

Digital Transformation of Micro-enterprises in the Light of the Covid-19 Pandemic

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Abstract

The article presents the results of a quantitative study of a group of micro-enterprises in Poland's industrial sector in the digital transformation field, considering the COVID-19 pandemic. The authors aimed to check the status quo of implementing digital solutions and technological innovations in business. Concluding, Polish micro-enterprises need more time to use digital solutions, implement technological innovations, and achieve digital transformation. The COVID-19 pandemic period, to some extent, gave rise to the need to implement digital solutions, but it did not happen suddenly and on a large scale. Advanced technological innovations such as virtual reality, augmented reality, robotization, or automation of production processes are still not fully understood by the entities surveyed and are even less of interest to them. Companies do not look for sources of financing and support from external entities to implement digital solutions for the company.

Keywords: digital transformation, Covid-19, entrepreneurship, IT solutions, management.

1. Introduction

Digital transformation is currently an essential element of company development. Implementing technological innovations and digital solutions is generally intended to improve company management, work organization, and information flow inside and outside the company, modernize and automate production and logistics processes, improve the quality of relationships with customers and contractors, and make running a business easier and smoother [1, 2, 3, 4, 5]. The world is dealing with the fifth industrial revolution, which focuses on using technology to benefit humans [6]. The integration of machines and people is, in fact, the critical assumption of Industry 5.0. It is not just about the cooperation of IT systems, machines, and devices but also about the synergistic collaboration and communication of man and machine [7, 8], [3, 4]. Therefore, digital transformation in the industry is essential to companies' development process.

2. Literature review

Digital transformation of enterprises focuses on using information technology innovations in business processes. Digital transformation aims to improve the organization's functioning, accelerate business processes, and improve customer relationships. It progresses management, decision support systems, knowledge management, expert systems, workflow, and groupware. It increases the value of the company and its competitiveness [9,10,5,11]. Enterprises that can adequately use technological innovations and digital solutions should generally achieve a competitive advantage and function more effectively. During the COVID-19 pandemic, when economies closed due to lockdown, information technology and digital applications would help many industries survive the problematic period [12]. The situation has shown that companies that skillfully use

technological innovations in emergencies cope better than companies that base their operations on traditional methods. The European Union has prioritized digital transformation in member countries. The European Commission, as part of the Digital Decade of Europe program, wants to implement safe and sustainable digital infrastructure by 2030 [13], carry out digital transformations of enterprises, digitize public services, widespread the use of artificial intelligence [14], and support innovations and digital skills. In Poland, digital transformation is poor, and the country is below the EU average. The financial sector performs best, while others require acceleration and increased spending on digitalization. In the DESI (Digital Economy and Society Index) ranking, Poland has been among the last places ahead of Greece, Bulgaria, and Romania for several years. The main reason is enterprises' lack of adequate integration of digital technologies. Poland's Business Digital Transformation Monitor index is 4.4 on a scale from 1 to 10 [15].

3. Purpose and method

The authors investigate the status quo of digital transformation in micro-enterprises. The basic aim was to discover how advanced digital transformation is among micro-businesses and if the pandemic had led companies to implement IT tools and applications for business purposes. It should be mentioned that the authors continue their work, as they have already conducted studies on SME sector enterprises in Poland and Hungary. The last study among Hungarian and Polish enterprises was based on a survey questionnaire conducted between 2022 and 2023 [16,17]. Using an arbitrary sampling technique, it collected data through a pre-tested, standardized online survey. The questionnaire contained only closed questions, and the research tool used two-dimensional, multidimensional, and scaled questions (Likert and semantic differential). The same questionnaire was used in the study conducted in March-May 2023. CAWI and CATI tools were used. For the paper, the authors excluded 75 Polish micro-companies from the industry from the collected data and analyzed the answers on digital transformation.

4. Results

45% of the surveyed enterprises are limited liability companies, 31% of entities are sole partnerships, and 24% are companies that operate in the form of another company. 56% of the surveyed companies have their headquarters in cities, 41% in the countryside, and 3% of entities have their headquarters in the country's capital. 93% of the surveyed companies have been operating for over 15 years. 5% of the surveyed companies have been operating for five to 15 years, and 2% are relatively young companies as they have been on the market for no longer than five years. 64% of the surveyed companies' owners, 19% of general directors or managers, and 17% of employees delegated to the survey responded to the questions in the survey questionnaire. Most of the surveyed entities use IT tools frequently (40%) or entirely (35%), 16% use them moderately, and 9% do not use any IT tools. 33% use digital workflow tools frequently, 21% fully. 27% do not use such tools, and 19% do so moderately. 20% of firms do not use digital solutions to improve communication. 15% use digital communication channels moderately, 36% use them often, and 29% entirely. Firms avoid artificial intelligence, 96% of firms do not use it. 86% of firms do not use robotization, and 12% use it moderately. Only 1% of surveyed entities use artificial intelligence or robotization frequently or thoroughly. Only 12% of companies have a satisfactory service offering digital solutions. 81% do not have and do not plan to use such services. 4% plans to cooperate with an IT service. Most companies use digital tools for online payments, 75% via websites, and 83% use POS. 71% use digital tools for booking, and 86% for placing orders. 45% use mobile phone applications. 47% of firms have not used them but have heard about them. No firms use augmented reality or virtual reality chatbots. No firms plan to implement them in business. 48% have not heard of augmented reality. 51% have not heard of virtual reality chatbots. 54% of firms have heard of but have not yet used management software. Online communication interfaces are known but still not used by 47% of firms, and 48% have heard of but not used automation systems yet. 76% of firms indicate financial problems as the main factor of difficulties in running a business. 70% confirm that lack of commitment or interest and lack of

information contribute to business issues. 56% of firms indicate that problems are caused by a lack of digital skills, and 87% by a lack of qualified labor. 68% admit that business problems are caused by technological gaps. COVID-19 made the firms use digital tools and applications in the company. In finance, 35% did not spread digital tools, 17% moderately, 31% widely, and 17% fully. 15% used fully digital solutions for company development, 32% of firms have yet to disseminate such tools. In communication, 32% of the surveyed entities did not disseminate the use of digital tools or any applications. 36% mostly disseminated them, 16% disseminated them fully. 44% use digital tools for organizational work. 32% of entities have yet to spread digital applications and tools, 27% have spread them moderately, 28% broadly, and 13% fully. During the pandemic, only 9% of the company's allocated digital tools in marketing. 32% largely did this, 31% not at all, and 28% moderately. During the pandemic, customer relations forced 46% of firms to spread digital tools and applications in business activity. 27% of firms did it moderately, and 27% remained unbothered. Purchasing during the pandemic made 51% of firms use IT tools entirely and widely, and 17% moderately. 32% did no changes. Similarly, 32% did not spread the use of digital tools in logistics during the pandemic, but broadly or moderately did so in 55% of firms and 13% completely. 33% did not disseminate any digital solutions in strategy development because of the pandemic. 24% did it to a moderate extent, 35% to a large extent, and only 8% to a full extent. Project management made 9% of firms fully spread the use of digital tools and applications during a pandemic. 33% of respondents did not do that at all. 27% did it fairly, and 31% to a great extent. 37% of the firms did not widely use digital tools and applications in the company regarding ecological transformation. 29% of entities essentially did this, 8% to a full extent, and 26% to a moderate extent.

91% of firms did not receive external financial support to carry out digital transformation. Five percent received EU or state support, two percent received repayable non-EU or non-state support, and two percent received non-repayable non-government financial support or EU support.

5. Conclusions

Based on the results, companies generally use essential IT tools, digital work organization tools, and communication channels. Technological innovations such as robotization, augmented reality, or virtual reality are not popular in companies. The main problems during the pandemic and after were financial issues, lack of commitment and interest, and the lack of qualified staff. 70% of the surveyed entities also noticed that problems in running business are caused by technological gaps. The pandemic did not contribute to a significant spread of digital tools and applications by the surveyed entities. Most firms do not use and do not plan to use the services of digital service companies. Almost all (91%) of firms did not use any government, EU, or other funding to carry out digital transformations in the company.

To sum up, Companies notice the problem or technological problems, but they need to fully use the opportunity to carry out digital transformation, which is indicated by the fact that they do not look for sources of financing and support from external entities to implement digital solutions for the company.

The presented research results should be treated as material for subsequent research and comparative analyses on the same or similar topics.

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References

1. Deloitte US: Industry Advantage™ to Transform Strategic Vision into Value, https://www2.deloitte.com/us/en/pages/about-deloitte/solutions/industry-advantage-business-transformation.html?id=us:2ps:3gl:inadv24:awa:tmt:031424:digital%20transformation%20strategy:b:c:kwd-296079429990&gad_source=1&gclid=EA1aIQobChMlkqTlg6TshQMV01GRBR1niww1EAA YASAAEgIHBvD_BwE. Accessed April 26, 2024
2. Javaid, D.M., Haleem, A., Suman, R.: Digital Twin applications toward Industry 4.0: A Review. *Cognitive Robotics*. 3, 71-92 (2023)
3. Pereira, A.C., Romero, F.: A review of the meanings and the implications of the Industry 4.0 concept. *Procedia Manufacturing*. 13, 1206-1214 (2017)
4. Yaqub, M.Z., Alsabban, A.: Industry-4.0-Enabled Digital Transformation: Prospects, Instruments, Challenges, and Implications for Business Strategies. *Sustainability*. 15 (11), 8553-8553 (2023)
5. Szymczyk, K.: Investments in ICT software and equipment in the process of digital transformation of European Union enterprises. In: Szymczyk, K. and El Emary, I.M.M. (eds.) *Advanced Trends in ICT for Innovative Business Management*. pp. 1-18. Taylor & Francis Group, Boca Raton (2021)
6. European Commission: Industry 5.0, *research-and-innovation.ec.europa.eu*, https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/industry-50_en. Accessed April 28, 2024
7. Nużka, M.: Przemysł 5.0: Rewolucja Czy Kolejny Krok? <https://bazawiedzy.air-com.pl/przemysl-5-0-rewolucja-czy-kolejny-krok/> (2024) Accessed April 25, 2024
8. Alcácer, V., Cruz-Machado, V.: Scanning the Industry 4.0: A Literature Review on Technologies for Manufacturing Systems. *Engineering Science and Technology, an International Journal*. 22 (3), 899-919 (2019)
9. Wren, H.: What is digital transformation? Definition, Examples, Main Areas, *Zendesk*, <https://www.zendesk.com/blog/digital-transformation/>, Accessed: April 28, 2024, (2021)
10. Vial, G.: Understanding Digital transformation: a Review and a Research Agenda. *The Journal of Strategic Information Systems*. 28 (2), 118-144 (2019)
11. Krawczyk, P.: The use of information and communication technologies in small and medium-sized enterprises in Poland. In: Szymczyk, K. and El Emary, I.M.M. (eds.) *Advanced Trends in ICT for Innovative Business Management*. pp. 19–36. Taylor & Francis Group, Boca Raton (2021)
12. Szymczyk, K.: COVID-19 as a Source of Failure or a Catalyst for Positive Changes in Business? *Annales Universitatis Mariae Curie-Skłodowska, sectio H – Oeconomia*. 56 (2), 131-148 (2022)
13. Komisja Europejska: Cyfrowa dekada Europy: cele na rok 2030 r. | Komisja Europejska, *commission.europa.eu*, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_pl. Accessed April 27, 2024
14. Parlament Europejski: Kształtowanie transformacji cyfrowej: strategia UE, *Tematy / Parlament Europejski*, <https://www.europarl.europa.eu/topics/pl/article/20210414STO02010/ksztaltowanie-transformacji-cyfrowej-strategia-ue>, Accessed: April 27, 2024 (2021)
15. KPMG: Monitor Transformacji Cyfrowej Biznesu. Edycja 2023 - KPMG Poland, KPMG, <https://kpmg.com/pl/pl/home/insights/2023/05/raport-monitor-transformacji-cyfrowej-biznesu-edycja-2023.html>. Accessed April 29, 2024 (2023)
16. Csiszárík-Kocsir, A., Varga, J., Garai-Fodor, M., Szymczyk, K.: The Impact of The Pandemic on Polish and Hungarian Businesses. In: *Proceedings of the 16th Annual International Conference on Economics and Business Challenges in The Carpathian Basin*, pp. 204-210, Sapientia Hungarian University of Transylvania, Cluj-Napoca (2023)
17. Csiszárík-Kocsir, A., Varga, J., Garai-Fodor, M., Szymczyk, K.: A Pandémia Hatása A Lengyel És A Magyar Vállalkozások Operatív Működésére Egy Kérdőíves Kutatás Eredményei Alapján. In: Bodáné Kendrovics, R. (ed.) *A Tudomány És Az Oktatás Felelőssége*, pp. 319-326, Óbuda University Rejtő Sándor Faculty of Light Industry and Environmental Engineering, Budapest, Hungary (2023)