2016. Retrieved from: https://men.gov.pl/wp-content/uploads/2015/07/propozycja-zmian-w-podstawie-programowej.pdf.
Mencl, J., Lester S.W. 2014. More alike than different what generations value and how the values affect employee workplace perceptions. Journal of Leadership & Organizational Studies, 21(3), 257-272.
OECD. 2021. Retrieved from: http://www.oecd.org/site/piaac/mainelementsofthesurveyofadultskills.htm.
Osińska, M. 2008, Ekonometryczna analiza zależności przyczynowych. Uniwersytet Mikołaja Kopernika, Toruń.
Osińska, M., Pietrzak, M.B., Żurek, M. 2011 Wykorzystanie modeli równań strukturalnych do opisu psychologicznych mechanizmów podejmowania decyzji na rynku kapitałowym, Ekonomia XLII - Nauki humanistyczno-społeczne - 403 - Acta Universitatis Nicolai Copernici, Toruń.
Ozkan, M., Solmaz, B. 2015. The changing face of the employees–generation z and their perceptions of work (a study applied to university students), Procedia Economics

and Finance, 26, 476-483.
Pandita, S., Singhal, R. 2017. The influence of employee engagement on the work-life balance of employees in the IT sector. IUP Journal of Organizational Behavior, 16(1), 38-57.
Patton, M.Q. 2002 Qualitative Research and Evaluation Methods. Sage Publications: Thousand Oaks, CA, USA.
Polska w liczbach. 2021. Poland in Numbers. Available online: https://www.polskawliczbach.pl/.
Reisenwitz, T.H., Iyer, R. 2009. Differences in generation x and generation y: Implications for the organization and markets. Marketing Management Journal, 19(2), 91-103.
Sample Size Calculator. Retrieved from: https://goodcalculators.com/sample-size-calculator/.
Siadak, G. 2016. Kompetencje cyfrowe polskich uczniów i nauczycieli–kierunek zmian. Ogrody Nauk i Sztuk, (6), 368-381.
Szreder, M. 2010. Losowe i nielosowe próby w badaniach statystycznych. Przegląd Statystyczny, 57, 168-174.
Tarkowski, A., Mierzecka, A., Jasiewicz, J., Filiciak, M., Kisilowska, M., Klimczuk, A., Bojanowska, E. 2015. Taxonomy of Functional Digital Skills and Methodology for Measuring the Functional Level of Digital Literacy of People Aged 50+, Centrum Cyfrowe Projekt: Polska, Stowarzyszenie "Miasta w Internecie, Warszawa-Tarnów.
Tulgan, B., 2009. Not Everyone Gets a Trophy: How to Manage Generation Y. Jossey-Bass, San Francisco, 12-45.
Zabel, K.L., Biermeier-Hanson, B.B., Baltes, B.B., Early, B.J., Shepard, A. 2017. Generational differences in work ethic: Fact or fiction? Journal of business and psychology, 32(3), 301-315.