

## DIGITALIZATION AS A PROCESS SHAPING THE FUTURE OF NATIONAL LABOR MARKETS AND EDUCATION SYSTEMS. RESULTS OF NATIONAL SURVEY RESEARCH

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**Abstract:** the article presents the results of surveys focusing on the impact of digitalization on the labor market. The conducted research and analyzes show that breaking the mental barriers to digitalization in order to strengthen its acceptance may play a decisive role in creating development within the labor market. As evidenced by numerous sources cited in the text, the pursuit of development, in the phase of digitalization growth, directly leads to economic growth in the dimension of both the state and local communities. This, in turn, favors the social dimension of the individual and strengthens the human feeling of fullness of life.

**Keywords:** digitalization, labor market, education, survey.

### 1. Introduction

According to research conducted among senior management in the spring of 2015 by *the Global Center for Digital Business Transformation* (Bradley et al., 2015), by 2020, digitalization may affect either positively or negatively 40 % of all businesses currently holding a strong position within their market sector. The most radical changes could occur mainly in those where the key asset is having the knowledge and skill to work with large data sets (*data-driven industries*), such as e.g.: new technologies (including products and services), media and entertainment, financial services, telecommunications, and retail. This change is one of the key challenges facing modern Europe in the area of labor market and education. The digital transformation indicated above determines important processes on the demand and supply sides of labor market (Dachs, 2018; Probst et. al., 2018; Wei et al., 2019). As shown by forecasts, most likely the majority of students currently starting their elementary school education, will work in new types of professions that do not yet exist (European Commission, 2017). This means that the current education system must be able to reorient itself and smoothly adapt its competences to constant changes in the economic environment (Martinet et al., 2001;

Leicht et al., 2018). It must also be ready to offer attractive ways of continuously raising the education potential. Therefore, it is worth emphasizing, in the light of the conducted surveys, that digital transformation processes are a serious challenge for the Polish economy, labor market and education (Hetmańczyk, 2019). As many studies show, Poland's position in the world depends on their ability to meet them (Górniak, 2015).

Based on the processes and megatrends indicated above, surveys were conducted to, among others, diagnose the impact of digitization on the national labor market and education system at every level of education; along with an attempt to determine a direction for its development.

## 2. Discussion of the results

As part of the assessment of digitalization impact on labor market, respondents were asked a total of five questions. These were questions aimed at diagnosing the digitalization impact on the current and future situation of the national labor market; along with an attempt to determine the direction of its development. These surveys were carried out using the CAWI technique – i.e. an online expert interview questionnaire (Batorski et al. 2006, pp. 99-131). As it has already been noted, the questionnaire contained four source questions and one metric question, including questions with the indicated cafeteria of answers, the construction of which was based on the Likert scale (Babbie, 2005, pp. 281-182).

A targeted sample was used in the research, which was created by representatives of social dialogue institutions, employees and trade union activists from the "KADRA" Trade Union Agreement and the Trade Union Forum, including:

- Social Dialogue Councils,
- Provincial Councils of Social Dialogue,
- Labour Market Council,
- Voivodeship Labour Market Councils,
- Poviats Labour Market Councils,
- Monitoring Committees,
- tripartite commissions,
- employees and trade union representatives who are active participants in social dialogue.

The key criterion for selecting a targeted sample was the following characteristics of the respondent: higher education, extensive life and professional experience, recognition in their socio-professional environment through their profession and social roles and, directly or indirectly, having input into the creation of labor market policy through the institutions of social dialogue.

The research tool was piloted on a sample of five randomly selected respondents. As part of the pilot, the following elements of the questionnaire were verified:

- 1) technical correctness: analysis in terms of transition rules, logic and order of questions asked, instructions for interviewers, etc. (technical notes),
- 2) linguistic correctness: analysis in terms of complexity and logic of sentences, intelligibility of the vocabulary used and abbreviations (linguistic and editorial comments),
- 3) substantive correctness: analysis of selection (relevance, legitimacy, completeness) of questions (e.g. controls) and indicators (cafeteria) for closed questions (substantive remarks).

Based on the remarks and opinions obtained in the pilot, the structure of the questionnaire, questions and cafeteria was clarified and the questions in terms of language were standardized and standardized response categories were used. As a result, a research tool was obtained that was technically, linguistically and substantively correct. This tool was used for actual research as a source of research material for analysis.

The final version of the questionnaire was then sent to responding representatives of social dialogue institutions, employees and trade union activists, according to orderer criterion. The respondents were selected in such a way that collection was the most valuable source of information about the studied phenomenon. The survey used an online questionnaire put into a Microsoft Forms web page with cover letter, explaining research desirability and affiliation. The questionnaire was available for the research group from 10 to 30 June 2019 and this period should be considered as the period of research implementation.

The respondents expressed their opinions, choosing "Yes" or "No" or "Other" and based on an extensive rating scale, by level of importance: definitely yes, rather yes, rather not, definitely not.

A total of 272 respondents were invited to participate in the study, of which 211 accepted. This was the final group of respondents. Women in the studies accounted for 26.1% of the total, men – 73.9%.

In the context of the regularities and forecasts noted at the beginning, the first question in the survey focused on assessing the impact of economy digitization on the number of jobs. The distribution of answers was according to the following percentages: answer "Increase in the number of jobs" – 32%, "Reduction in the number of jobs" – 55% and "I do not know" – 13%. These results indicate the existence of fear of the digitization process.

On analyzing the results of the research according to gender criterion, obtained scores were divided according to the following percentage of respondents. For women, the answer "Increasing the number of jobs," stood at 29.4%, the remaining 51% focused on answering "Reducing the number of jobs." Among men, distribution was 33.3% - "Increase in the number of jobs" and 55.6% - "Reduction in the number of jobs".

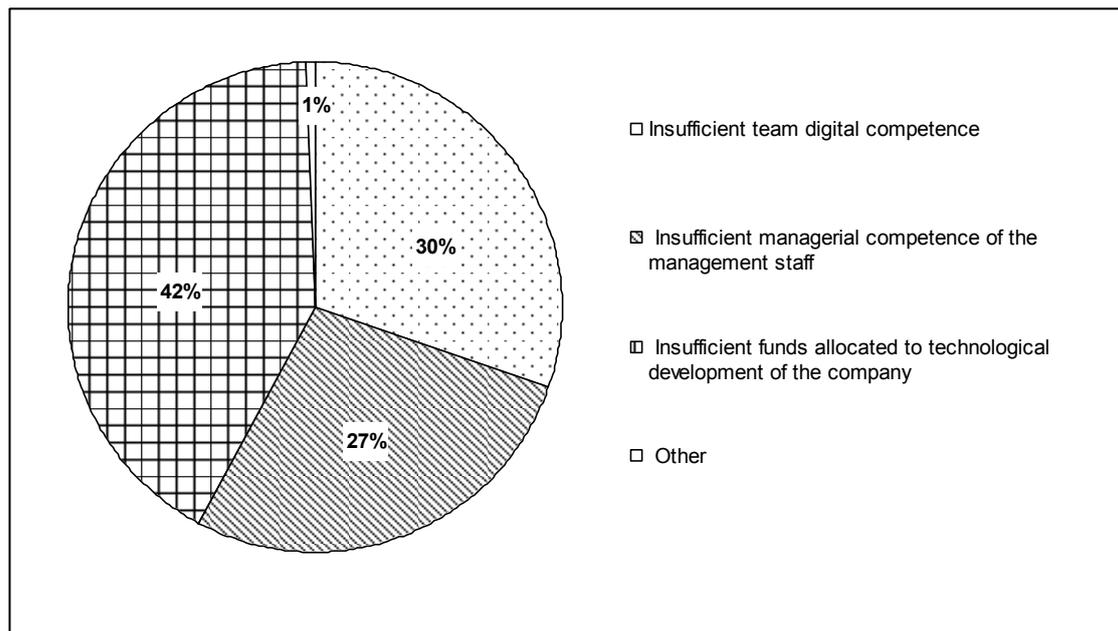
In the next question, the respondents were asked to assess the biggest challenges faced by companies wanting to digitally transform. Each of the respondents could give a maximum of two answers. The assessment of the challenges is presented in the Table 1 and Figure 1.

**Table 1.**

*Challenges for companies wishing to carry out digital transformation [N = 211]*

Type of challenges	Number of readings	%
Insufficient team digital competence	104	30.3
Insufficient managerial competence of the management staff	94	27.4
Insufficient funds allocated to technological development of the company	143	41.7
Other	2	0.6

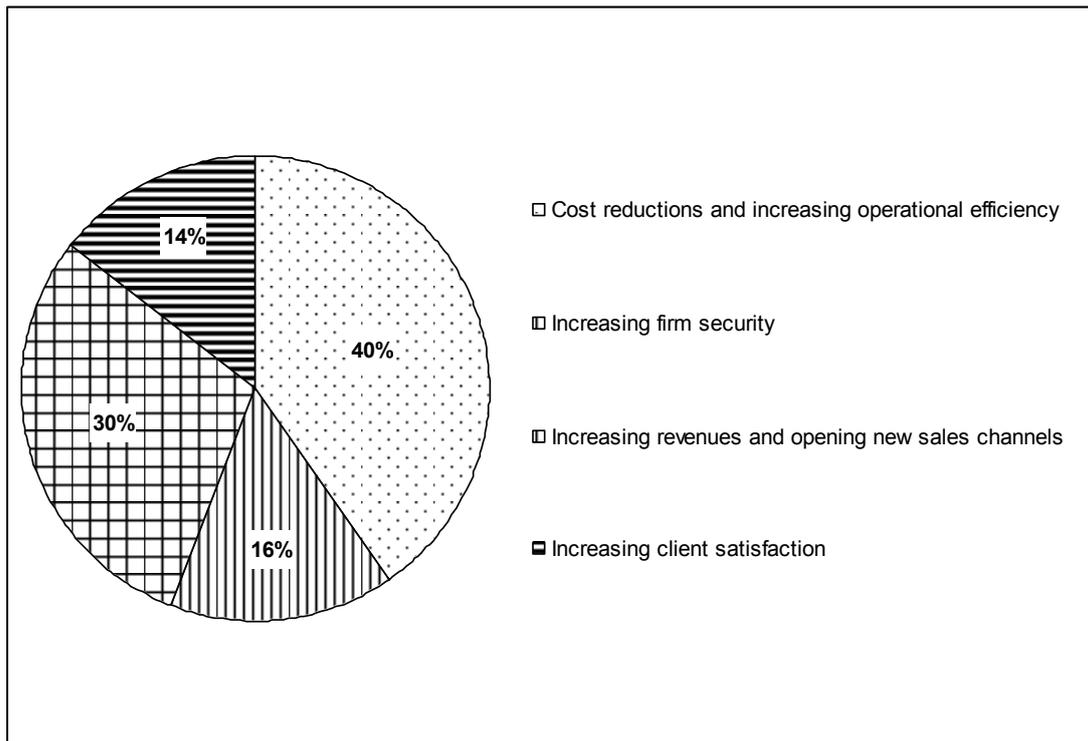
Source: own study based on the conducted research.



**Figure 1.** The biggest challenges facing companies wanting to digitally transform [N = 211]. Source: own study based on the conducted research.

The obtained results indicate the following regularities. According to the respondents, the main challenge facing Polish entrepreneurs are insufficient funds allocated for technological development of the company (42% of the total), while the second challenge is insufficient competences of both the team and the management (30%).

In light of the third question concerning the most common digitization drivers of production and other areas of industry operating in various areas of the economy (respondents could choose maximally two answers), it is clearly noted that cost reduction and increased operational efficiency are dominant (143 indications). Additionally, 30% chose revenue enhancement and the opening up of new markets (105 indications). Less significant reasons for the digitization drive are enhanced company security (55 responses) and increased customer satisfaction (51 responses) (Figure 2.).



**Figure 2.** The most common digitization reasons for production and other industries operating in various economy sectors [N = 211]. Source: own study based on the conducted research.

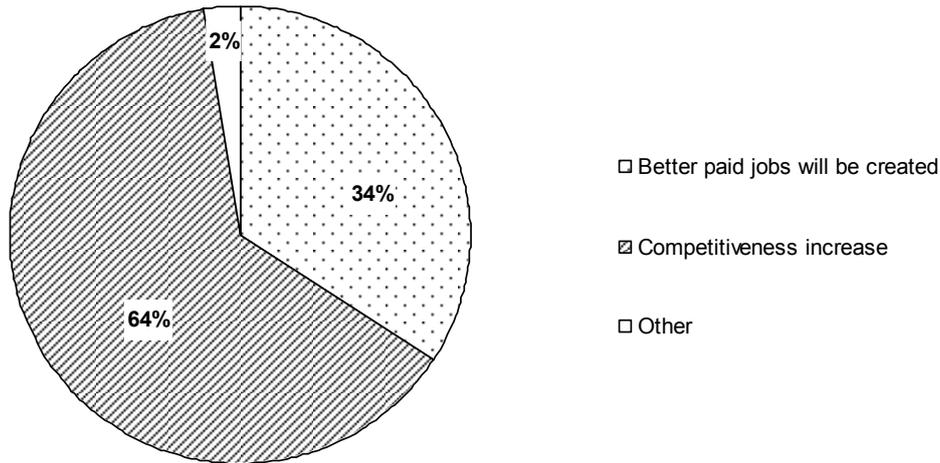
Another question referred to the assessment of digitization impact of industrial processes on national economy competition and increase of better-paid jobs. The assessment of the effect of digitization is presented in the Table 2 and Figure 3.

**Table 2.**

*Impact of digitization of industrial processes on the competitiveness of the national economy and growth in better-paid positions [N = 208]*

Factor	Number of readings	%
Better paid jobs will be created	71	34.1
Competitiveness increase	132	63.5
Other	5	2.4

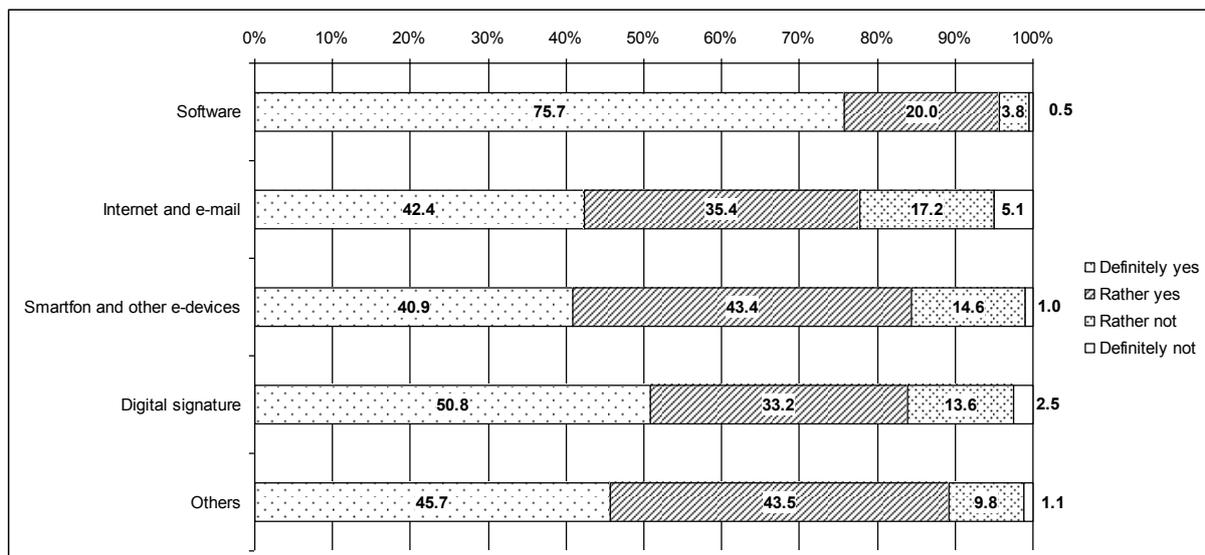
Source: own study based on the conducted research.



**Figure 3.** Impact of digitization of industrial processes on the competitiveness of the national economy and growth in better-paid positions [N = 208]. Source: own study based on the conducted research.

The obtained results clearly indicate that digitization of industrial processes in the opinion of respondents mainly determines the increase in national economy competitiveness (63.5% of all responses). In the opinion of every third respondent, digitization contributes to creation of better-paid jobs. Other response choices were not analyzed due to irrelevant interest in the application process.

The issue of the need to conduct training in the use of digital technology in the country is another problem aspect on which assessments of research participants focused. In order to determine the most important types of training, results obtained in research were summarized according to answers definitely and rather yes. They are presented in a Figure 4.



**Figure 4.** Types of training according to the importance of their impact on the use of digital technologies [N = 210]. Source: own study based on the conducted research.

Accordingly, the trainings having the greatest impact on the use of digital technologies. These include: trainings in the area of introduced technology software, smartphones and other e-devices that will become the main determinants of digital development, including digital signature.

### 3. Conclusions

The problem areas considered in research focusing on the digitization process are universal and known to the research participants, regardless of gender (Suter, 2019). The dynamic development and dissemination of new technologies should be noted, and this serves both as a facilitation and challenge for every user (Tüzemen, 2013; Michaels et al., 2014). Changing software and the emergence of newer ICT devices drive the need for skills that will allow users to properly use them (Batorski, 2012). In this context, on the basis of the results, the need for lifelong learning is evident (Weller, and Woodcock, 2013; Jasiewicz, 2012). In the opinion of respondents, certain indicated actions should be considered as priority. It is worth noting that the level and type of response was similar to that in strategic European and national development documents such as the "White Paper on the Future of Europe" (European Commission, 2017) and "Time to speed up. Digitization of the Polish economy" (Arak, and Bobiński, 2016).

In the face of globalization, all agree that it is necessary to increase company competitiveness. The keys to increasing this, are innovation and the use of new technologies – and their mastery will ultimately determine the creation of better-paid work. In this context, it is worth noting that the digitization process, in the opinion of research participants, mainly affects the reduction of production and services costs, and thus increases operational efficiency. Hence, it seems that it would be an important for companies and institutions to ascertain how far it is possible to operate in the current model, and how the model is vulnerable to global competition-shaped digitization process.

To sum up, digital transformation is a significant challenge for the labor market and education (Wyckoff et al. 2017; Sorbe et al. 2018). The development of the information society, which is a new phase in the development of civilization, is a challenge and is an important element in creating a modern economy based on innovation and advanced technologies wherein intellectual capital is the most important (Głąb, 2016; OECD, 2019).

## References

1. Arak, P., Bobiński, A. (2016). Czas na przyspieszenie – *Cyfryzacja gospodarki Polski, Polityka Insight RESEARCH*. Warszawa. <https://zasoby.politykainsight.pl/polityka-insight.pl/public/Czas-na-przyspieszenie--Cyfryzacja-gospodarki-Polski.pdf>, 30.05.2019.
2. Babbie, E. (2005). *Social research in practice*. Warszawa: PWN.
3. Batorski, D. (2012). *Cyfrowa gospodarka. Kluczowe trendy rewolucji cyfrowej*. Warszawa: MGG Conferences.
4. Batorski, D., Marody, M., Nowak, A. (2006). *Spoleczna przestrzeń internetu*. Warszawa: Academica.
5. Bradley, J., Loucks, J., Macaulay, J., Noronha, A., Wade, M. (2015). *Digital Vortex: How Digital Disruption is Redefining Industries, Global Center for Digital Business Transformation*. [http://global-center-digital-business-transformation.imd.org/globalassets/digital\\_vortex\\_full-reportv2.pdf](http://global-center-digital-business-transformation.imd.org/globalassets/digital_vortex_full-reportv2.pdf), 22.05.2019.
6. Dachs, B. (2018). *The impact of new technologies on the labour market and the social economy*. Brussels: European Parliament.
7. European Commission (2017). *Biała Księga w Sprawie Przyszłości Europy*, COM(2017) 2025, 1 March 2017, Brussels
8. Głąb, K. (2016). *Kompetencje przyszłości w czasach cyfrowej dysrupcji*. Warszawa: Fundacja Naukowa Evidence Institute.
9. Górniak, J. (2015). *Polski rynek pracy – wyzwania i kierunki działań na podstawie badań Bilans Kapitału Ludzkiego 2010-2015*. Warszawa-Kraków.
10. Hetmańczyk, P. (2019). *Cyfryzacja i jej wpływ na rynek pracy i edukację. Wybrane aspekty*. <http://www.kadra.org.pl/wp-content/uploads/2019/06/Cyfryzacja>, 28.10.2019.
11. Jasiewicz, J. (2012). *Przygotowanie do pracy w środowisku informacyjnym*. Warszawa: MGG Conferences.
12. Leicht, A., Heiss, J., Byun, W.J. (2018). *Issues and trends in Education for Sustainable Development*. Paris: UNESCO.
13. Martinet, M., Raymond, D., Gauthier, C. (2001). *Teacher Training. Orientation and professional competencies*. Quebec: Ministère de l'Éducation.
14. Michaels, G., Natraj, A., Van Reenen, J. (2014). Has ICT polarised skill demand? Evidence from eleven countries over twenty-five years. *Review of Economics and Statistics*, 96, 1, 60-77.
15. OECD (2019). *Preparing for the Changing Nature of Work in the Digital Era*. Paris: OECD.
16. Probst, L., Pedersen, B., Bohn, N., Verzijl, D. (2018). *Skills for Smart Industrial Specialisation and Digital Transformation*. Luxembourg: European Commission.

17. Sorbe, S., Gal, P., Millot, V. (2018). Can productivity still grow in service-based economies? Literature overview and preliminary evidence from OECD countries. *OECD Economics Department Working Papers, 1531*. Paris: OECD Publishing.
18. Suter, J. (2019). *Behavioural study on the digitalisation of the marketing and distance selling of retail financial services*. Brussels: European Commission.
19. Tüzemen, D., Willis, J. (2013). *The vanishing middle: job polarization and workers' response to the decline in middle-skill jobs*. Kansas City: Federal Reserve Bank.
20. Wei, J., Sanborn, S., Slaughter, A. (2019). *Digital Innovation. Creating the utility of the future*. San Francisco: Deloitte Development.
21. Weller, D., Woodcock, B. (2013). Internet Traffic Exchange: Market Developments and Policy Challenges. *OECD Digital Economy Papers, 207*. Paris: OECD Publishing.
22. Wyckoff, A., Pilat, D. (2017). *Key Issues for Digital Transformation in the G20*. Berlin: OECD.