

## DIGITAL TRANSFORMATION AS A CHALLENGE FOR SMES IN POLAND IN THE CONTEXT OF CRISIS RELATING TO COVID-19 PANDEMIC

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**Purpose:** This article is devoted to identifying major problems and obstacles to the digital transformation of SMEs in Poland in the context of the Covid crisis and to indicating directions and methods to improve the digitisation level in the SME sector.

**Design/methodology/approach:** This article seeks to answer the question of what the SME digitisation level in Poland is, what the main obstacles hampering the digital transformation process are and how they can be removed. The following research methods were used: reference works review, analysis of secondary sources (reports from OECD, the World Bank, the European Commission, the Polish Agency for Enterprise Development (PARP), Statistics Poland) and deductive reasoning.

**Findings:** The digitisation level of SMEs in Poland is relatively low and the main obstacles to accelerating the digital transformation include the financial and competence limitations which can be removed only with institutional support.

**Practical implications:** This article mentions methods and directions of measures initiated by the government and other institutions to reduce obstacles to SME digital transformation in Poland.

**Originality/value:** The article has informative values as it contributes to the development of knowledge on the impact of the Covid-related crisis on the speed of the digital transformation in the SME sector in Poland and in other countries worldwide.

**Keywords:** digital transformation, SME, COVID-19 crisis.

**Category of the paper:** Conceptual paper.

## 1. Introduction

For several decades, the sector of Small and Medium-sized Enterprises (SME) has been the key component of the Polish economy. In the company structure by size, small and medium-sized enterprises make 99.8% of all enterprises (with 97.0% of microenterprises, 2.2% of small enterprises and 0.7% are medium-sized ones). The predominant areas of SME activity include services (52.5%), commerce (22.4%), construction (14.9%) and industrial production (10.1%). This sector employs 6.75 million people (67.4% of all enterprise workers) and generates close to 50% of GDP (Raport o stanie małych i średnich przedsiębiorstw w Polsce, 2021).

The technical development and the development of Industry 4.0 make the enterprises implement cutting-edge technology and digital tools more and more often, thus reducing the cost of their operations, improving economic and financial results and achieving many other benefits (Kuusisto, 2017; Dalenogare et al., 2018; Bai et al., 2020). This refers mostly to large enterprises which possess suitable investment, organisational and HR capacities. For SMEs, the digital transformation is a serious challenge, though it is necessary to maintain their position on the contemporary market as it offers opportunities for improving efficiency and competitive advantage (Ulas, 2019; Chan et al., 2018; Li et al., 2017). It is of particular importance in the face of the crisis caused by Covid-19 pandemic which struck the SME sector most (Kala'lembang, 2021; Khai et al., 2021). On the other hand, however, the circumstances and restrictions caused by the pandemic forced the companies to change their operating mode, rebuild business models (teleworking, online transactions) and improve the digital transformation pace (Priyono et al., 2020; Klein & Todesco, 2021).

Considering the SME sector significance for the Polish economy and the need of its digital transformation, this article is aimed at identifying the major problems of and barriers to the digital transformation of enterprises in that sector in Poland in the context of crisis caused by the Covid-19 pandemic and indicating directions and methods to improve the related situation. To meet that objective, the article poses the following research questions:

1. What was the SME digitisation level in Poland before the pandemic?
2. What was the pandemic impact on the SME sector digitisation level?
3. What are the obstacles to the digital transformation of SMEs in Poland and abroad?
4. What should be done to support SMEs in the implementation of cutting-edge technology and digital solutions?

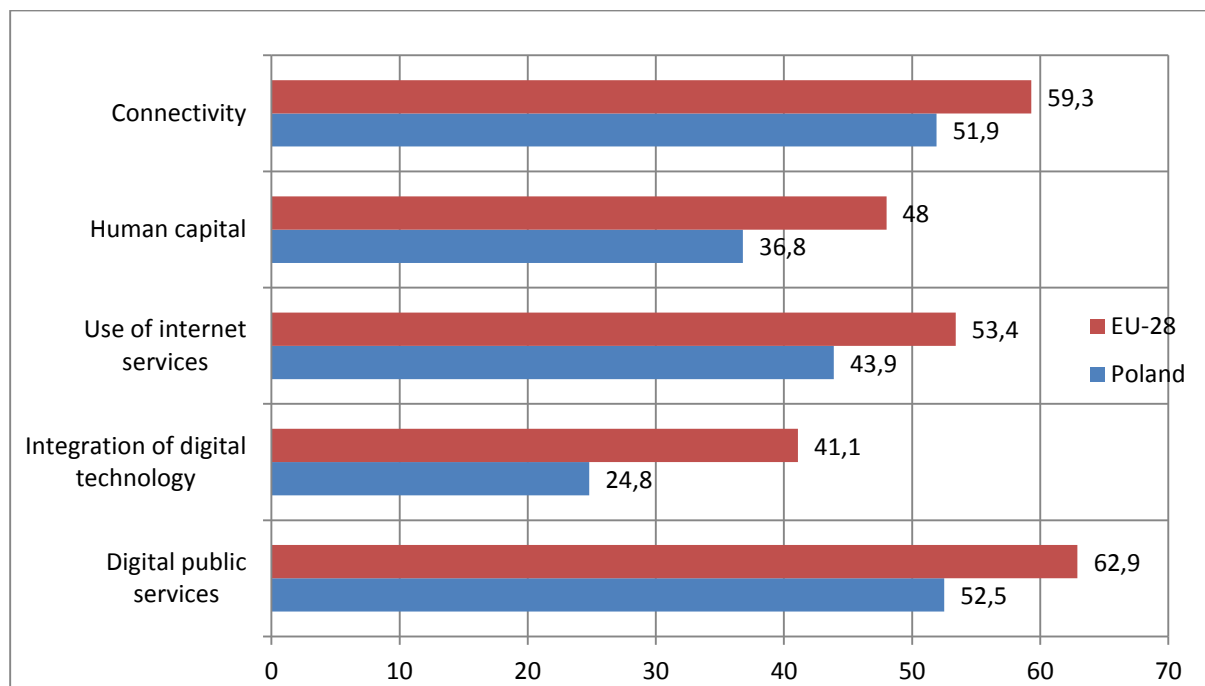
The following research methods were used: reference works review, analysis of secondary sources (reports from OECD, the World Bank, the European Commission, the Polish Agency for Enterprise Development (PARP), Statistics Poland) and deductive reasoning.

The structure of this article, subordinated to fulfilling the major objective, comprises the following sections. Section 2 describes the level of Polish SMEs' digitisation before the Covid-19 pandemic. In section 3, the pandemic impact on the digital transformation pace in

small and medium-sized enterprises was discussed. Section 4 presents the major obstacles to the digital transformation of SMEs in Poland and abroad. In section 5, the directions and methods used to support small and medium-sized enterprises when implementing the digital technology and solutions are named. Section 6 contains the conclusions.

## 2. Level of the Polish SMEs' digitisation before the pandemic

The digitisation level of Polish companies, in particular the ones in the SME sector, as assessed using DESI, was relatively low when compared to other EU states and has remained low. DESI Poland for 2019 was 41.6, while in the EU it was 52.5, giving Poland 25<sup>th</sup> position in the ranking of 28 EU states. The largest difference was recorded in the following subindices: Integration of digital technology and Human capital, while the lowest in the Connectivity and Use of internet services (Fig. 1).

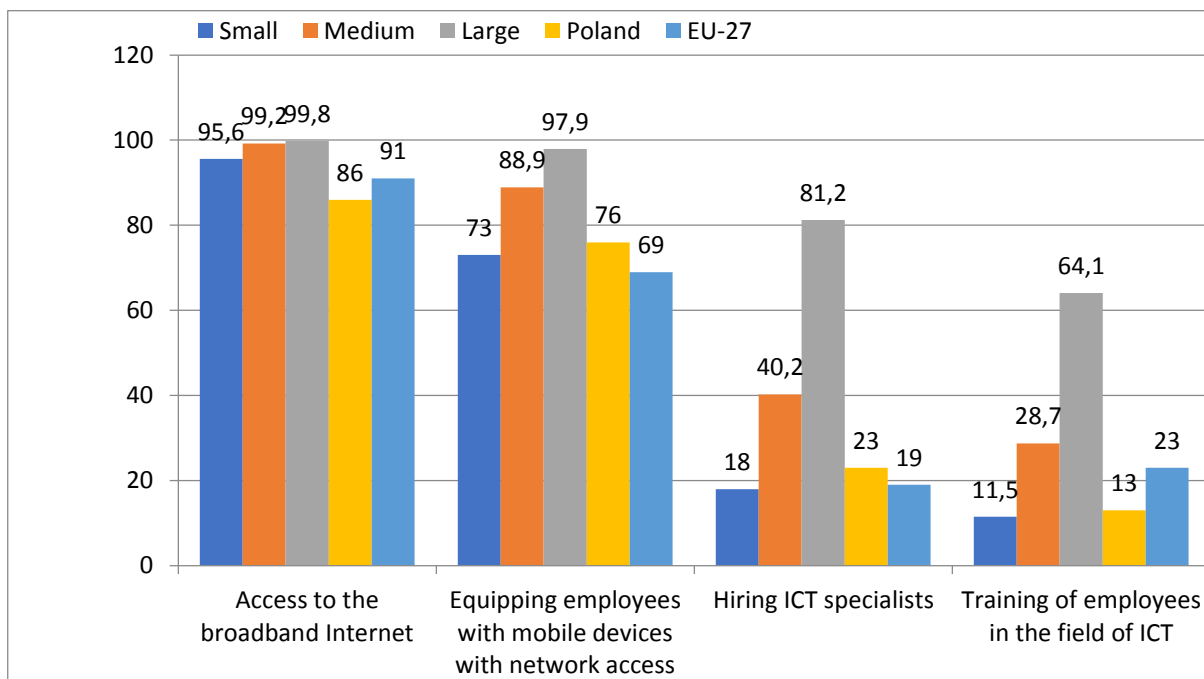


**Figure 1.** DESI subindices in 2019 (Poland and EU average). Source: Poland in the Digital Economy and Society Index. European Commission. <https://digital-strategy.ec.europa.eu/en/policies/desi-poland>.

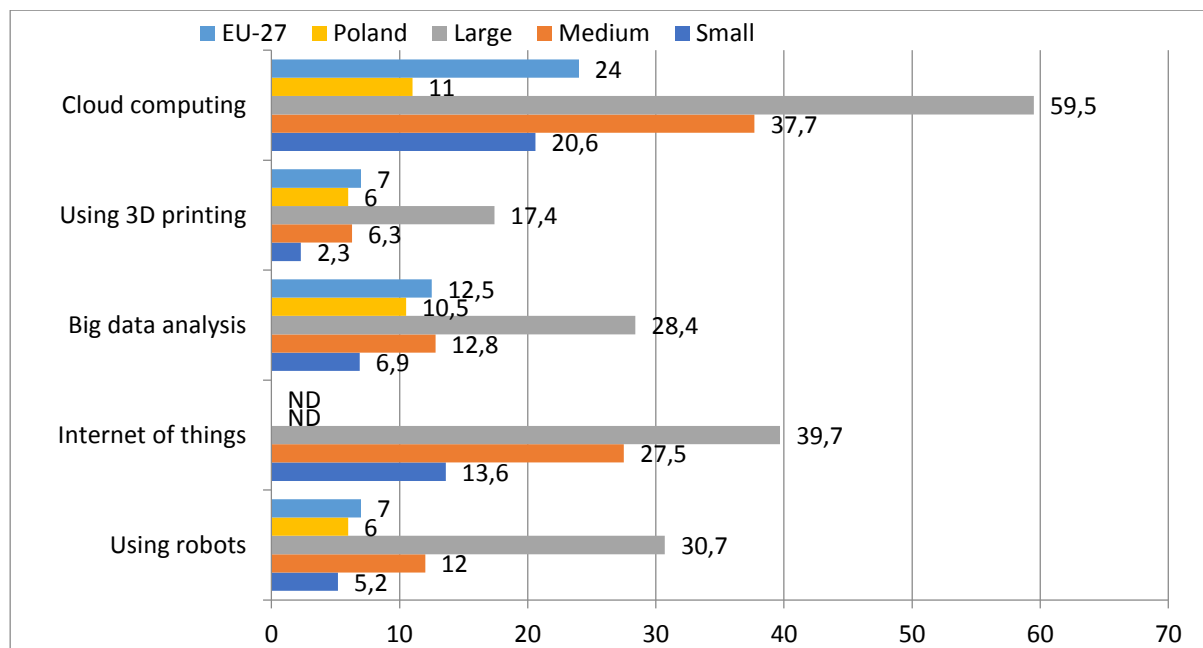
The enterprise digitisation level is indicated mostly by the Integration of digital technology subindex which was 16.3 percentage points lower than the EU average in 2019. Only 12% of SMEs sold online (the EU average was 17%), only 4% of SMES sold online abroad (the EU average was 8%) and the online sale was 7% of the enterprises' turnover (the EU average is 10%).

A similar assessment of the Polish SME digitisation level is provided by the data collected by Statistics Poland (Fig. 2 and 3). As shown in Fig. 2, small and medium-sized enterprises in Poland have access to broadband Internet and their employees are mostly equipped with mobile devices with access to the Internet. The situation is much worse in terms of ICT specialists' employment (40.2% of medium-sized enterprises and 18% of small ones employs them) and in terms of organising training for employees in that respect (the training was organised in 28.7% of medium-sized enterprises and 11.5% of small ones).

When it comes to using cutting-edge technology of Industry 4.0 by Polish SMEs, for large companies the highest difference referred to the cloud computing, using robots and big data analysis (Fig. 3).



**Figure 2.** Access to the Internet and mobile devices of SMEs in Poland in 2019. Source: Own work based on: Information society in Poland in 2020 Statistics Poland and the Statistical Office in Szczecin. Warsaw, Szczecin 2020; Report on the Condition of Small and Medium-Sized Enterprises in Poland, 2021. PARP; DESI, 2021. European Commission. <https://digital-strategy.ec.europa.eu/en/policies/desi>.



**Figure 3.** The use of 4.0 technology by Polish enterprises in 2019. Source: Own work based on: Information society in Poland in 2020 Statistics Poland and the Statistical Office in Szczecin. Warsaw, Szczecin 2020; Report on the Condition of Small and Medium-Sized Enterprises in Poland, 2021. PARP; DESI, 2021. European Commission. <https://digital-strategy.ec.europa.eu/en/policies/desi>.

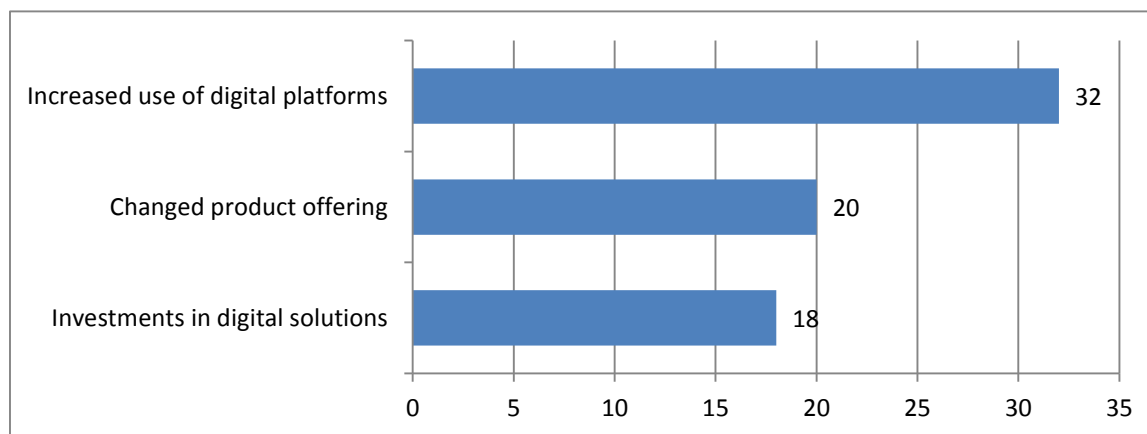
Small and medium-sized enterprises carry out online sale only to a limited degree. In 2019, fewer than 1/4<sup>th</sup> of medium-sized enterprises and ca. 15% of small ones processed orders using the Internet (websites, mobile applications or e-commerce platforms) and even fewer SMEs (below 10%) offered chat, chatbot or voicebot services to their customers (Information Society in Poland in 2020, 2020, pp. 94-95).

### 3. Covid-19 crisis and the pace of digital SME transformation

Lockdowns, obligatory social distancing and other restrictions caused by the Covid-19 pandemic forced companies in many sectors to change their business models and to run their activity remotely to stay on the market and overcome delivery chain disturbances (Sonobe et al., 2021; Klein & Todesco, 2021; Bai et al., 2021). Consequently, it was necessary to accelerate the digital transformation both in large enterprises and in the small and medium-sized ones. According to the global studies, most (ca. 70%) of SMEs intensified using cutting-edge digital technology due to the pandemic (OECD, 2020a). In the United Kingdom, 75% SMEs changed to teleworking and ca. 30% invested in cutting-edge digital tools (Riom & Valero, 2020). More than 72% of small online companies in Canada decided that e-commerce was necessary to succeed in today's conditions (Paypal, 2020). What is more, more than a half of SMEs in Brazil appreciate the digitisation advantages in the form of increased customer acquisition efficiency and improved customer relations (Zdnet, 2020).

Similar changes were recorded in the Polish SME sector as well. According to the data collected by Statistics Poland, more than 1/3<sup>rd</sup> of Polish enterprises (35.5%) increased the use of ICT in 2020 in connection with the pandemic, including 90.7% of large enterprises, 62.4% medium-sized ones and 28.4% of small ones (The Use of Information and Communication Technology in Public Administration Bodies, Enterprises and Households in 2021).

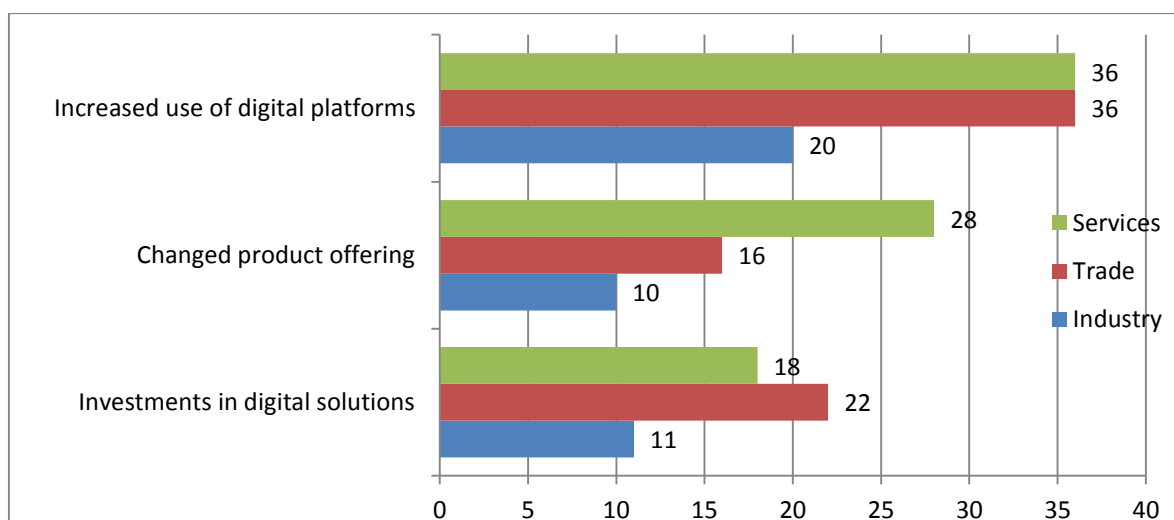
According to the report by the Polish Agency for Enterprise Development (PARP) called “COVID-19 Business Pulse Survey – Polska” concerning the studies in 2020<sup>1</sup>, starting from the pandemic beginning, close to 32% of SMEs increased the use of digital platforms, 18% of enterprises invested in cutting-edge digital solutions (purchase of new hardware or software) and, thanks to digitisation, 20% of enterprises updated and modernised their product and service offering (Fig. 4).



**Figure 4.** Digital tool use as a result of Covid-19 by SMEs in Poland in 2020 (enterprise number in %). Source: Covid-19 Impact on SME Digitisation in Poland, 2020. <https://ictmarketexperts.com/aktualnosci/wplyw-covid-19-na-cyfryzacje-msp-w-polsce/>.

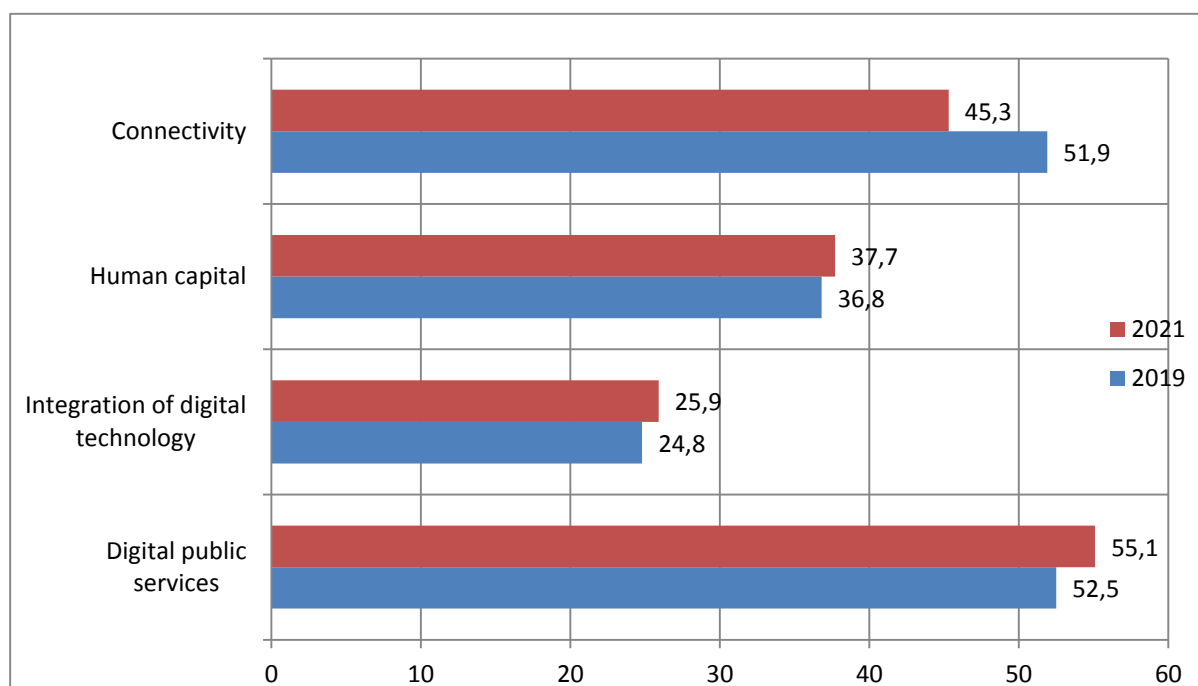
The digital tool use by SMEs was diversified by sectors (Fig. 5). The higher use of digital platforms was recorded mostly for commercial (36%) and service companies (36%). Also, most commercial (22%) and service companies (18%) decided to invest in digital solutions. The offering was adjusted by the highest number of service companies (28%). All the changes took place in the manufacturing enterprises to the smallest degree.

<sup>1</sup> The study was carried out by the World Bank and the Polish Agency for Enterprise Development between May and July 2020 based on the sample of 1.4 thousand enterprises.



**Figure 5.** Digital tool use as a result of Covid-19 by SMEs in Poland in 2020 (by sectors, in %). Source: Covid-19 Impact on SME Digitisation in Poland, 2020. <https://ictmarketexperts.com/aktualnosci/wplyw-covid-19-na-cyfryzacje-msp-w-polsce/>.

When it comes to DESI for 2021, it was 41.0, while in the EU it was 50.7, giving Poland 24<sup>th</sup> place among 27 EU states. Although Poland improved numerous indices in 2020 (Fig. 6), it did not translate into changing its place in the ranking (DESI, 2021), considering the progress of other EU states.



**Figure 6.** DESI subindices for Poland in 2019 and 2021. Source: Poland in the Digital Economy and Society Index. European Commission. <https://digital-strategy.ec.europa.eu/en/policies/desi-poland>.

The ICT integration index grew from 24.8 in 2019 to 25.9 in 2021, but it remained lower than the EU average of 37.6. Slightly more than one half (52%) of Polish small and medium-sized enterprises reached at least the basic level of the ICT use index, while the EU average was 60%. Only 13% of Polish SMEs offered online sale and just 5% trans-boundary sale to other EU states (DESI, 2021).

Introducing cutting-edge technology and accelerating digital transformation in SME sector has remained a significant challenge due to numerous obstacles which are difficult to overcome alone with no external support.

#### **4. Obstacles to digital transformation in SME sector**

Reference works have indicated for years that small and medium-sized enterprises should implement cutting-edge information and communication technology more broadly and use e-marketing tools to meet the challenge of Industry 4.0 era and the growing competition (Stockdale & Standing, 2004; Gilmore et al., 2007; Harrigan et al., 2011). Using new digital tools generates numerous measurable benefits, including increased sale (Kumar et al., 2017; Bill et al., 2020), cost reduction (Odoom et al., 2017), improved financial results (Cenamor et al., 2019) and improved innovation and competitive advantage level (Nobre & Silva, 2014; Itani et al., 2017). However, SMEs do not use the full potential of the cutting-edge solutions due to numerous obstacles and limitations. The following obstacles are mentioned most often irrespective of the country and sector (Styvén and Wallström, 2019; Cenamor et al., 2019; Yaseen et al., 2019; Peter & Vecchia, 2020; Coman et al., 2020; Civelek et al., 2020; Chen et al., 2021):

- shortage of funds,
- excessive investment risk and difficulties measuring the ROI,
- insufficient expertise,
- insufficient competences of employees,
- no access to the infrastructure and technical obstacles,
- cybersecurity concerns.

In the OECD report concerning SME digitisation, the following long-term structural obstacles are mentioned (OECD, 2021):

- competence gap preventing managers and employees from identifying digital solution needs and adapting business processes and models,
- financial gap reducing availability of funds for implementing cutting-edge digital technology,
- infrastructure gap concerning insufficient access to fast broadband connections.

It is popularly believed that overcoming larger obstacles, in particular in the context of the pandemic-related crisis, will not be possible without the institutional support of the government, local governments, international institutions and inter-organisation cooperation (Amuda, 2020; Khai et al., 2021; Ssenyonga, 2021; Adam & Alarifi, 2021; Masouras et al., 2021). European SMEs expect broad state aid, starting from employee training, through counselling and mentoring, and ending with tax reliefs and direct financial support from the government or EU (Rupeika-Apoka et al., 2022).



## 5. Possible activities accelerating digital transformation in SME and their directions

Accelerating the digital transformation in the SME sector becomes a prerequisite for SME survival and development, especially following the crisis caused by the pandemic (Guo et al., 2020). Many authors stress that the cutting-edge digital technology and solutions are the only opportunity for the sector to improve its efficiency, innovation and competitive advantage on the modern markets (Fitriasari, 2020; Kala'lembang, 2021). This is also confirmed by the results of studies conducted in this area. The studies carried out by Scuotto et al. (2021) using the sample of 2 million of European SMEs revealed that the development of that sector in the digital transformation era requires the employees to hold relevant digital competences in the area of information, communication and software.

Given the barriers and obstacles discussed above, it will not be possible to meet the objective and challenge if there is no support offered by the government and local government bodies/authorities and there is no cooperation of other institutions or organisations. Chen et al. (2021) pointed to four directions of government support for the digital transformation in small service enterprises, including building a digital platform dedicated to small service enterprises, promoting mobile/digital payments, co-organising digital training and building an ecosystem of digital cooperation.

According to OECD, governments can support the digital transformation of SMEs in different ways presented in table 1.

**Table 1.**

*Directions of government support for the digital transformation of SMEs*

Support direction	Activity types
Increasing the internal potential of the enterprise	<ul style="list-style-type: none"> <li>• Providing financial support (consultation vouchers, grants) and technology support (diagnosis, self-assessment tools, e-business tools, guidelines, educational materials);</li> <li>• Encouraging to undergo training and improve qualifications (e.g. fiscal incentives, donations, promoting training in the workplace, coaching programmes etc.);</li> <li>• Building data culture by increasing the awareness and skills relating to data management and protection (e.g. by information distribution, financial or technical support);</li> <li>• Improving the digital security level (awareness campaigns, providing tools, audit, assurance framework, protocols and systems of certification as well as training opportunities);</li> </ul>
Facilitating access to strategic resources	<ul style="list-style-type: none"> <li>• Promoting the use of new technology (including e.g. blockchain and artificial intelligence) to reduce transaction costs on financial markets and also to use mobile banking or alternative data to assess credit risk;</li> <li>• Encouraging business innovation in the area of cybersecurity, blockchain, AI etc. (e.g. grants for research and studies, public procurements, tax incentives, demand regulations, competence centres, public-private partnerships etc.);</li> <li>• Connecting SMEs with the knowledge networks by means of the schemes of cooperation with large enterprises, public procurements or network interfaces (e.g. digital innovation hubs, excellence centres, clusters and co-working spaces);</li> <li>• Providing access to data and technology via test stations and experimental laboratories, data centres, digital innovation hubs, university transfer offices, co-creation platforms etc.</li> </ul>

Cont. table 1.

Creating a suitable business environment	<ul style="list-style-type: none"> <li>• Creating supportive regulatory framework (standardisation and improvement of regulations on business secrets, intellectual property, data protection, cybersecurity etc.);</li> <li>• Promoting e-administration and e-services using one-stop shops and digital portals;</li> <li>• Introducing high-quality digital infrastructure using the infrastructure development plans and roadmaps (e.g. fast broadband connections and connection of remote areas).</li> </ul>
Promoting general institutional approach	<ul style="list-style-type: none"> <li>• Development of long-term strategic frameworks, national strategies and action plans and coordination of investments and activities in all areas;</li> <li>• Creating bodies and structures to coordinate the support policy in such areas as AI or blockchain;</li> <li>• Creating multi-enterprise consulting and counselling groups to promote ethical and responsible digitisation policies.</li> </ul>

Source: Own work based on: OECD, 2021. The Digital Transformation of SMEs. OECD Studies on SMEs and Entrepreneurship. OECD Publishing, Paris. <https://doi.org/10.1787/bdb9256a-en>.

In Poland, the entity responsible for the digital transformation process is the Ministry of Digital Affairs with the Council for Digital Affairs. Its tasks comprise e.g. the development and recommendation of solutions concerning the systemic support for the digital transformation. In the framework of the Polish government's activities, the active role of the state is ascribed to five areas, including science, finance, cybersecurity, economy and administration. Generally speaking, the recommended activities refer to all enterprises, but some of them are particularly applicable to SMEs.

The areas of state activity relating to the digital transformation, including the recommended activities for the small business, are presented in Table 2.

**Table 2.**

*Recommendations concerning digital solutions to support the digital transformation of SMEs in Poland*

Area – characteristics	Recommended activities for the SME sector
SCIENCE – science, education and research are required for effective digital transformation and are an innovation driver	<ol style="list-style-type: none"> <li>1) Minimising the deficits in the so-called digital gap and the digital competence development by a general access and incentives for SME entrepreneurs to participate in education;</li> <li>2) Using the research potential of universities when cooperating with SME entrepreneurs – increasing the practical activity criterion in the parameter-based assessment of universities, e.g. cooperation with SME.</li> </ol>
FINANCE – broader access to funds for innovative small and medium-sized enterprises (SME) in particular funding schemes	<ol style="list-style-type: none"> <li>1) Promoting commercial loans, loan and guarantee funds as a prospective external source of funds for the digital transformation in the SME sector;</li> <li>2) Creating digital innovation hubs supporting the development of start-ups and SMEs in IT and cybersecurity areas (it would be also a <i>one-stop-shop</i> offer for external stakeholders for building trust in young, innovative enterprises without any consolidated market position).</li> </ol>
CYBERSECURITY – creating the suitable regulatory environment and infrastructure to guarantee highest cybersecurity standards	<ol style="list-style-type: none"> <li>1) Creating an organisation to certify companies, products and services relating to cybersecurity on the public administration level which would enable to reduce the time required to approve new technology and bring it to the market;</li> <li>2) Establishing a central path for buying certified cybersecurity solutions for the public sector, resembling the UK <i>Cyber Security Services 2</i>, would facilitate access of the Polish SMEs to public procurements.</li> </ol>

Cont. table 2.

ECONOMY – ensuring social cohesion and development balanced in terms of territory	<ol style="list-style-type: none"> <li>1) Building and developing the dialogue of the administrative structures with start-ups to facilitate their debut and rapid market entry.</li> <li>2) Developing the tax relief system for SMEs investing in training, professional development of employees and cooperation with universities to accelerate and implement innovation which should result in feedback, thanks to which SMEs will invest in professional improvement and, all the same, feed the adult education system.</li> </ol>
ADMINISTRATION – providing high-quality services for citizens (including SMEs) by using cutting-edge ICT solutions and a logical and consistent IT system of the state	<ol style="list-style-type: none"> <li>1) Creating a number of institutions to promote development, including the ones supporting SME digitisation (when establishing the regulatory framework, particular stress should be placed on the digital agenda and also work on data standardisation and interoperability).</li> </ol>

Source: Own work based on: Systemic support for the digital economic transformation. <https://www.gov.pl/web/cyfryzacja/systemowe-wsparcie-dla-cyfrowej-transformacji-gospodarki-z-komponentem-security-by-design>.

Based on the presented activities recommended by the Polish authorities to support the digital transformation of the SME sector, it can be inferred that they are convergent with the support directions advocated by OECD. However, they are general. The pandemic period changed the conditions of the economic entities' activity and society's life, accelerating the transformations relating to digitising business activity, including the small business one. This was followed by the support for SMEs. The presented areas and activities within them are of a systemic nature and hence not all of them could be adapted to the new conditions. The areas where the steps were taken have been science and finance.

In the SCIENCE area, the government activities were related to training and counselling to minimise the pandemic effects. The government aid entailed co-funding the educational and counselling offering. The proposals addressed to small and medium-sized enterprises covered e.g. counselling relating to changing the company operation model, including changing the sector, using remote solutions, safe teleworking rule, innovative crisis solutions, network administration (for LAN and WAN), creation and development of cloud solutions, server virtualisation, using online marketing tools and more (<https://www.parp.gov.pl/component/grants/grants/kompetencje-dla-sektorow-covid>).

In the FINANCE sector, the government proposals are related to the financial support to mitigate the effects of COVID-19 and minimise economic and social risks caused by the pandemic by means of the digital transformation of the economy. An example of this scheme is digitisation vouchers for buying programming services and/or out-of-the box software, or for buying fixed assets and/or counselling services to implement a digitisation solution. The activities are aimed at SMEs' implementation of digital technology in connection with the need to change processes, the operations during epidemic, including but not limited to COVID-19 pandemic, or to improve immunity in case of subsequent, similar crises caused by epidemics (<https://www.parp.gov.pl/component/grants/grants/wsparcie-msp-w-obszarze-cyfryzacji-bony-na-cyfryzacje>).

The above government proposals relating to processes supporting the digital transformation of SME sector as a result of COVID-19 pandemic are embedded in the systemic solutions concerning the transformation of the whole economy. At present, it is difficult to speak of their effects as they have been underway. The financial perspective of EU for 2021-2027 contains numerous instruments designed to fund investments in the automation, robotisation and digitisation of Polish enterprises. An example can be the “Digital Europe” programme aimed at accelerating the digital transformation of Polish business entities.

## 6. Conclusions

The SME sector is a key component and the driving force of the Polish economy, constituting more than 99% of all enterprises, generating close to one half of GDP and employing more than 67% of people working in business. In the times of digital transformation and Industry 4.0, the effectiveness, innovation and development of the sector are determined by the scope and pace of implementing cutting-edge technology and tools. However, the level of digitisation and advancement relating to implementing new solutions by small and medium-sized enterprises is low when compared to the large enterprises and the EU average. This refers both to the situation before the COVID-19 pandemic and at present.

Although the changes caused by the pandemic (moving to teleworking, online sale) accelerated the digital transformation in most SMEs in Poland and worldwide, the level and scope of using cutting-edge digital tools in the sector enterprises have remained insufficient. This stems from numerous obstacles and limitations of a universal nature, meaning they are identical regardless of the analysed country or sector. The major obstacles are the funds, insufficient expertise and low employee competences.

It is popularly believed that the obstacles cannot be overcome without any institutional support. OECD recommends initiating activities in the following four directions: (1) increasing the internal potential of the enterprise, (2) facilitating access to strategic resources, (3) creating a suitable business environment, (4) promoting general institutional approach.

In many countries, there are numerous projects and programmes launched to support the digital transformation of SMEs in cooperation with other institutions and large enterprises. In Poland, systemic proposals were developed, grouped in five areas: (1) science, (2) finance, (3) cybersecurity, (4) economy and (5) administration. They are convergent with international recommendations. However, it should be stressed that the changed operating conditions as a result of the COVID-19 pandemic brought about the need for activities supporting small and medium-sized enterprises relating to digital transformation. Such programmes were developed in Poland. They covered two types of activities. The first ones were connected with training and counselling to minimise the pandemic effects. The other ones refer to the financial support

which is aimed at mitigating the effects of COVID-19 and limiting economic and social risks caused by the pandemic.

The ponderations and conclusions presented in the article:

— contribute to the development of the theory of SME sector operations in the context of its development relating to the digital transformation, stimulated by the COVID-19 pandemic;

- in the managerial aspect, demonstrate how to facilitate the digital transformation process of small and medium-sized companies by indicating the degree of using individual digital tools in Poland and in the European Union, obstacles hampering transformation processes and the presentation of governmental support forms for the SME sector in the specified area;
- from the social perspective, suggest the need for further support of the digital transformation of small and medium-sized enterprises due to their social significance.

The analyses carried out in this article are limited by the absence of empirical studies on the use of digital tools by small and medium-sized enterprises in Poland as a result of the COVID-19 pandemic and obstacles to their digital transformation. The article may provide theoretical grounds for analyses from different perspectives, e.g. by sectors, territory and by enterprise size (micro-, small and medium-sized enterprises).

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