

## VARIA

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# POSITIVE AND NEGATIVE EFFECTS OF CARRYING OUT THE PROCESS OF DIGITALIZATION OF THE POLISH ECONOMY AND SOCIETY DURING THE COVID-19 PANDEMIC

## Introduction

J. Pieriegud thinks that the digitization of both the economy and society is one of the most dynamic transformations taking place in our time. On the one hand, this process offers new opportunities in the creation of business models, and on the other hand, it is associated with uncertainty, as well as various risks, related to the social impact of automation of manufacturing processes or widely understood security. The notion of digitization as a continuous process of convergence of the real and virtual worlds is becoming a major component of innovation and change in most sectors of the economy. The main factors influencing the development of the digital economy today include:

- The Internet of Things and the Internet of Everything,
- ubiquitous connectivity,
- applications and services based on cloud computing,
- Big Data analytics and Big Data as a service,
- automation and robotization,
- multi-channel and omnichannel distribution models for products and services<sup>1</sup>.

However, each sector of the economy is prepared differently to implement digital transformation. This article was written to identify both positive and negative changes that are being undertaken in carrying out the digitization of the economy during the COVID-19 pandemic and to identify changes that could be implemented in this direction. The paper was created based on a literature review of the selected topic.

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<sup>1</sup> J. Pieriegud, *Digitization of the economy and society – global, European and national dimension*, in: *Cyfryzacja gospodarki i społeczeństwa – szanse i wyzwania dla sektorów infrastrukturalnych*, ed. J. Gajewski, W. Paprocki, J. Pieriegud, Gdańsk 2016, p. 16.

## **Digitalization as a chance for Poland to dominate the world economy**

J. Pieriegud points out that to increase the strength of the Polish economy and its competitive position, it will be required to counter protectionism or dominance of other economies. Even partial fragmentation of the digital marketplace precludes the opportunity for a transformational leap. In purpose of enabling Polish companies to participate in European and global value chains, it is necessary to:

- use the potential of SOEs by applying digitalization to strengthen key network infrastructure (transport and energy) through smart grid technologies and implementation of horizontal and platform solutions,
- build cooperation and communication platforms for small and medium-sized enterprises, enabling virtualization of production processes, linking them into complex economic organisms to make their production more flexible and build new business models. Such platform should provide access to open machine data (before algorithmization) to provide an environment for further innovation,
- transform the industry towards fourth-generation solutions, which will generate huge volumes of data that will open new opportunities for value creation in both the sectors from which the data originates and neighboring sectors. Creative use of data to create new value chains will create cross-sector synergies and broaden the scope of businesses. It will be decisive to ensure conditions for interoperability of systems and data sets and their free flow, and to reject certifications that favor protectionism of other economies,
- build trust in the digital world by creating appropriate security and value protection standards and a system of incentives and supporting the creation of benefits for participants in digital collaboration platforms<sup>2</sup>.

R. Orłowska states that the development of digitalization increases the competitive advantage of companies. The digitalization process is one of the possibilities to achieve optimization of the processes of entering new markets, as well as expanding existing ones and introducing new and innovative products. This is how digitization has become the most effective tool for managing business processes<sup>3</sup>.

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<sup>2</sup> Ministerstwo Cyfryzacji (2018), *The data economy*, <<https://www.gov.pl/attachment/7cb1aede-e692-40c5-aea3-000fc0ad433d>>, access 20.12.2020.

<sup>3</sup> R. Orłowska, K. Żołądkiewicz, *Barriers of digitalization of micro-, small and medium-sized enterprises (MSMES) in Poland based on the research in Pomeranian Voivodeship*, „Studia Ekonomiczne. Zeszyty Naukowe” 2018, no 372, p. 105.

## Digitization development programs

P. Kokot-Stepień notes that the purpose of creating the program „From Paper to Digital Poland”, which was introduced by the Ministries: Development, Digitalization, Finance, Infrastructure and National Education is to develop e-state and digitalization of the economy. The program assumes that modern e-administration is an essential element for functioning of an efficient state within the concept of sustainable development<sup>4</sup>.

M. Klimek believes that the digital transformation of Poland is improving the functioning as well as the use of public infrastructure. In addition, the state performs its functions more effectively by contributing, among other things, to meeting the conditions necessary for the development of an innovative and competitive economy<sup>5</sup>. Not only citizens but also entrepreneurs benefit from the Program. As a result, it has become much easier and quicker to deal with official matters, and the whole administrative process has become cheaper. Since the Program came into effect, there has also been an increase in tax revenue and a reduction in the shadow economy.

E. Jajeśniak states that blockchain technology provides an opportunity for governments as well as regional authorities to make many improvements. These can include:

- lower operating costs, including reduced fraud and payment errors,
- greater transparency in transactions between government agencies and citizens,
- increase access to financial services for those on the fringes of the financial system,
- lower costs of protecting citizens' data while allowing data to be shared between different entities,
- protection of critical infrastructure<sup>6</sup>.

There are also 9 work streams under the program:

- 1) Digital Public Services Stream – is responsible for supporting the Ministry of Digitalisation in designing new digital public services implementing life events at the 4th and 5th maturity level, optimising the functioning of existing e-services, as well as developing standards and guidelines for building and functioning of digital public services,
- 2) e-reporting Stream – it aims to reduce administrative burdens and improve the use of public information resources, among other things, by unifying

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<sup>4</sup> P. Kokot-Stepień, L. Piersiala, *Analysis of the functioning of Information Technologies in public administration*, „Roczniki Kolegium Analiz Ekonomicznych” 2019, p. 94.

<sup>5</sup> M. Klimek (2017), *Programme „From Paper to Digital Poland” – assumptions and state of implementation*, <<https://pisil.pl/wp-content/uploads/2017/06/M.Klimek-Program-Od-papierowej-do-cyfrowej-Polski.pdf>>, access: 20.12.2020.

<sup>6</sup> E. Jajeśniak (n/a), *Blockchain as a technological revolution and its application by country governments*, <<https://www.lazarski.pl/pl/wydzialy-i-jednostki/instituty/wydzial-ekonomii-i-zarzadzania/centrum-technologiei-blockchain/blockchain-jako-rewolucja-technologiczna-i-jej-zastosowanie-przez-rzady-krajow/>>, access: 02.07.2021.

and integrating the reporting obligations of companies required by public administration. The stream currently operates under two substreams covering financial statements and changes in telecommunications law regarding operator reporting,

- 3) Distributed Registers Stream – is a continuation of a previously running stream of Blockchain/DLT and digital currencies. The stream is working on the implementation and subsequent diffusion of blockchain technology in government and various sectors of the economy. An important priority of the Stream's activities is the preparation of assumptions of state policy in the field of application of distributed/blockchain registry technologies and programming of implementations in this area,
- 4) The e-Transport and e-Flow of Goods Stream – centralizes traffic management and charging systems and streamlines the supply chain through process integration of tax, customs and road administration systems, standardizing transport, and customs data exchange in global supply chains according to the e-Freight Common Framework for ICT requirements and simplifying administrative, customs, port and transport procedures,
- 5) Increase Non-Cash Trade Stream – deals with the implementation of initiatives reducing cash circulation in the economy, inter alia, by introducing a statutory obligation to accept payment with an electronic instrument,
- 6) e-Invoice and e-Paragon Stream – carries out activities aimed at digitalization of the document flow in public procurement and trade through, among others, implementation of B2A and B2B e-invoicing, creation of e-invoicing clusters and incubators, as well as through creation and implementation of an e-paragon system,
- 7) E-education Stream – supports the implementation of a comprehensive strategy of a modern teaching system through the creation and dissemination of IT tools improving the effectiveness of the educational process for children and young people, seniors, and the disabled,
- 8) Artificial Intelligence Stream – includes activities in the field of data economy, research and market financing, education, and ethics and human rights. Its main goal is to implement the „Policy for the Development of Artificial Intelligence in Poland from 2020”,
- 9) The Internet of Things Stream – a newly created stream whose main goal is to remove regulatory barriers to the development of the economy in the field of IoT technologies and introducing regulations to stimulate the market and facilitate business cooperation<sup>7</sup>.

The results of the Digital Progress of Europe report, which was created by the European Statistical Office for 2017, show that in Poland this progress accounted for only 4.1% of GDP<sup>8</sup>. According to PKO Bank Polski, the tourism

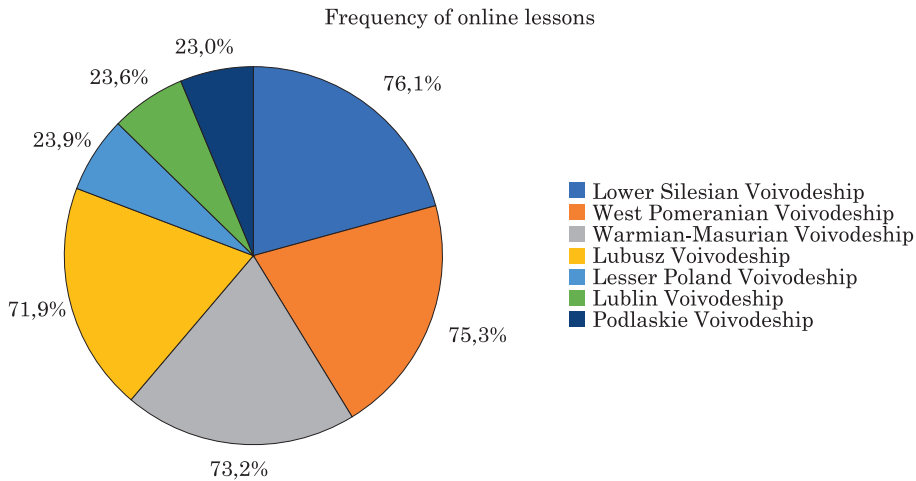
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<sup>7</sup> Cyfryzacja KPRM (n/a), *From paper to digital Poland*, <<https://www.gov.pl/web/cyfryzacja/od-papierowej-do-cyfrowej-polski>>, access: 20.12.2020.

<sup>8</sup> Eurostat (2017), *Europe's digital progress report 2017*, <<http://ec.europa.eu/newsroom/document.cfm?doc-id=44328>>, access: 02.07.2021.

and aviation sectors were the most affected by the COVID-19 pandemic. The reason was the low capacity to convert their business to offer online services<sup>9</sup>.

As part of the digitalization in the field of education, the National Educational Network, a program of public telecommunication network, was introduced, giving schools throughout Poland the opportunity to connect to fast, free, and safe Internet. The program was designed by the Ministry of Digitization, and its assumptions are implemented by the NASK National Research Institute<sup>10</sup>.



**Figure 1.** Frequency of online lessons delivered from the school building in given provinces  
Own source based on: Cyfryzacja KPRM (2021), *OSE helps in remote education*, <<https://www.gov.pl/web/cyfryzacja/ose-pomocne-w-zdalnej-edukacji>>, access: 02.07.2021.

Based on Chart 1, it can be concluded that the most frequently used online lessons from the school building in the Lubuskie Voivodship, Warmian-Masurian Voivodship, West Pomeranian Voivodship and Lower Silesian Voivodship, and least often in the Lesser Poland Voivodship, Lublin Voivodship and Podlaskie Voivodship.

EU support in matters of digitization is an opportunity to transform the state and has great significance for the continued dynamization of the development of both the economy and Polish society, in which digitization is of great importance<sup>11</sup>. According to a report titled Digital Vortex, those most „resistant” to digital transformation include: the oil and gas sector, the pharmaceutical sector, and the utilities sector (power, gas, heat, and water companies)<sup>12</sup>.

<sup>9</sup> Money.pl (2021), *The economy in the post-pandemic era. Who stands to gain and who stands to lose?*, <<https://www.money.pl/gospodarka/gospodarka-w-czasach-postpandemicznych-kto-moze-zyskac-a-kto-stracic-663609067717728a.html>>, access: 02.07.2021.

<sup>10</sup> OSE (n/a), *What is OSE?*, <<https://ose.gov.pl/faq/czym-jest-ose>>, access: 02.07.2021.

<sup>11</sup> L. Koćwin, *Challenges and problems the creation of an information society in Poland*, „Praktyki Komunikacyjne” 2019, p. 110.

<sup>12</sup> J. Pieriegud, *Digitization of the economy and society...*, p. 14.

## The negative effects of digitization on society

The Internet has created growth opportunities for new businesses, professions, and markets. In addition, access to computers and telephones with 24-hour access to Internet resources, completely changes the capabilities of society and the way we communicate and affects human relationships. Due to Internet access, there are new opportunities to purchase goods and services, but also new opportunities to educate young people (e-learning, on-line education, distance-learning). People all over the world benefit from informal education by using the resources of the Web.

The negative effect of such a phenomenon, however, is the difficulty in selecting content and information. Many young people have trouble concentrating, synthesizing, or connecting content into a logical whole. Manfred Spitzer, during a discussion in Germany, said that the growing digitization of society could lead to dementia among people who misuse technology in the process of learning, as well as raising their own children. The book he wrote, entitled „Digital Dementia – How we are depriving ourselves and our children of reason” focuses on criticizing the excessive digitization of the cognitive process, the negative effects of which are felt especially in children and adolescents. In addition, Spitzer was very critical of new media and the new „pseudo-communication” in his book.

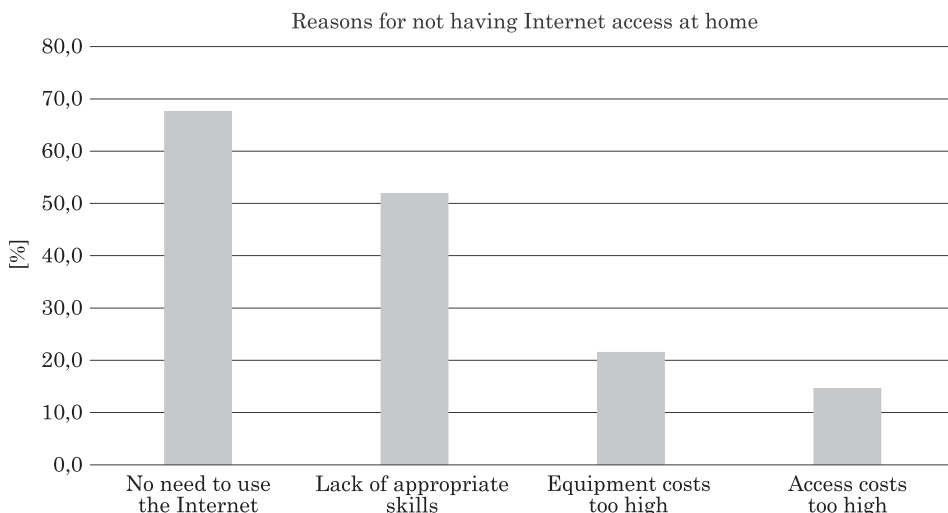
In his work, he emphasized that excessive digitization and technologies have a negative impact on all people, regardless of age, because they limit the brain’s capabilities and the process of remembering. Developing the ability to write with a pen (rather than on a computer) is critical to a child’s proper development. Spitzer believes that excessive computer use has very negative psychosomatic effects because it can lead to addiction, among other things. Referring to the phenomenon of computerization and digitization of society, Putnam points to the problem of unequal access to technology, asymmetry of information and, above all, the fact that children of the poor use the Internet for purposes other than learning. Young people treat access to technology mainly as entertainment and not as a source of knowledge and learning<sup>13</sup>.

In addition, according to CSO data for 2019, 4.51 million Poles have never used the Internet. Among the EU countries, Poland achieved one of the highest rates in this respect, namely 15%<sup>14</sup>.

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<sup>13</sup> M. Grewiński, *Digitalisation and social innovations – perspectives and risks to the society*, „Kwartalnik Nauk o Przedsiębiorstwie” 2018, p. 23–24.

<sup>14</sup> Federacja Konsumentów (2021), *Digital exclusion during a pandemic*, <spoleczenstwo\_informacyjne\_w\_polsce\_w\_2020\_r..pdf>, access: 02.07.2021.



**Figure 2.** Reasons for not having Internet access at home in 2020  
 Own source based on: Federacja Konsumentów, *Digital exclusion during a pandemic* (2021),  
 <spoleczenstwo\_informacyjne\_w\_polsce\_w\_2020\_r..pdf>, access: 02.07.2021.

Based on Figure 2, it can be concluded that the main reason for not having access to the Internet was the lack of need for this opportunity. The least frequent reason was the high cost of accessing this technology.

Based on Table 1. prepared based on data from the Central Statistical Office, it can be deduced that in 2020 the greatest access to the Internet was in cities, while the least access was in households located in rural areas.

**Table 1.** Internet access in households by class of residence in 2020

Specification	Class of place of residence				
	cities together	cities with a population of		village	
A – in absolute numbers		over 100 thousand	up to 100 thousand		
B – in percentage					
Households (people aged 16–74) including households:	A	8 473 898	4 270 783	4 203 115	4 161 354
	B	100,0	100,0	100,0	100,0
– with access to the Internet	A	7 705 938	3 933 872	3 772 066	3 714 294
	B	90,9	92,1	89,7	89,3
– without access to the Internet	A	763 077	334 118	428 959	440 708
	B	9,0	7,8	10,2	10,6
– lack of Information	A	4 884	2 793	2 091	6 353
	B	0,1	0,1	0,0	0,2

Source: GUS (2020), *The use of information and communication technologies in public administration units, enterprises and households in 2020*, access: 02.07.2021.

Another negative effect of the irreversible digitization process is the marginalization of small businesses<sup>15</sup>. In Pomeranian Voivodeship, micro-, small, and medium-sized enterprises have a problem with the implementation of modern information and communication technologies due to the lack of sufficient funds to cover the costs associated with these improvements. Another problem is also the lack of motivation of entrepreneurs to introduce ICT systems.

In addition, interest in enterprise digitization varies by industry. Service sectors are less interested in the technological development of the company, while in manufacturing companies the interest is already higher<sup>16</sup>. Poland is one of the EU countries where the economy is developing dynamically. However, it also has one of the lowest levels of digitization. Polish companies are in a weak position compared to other EU countries. The problem is the low economic potential of these companies, which results in them focusing more on current operations and being reluctant to consider investment opportunities related to the introduction of new technologies. Decisions about workplace changes are mostly made by one person, specifically the business owner, who acts on intuition rather than data analysis. The age of entrepreneurs is also significant. When starting a business, older entrepreneurs did not take advantage of the opportunities offered by digitization. Because of their lack of experience in making these types of changes, they are concerned about the lack of benefits relative to the costs incurred; they believe it is too great a risk.

The reason for small businesses' reluctance to embrace digitalization is also due to their low level of internationalization, so they don't feel the need to make changes to fight the competition. Therefore, the area of operation of these companies is important, which should not be limited to the local market focusing on traditional activities, lack of motivation to invest in new technologies<sup>17</sup>. Businesses in the consumer services sector have been hardest hit by the effects of the pandemic. Construction and business services companies were least affected by the pandemic. One-third of companies have reduced their workforce because of the economic shock. 42.5% are small businesses that are forced to lay off some employees. Among mid-sized companies with 50 to 249 employees, one-quarter have begun or plan to begin layoffs. Such a phenomenon is evidence that the smallest firms feel the greatest shock from a pandemic, while larger firms may be slightly more resilient to short-term shocks. 59.3% of companies cannot manage their cash flow without laying off employees for more than 3 months. Thus, the situation may worsen. Social isolation will also have a negative impact on the Polish economy. An increasing number of companies will start to lose the ability to pay their liabilities. In the consumer sector, the negative effects of the pandemic will be felt the most<sup>18</sup>.

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<sup>15</sup> R. Orłowska, K. Żołądkiewicz, *Barriers of digitalization...*, p. 100.

<sup>16</sup> *Ibidem*, p. 105.

<sup>17</sup> *Ibidem*, p. 106.

<sup>18</sup> *Polish micro, small and medium business in the face of the COVID-19 pandemic. Revenue, Liquidity, and Shock Response*, <<https://www.pwc.pl/pl/pdf/polski-mikro-maly-sredni-biznes-w-obliczu-pandemii.pdf>>, access: 20.12.2020.



## Conclusion

The process of digitization of the Polish economy and society during the COVID-19 pandemic is an extremely important step in the fight against the pandemic. Thanks to the innovative approach of many companies, Poland has a chance to appear on the international market and start introducing more innovative products. The program „From Paper to Digital Poland” aims to develop the innovative approach of the state and will significantly improve the conditions of society. However, the problem is the division of Polish enterprises into smaller and larger ones. The former has been marginalized as a result of lack of financial capacity and lack of knowledge related to the use of the latest technologies. Business owners are also afraid of the new investments during a pandemic, of the fact that they could suffer significant losses. Digitalization has also reached the younger part of Polish society. The problem for school children is not only unequal access to the latest technologies, but also the negative effects of their excessive use. Children’s problems with concentration, synthesis, combining content into a logical whole, as well as difficulties in selecting content and information are among the many consequences of the introduction of digitization in schools. Due to varying degrees of access to modern technology, the government will pursue policies to ensure equal access to technology services. Once the COVID-19 pandemic has subsided, most business sectors will continue to move forward with digitization, as it is associated with, among other things, lower costs for the services that are offered to customers.

## BIBLIOGRAPHY

- Cyfryzacja KPRM (n/a), *From paper to digital Poland*, <<https://www.gov.pl/web/cyfryzacja/od-papierowej-do-cyfrowej-polski>>, access: 20.12.2020.
- Eurostat (2017), *Europe’s digital progress report 2017*, <<http://ec.europa.eu/newsroom/document.cfm?doc-id=44328>>, access 02.07.2021.
- Federacja Konsumentów (2021), *Digital exclusion during a pandemic*, <[spoleczenstwo\\_informacyjne\\_w\\_polsce\\_w\\_2020\\_r.pdf](#)>, access: 02.07.2021.
- Grewiński M., *Digitalization and social innovation – prospects and threats for society*, „Kwartalnik Nauk o Przedsiębiorstwie” 2018, p. 19–29.
- Jajeśniak E. (n/a), *Blockchain as a technological revolution and its application by country governments*, <<https://www.lazarski.pl/pl/wydzialy-i-jednostki/instituty/wydzial-ekonomii-i-zaradzania/centrum-technologii-blockchain/blockchain-jako-rewolucja-technologiczna-i-jej-zastosowanie-przez-rzady-krajow/>>, access: 02.07.2021.
- Klimek M. (2017), *Programme “From Paper to Digital Poland” – assumptions and state of implementation*, <<https://pisil.pl/wp-content/uploads/2017/06/M.Klimek-Program-Od-papierowej-do-cyfrowej-Polski.pdf>>, access: 20.12.2020.
- Koćwin L., *Challenges and problems the creation of an information society in Poland*, „Praktyki Komunikacyjne” 2019, p. 97–123.
- Kokot-Stępień P., Piersiala, L., *Analysis of the functioning of Information Technologies in public administration*, „Roczniki Kolegium Analiz Ekonomicznych” 2019, p. 91–103.
- Ministerstwo Cyfryzacji (2018), *The data economy*, <<https://www.gov.pl/attachment/7cb1aede-e-692-40c5-aea3-000fc0ad433d>>, access: 20.12.2020.

- Money.pl (2021), *The economy in the post-pandemic era. Who stands to gain and who stands to lose?*, <<https://www.money.pl/gospodarka/gospodarka-w-czasach-postpandemicznych-kto-moze-zyskac-a-kto-stracic-6636090677717728a.html>>, access: 02.07.2021.
- Orłowska R., Żołądkiewicz K., *Barriers of digitalization of micro-, small and medium-sized enterprises (MSMES) in Poland based on the research in Pomeranian Voivodeship*, „Studia Ekonomiczne. Zeszyty Naukowe” 2018, nr 372, p. 94–109.
- OSE (n/a), *What is OSE?*, <<https://ose.gov.pl/faq/czym-jest-ose>>, access: 02.07.2021.
- Pieriegud J., *Digitization of the economy and society – global, European and national dimension*, in: *Cyfryzacja gospodarki i społeczeństwa – szanse i wyzwania dla sektorów infrastrukturalnych*, ed. J. Gajewski, W. Paprocki, J. Pieriegud, Gdańsk 2016.

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SUMMARY

The aim of the article is to identify both positive and negative changes that have resulted from the digitization the Polish economy and society during the COVID-19 pandemic. Different sectors of the economy, which differ in their degree of vulnerability to digital transformation, have been analyzed in detail. The main research question is to evaluate the changes, both positive and negative, that have occurred in the economy. One of the positive effects of innovation is greater quality of work, better production outcomes, and overall economic growth. The phenomenon of introducing new technologies may become a stimulus to include Poland among the most digitally developed economies within Europe. Digitalization can also be an opportunity to dominate the global economy, but the whole process mainly concerns only large companies, because only they have the financial capacity to make changes. Small businesses are now said to be marginalized and run on traditional principles. In addition, the digitization process during the COVID-19 pandemic affects all members of society, including children in schools, which can also be a problem due to the insufficient financial capacity of many parents in Poland.

**KEY WORDS:** digitization of the economy, COVID-19 pandemic, new technologies, economic sectors