DOI: https://doi.org/10.31410/ERAZ.2022.141

SMEs Digital Transformation – Are We Ready?

Sanja Tišma[1]
Andrea Ruk[2]
Dragana Markanović[3]
Iva Tolić[4]

Received: June 15, 2022
Accepted: December 26, 2022
Published: December 30, 2022

Keywords:
Digital transformation;
SMEs;
VET providers;
Knowledge and skills

Abstract: *The paper presents the results of the analysis of the readiness of small and medium enterprises, VET providers, high education institutions and consultancy organizations towards digital and bionic transformation and acquisition of a "bionic status". The purpose of the paper is to find out which key skills and knowledge are needed for employees in order to be ready for digital transformation. SMEs that were a part of the survey operate in different economic sectors in various countries of the European Union (Spain, Slovenia, Poland, Croatia, Ukraine, Austria, Italy, Germany, Macedonia, Switzerland, Belgium, and Hungary). Other organisations such as public bodies, non-governmental organisations (NGOs), universities and technological centres also participated in the survey on digital competences. Key conclusions of the analysis indicate that almost all participants are familiar with the need for digital transformation, but that knowledge about 4.0 technologies is still lacking. The most significant knowledge is in robotics, 3D printing and Cloud Services, big data, and IoT. Blockchain and artificial intelligence are considered less important for digital transformation. However, a strong need for further education and training in all of these areas was expressed.*

1. INTRODUCTION

SMEs are the main driver of economic growth, innovation, job creation and social integration in Europe and the world's economies. The World Economic Forum predicts that global spending on the digital transformation of business practices, products and organizations is forecast to reach $2.8 trillion in 2025 at a compound annual growth rate of 16.4% – more than double the amount allocated in 2020[5]. Digital transformation is well recognized as a key element for the future development of small and medium enterprises, but these enterprises will certainly face obstacles while implementing digital transformation. Digital transformation offers SMEs opportunities to innovate, and grow and furthermore can help, by conserving manpower, raw material and energy during the manufacturing process, production monitoring, improving yield, predicting customer needs, marketing adjustment and customer service. Therefore, the implementation of digital transformation can not only improve manufacturing efficiency but also can help companies in their productivity. In 2019, SMEs active in the digital sector (manufacture of computers, electronic and optical products, telecommunications, computer programming, consultancy and related activities and information service activities) posted stronger value added and employment performances than SMEs in the non-digital sector: 4.5% vs. 3.7% in the case of value-added, and 2.4% vs 1.3% in the case of employment.[6]

[1] Institute for Development and International Relations (IRMO), Lj. F. Vukotinovića 2, 10000 Zagreb, Croatia
[2] Institute for Development and International Relations (IRMO), Lj. F. Vukotinovića 2, 10000 Zagreb, Croatia
[3] Institute for Development and International Relations (IRMO), Lj. F. Vukotinovića 2, 10000 Zagreb, Croatia
[4] Institute for Development and International Relations (IRMO), Lj. F. Vukotinovića 2, 10000 Zagreb, Croatia
[5] World Economic Forum, https://www.weforum.org/events/world-economic-forum-annual-meeting-2017/sessions/global-economic-outlook
[6] Annual Report on European SMEs 2020/2021 Digitalisation of SMEs

SMEs have a central role in this transition, not only because they represent the bulk of the EU companies, but also because they are a critical source of innovation.[7] That is why the European Commission has designed the Digital Europe Program to fill the gap between research and deployment of digital technologies. In Europe's digital transformation[8] the Commission proposes a Digital Compass for the EU's digital decade that evolves around four cardinal points: skills, secure and sustainable digital infrastructures, digitalisation of public services, digital transformation of businesses[9]. With the support of Digital Innovation Hubs and industrial clusters, by 2030, SMEs should have the opportunity to access digital technologies or data easily and on fair terms, ensured by appropriate regulation, and benefit from adequate support to digitalise. SMEs will work towards becoming high-value businesses by adopting digital technologies and smart manufacturing, making them the cornerstone for economic output and job creation in each economy.

In this paper, an in-depth study of knowledge related to digital transformation was conducted. An analysis of the current situation was carried out through a survey and the findings of the analysis will be used for the preparation of a new educational program that will enable the acquisition of new knowledge on digital transformation, Industry 4.0 for the bionic transformation of SMEs and enable the strengthening of management capacity to introduce change.

2. METHODOLOGY

The survey conducted was in form of a questionnaire and it was completed by 30 respondents.

The first part of the questionnaires regarding general information is the same for all participants and requires their nationality, gender, education and other general questions. In the second part of the questionnaire, SMEs rated the situation regarding digital transformation in their enterprises, while high education institutions and consultancy organizations expressed their opinion based on their experience and knowledge regarding digital transformation. In this paper, an analysis was performed based on the available scientific and professional literature.

The results of these research groups are presented in the following chapter.

3. RESULTS

As already mentioned, the questionnaire related to SMEs was divided into two parts, the first part regarding general information and the second part regarding knowledge and skills on digitalisation and 4.0 technology.

Out of 30 SMEs that were a part of this research, 11 are micro enterprises with less than 10 employees, 11 are small enterprises with 10 to 49 employees and 8 are medium enterprises with 50-249 employees (Figure 1). SMEs that were a part of the survey operate in different sectors, such as marketing, software, consultancy, industrial and intellectual property, sports medicine and management, automation, education, the metal industry, real estate, etc. However, most of the SMEs are related to the furniture sector, including upholstered furniture, kitchen furniture,

7 An SME Strategy for a sustainable and digital Europe, COM/2020/103 final

8 https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021DC0118

9 https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

custom furniture, indoor furniture, children's beds and components, and cabinet furniture. The roles of the participants in SMEs are also quite different and include owners, CEOs, directors, managers, software developers, technologists, sellers, administrators, and designers.

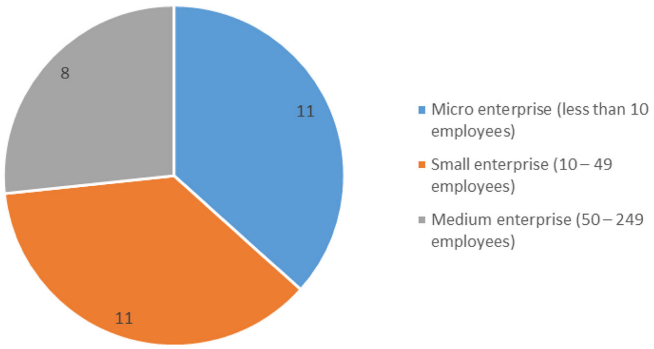

Figure 1. Size of SMEs
Source: Own research

Most of the respondents (34%) have 20 or more years of professional experience, followed by 15-19 and 10-14 years (23% each) (Figure 2).

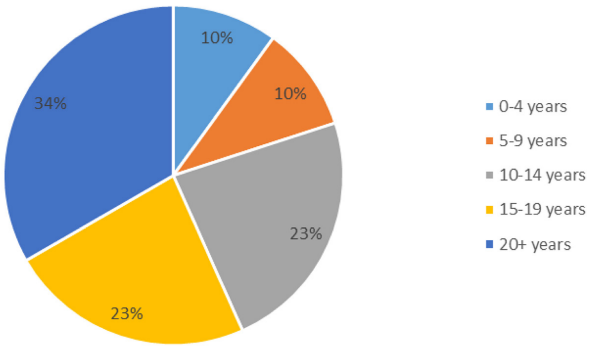

Figure 2. Professional experience
Source: Own research

The second part of the questionnaire, related to 4.0 technology started with the question of whether the participants are familiar with 4.0 technologies and the results show that 50% of the respondents are rather familiar with it, 40% are familiar, while only 3% (1 participant) are not familiar with 4.0 technologies (Figure 3).

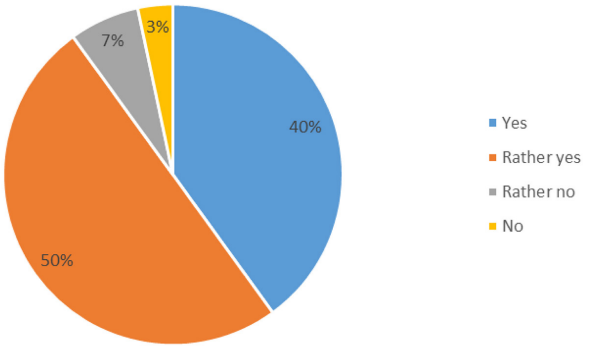

Figure 3. Familiarity with 4.0 technologies
Source: Own research

Additionally, 57% of respondents consider 4.0 technologies important for their sector, followed by 40% of them considering it rather important. No one considers 4.0 technologies not important (Figure 4).

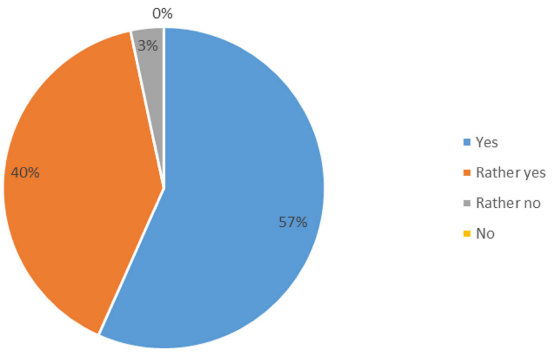

Figure 4. Importance of 4.0 technologies
Source: Own research

As the main barriers to the implementation of 4.0 technologies in the furniture and related sectors, most respondents, 70%, have chosen a lack of skills and knowledge among staff. Other main barriers include the cost of technologies (66.67%), lack of digital transformation strategy and leadership (53.33%) and reluctance to change and new technologies adoption (43.33%). The least number of participants as the main barrier consider lack of technological solutions from suppliers and further adoption of technologies (Figure 5).

Figure 5. Main barriers to the implementation of 4.0 technologies
Source: Own research

The following set of questions analyses the situation regarding the readiness for digitalisation of SMEs. The set starts with the question of whether the SME practices an open culture of communication, which can help all involved understand and adapt to challenges with more ease. According to the participants, 23 out of 30 SMEs practices or rather practice the open culture of communication. Participants were also asked if they are aware of all the different risks their company is exposed to and most of them are rather aware (40%), followed by rather unaware (36.67%). None of the respondents is completely unaware of the risks their company is exposed to.

To the question of whether the company is regularly carrying out a comprehensive analysis of all company's strengths and weaknesses, 9 out of 30 respondents answered rather yes, 8 of them said rather no and 8 of them pointed out that company is not carrying out a comprehensive analysis of strengths and weaknesses. According to the respondents, 10 out of 30 SMEs are rather not equipped with a systematic inventory of all-important aspects of their current business model, while 8 of them are completely not equipped with it. Only 5 SMEs have a systematic inventory of all-important aspects of their current business model. On the other hand, most of the SMEs, 13 completely and 6 rather, have experience with methods of analysis, such as the SWOT analysis, that can support them to identify the development strategies with the biggest potential for success.

Furthermore, participants were asked whether the European Union's General Data Protection Regulation (GDPR) impacted their company and most of them, 43.33% said rather not, followed by 30% who stated that the GDPR impacted their company. Additionally, respondents were asked how it impacted their company and there were quite different answers, such as that GDPR complicates things, brings changes in the management system and necessity to organise data and data security differently, introduces new responsibilities, makes networking more difficult and requires permissions for sending surveys. To the question of whether the company listens to the fears of employees regarding digital transformation and are those fears analysed regarding their significance for a proper digital transformation process in the company, most of the respondents, 13 out of 30 answered rather yes, followed by 7 of them who answered rather no. Additionally, most of the participants, 18 out of 30 (60%) are rather able to present their ideas on how to measure the success of the company within their company team, followed by 7 respondents who are completely able to do it. Only 5 of the respondents are not able or rather not able to present their ideas within their company team. Also, participants of the survey were asked if their company has systematically prepared for the optimisation and upgrade of technology used, and 14 out of 30 participants answered rather yes, followed by 11 of them who answered rather no. The last question of this group analysed whether the company has already tackled the challenge of what a new, digital business model for the company could look like, and most of the respondents, 13 out of 30, answered rather yes, followed by 8 of them who said yes and 8 of them who said rather no. All the results regarding readiness for digitalisation of SMEs are presented in Figure 6.

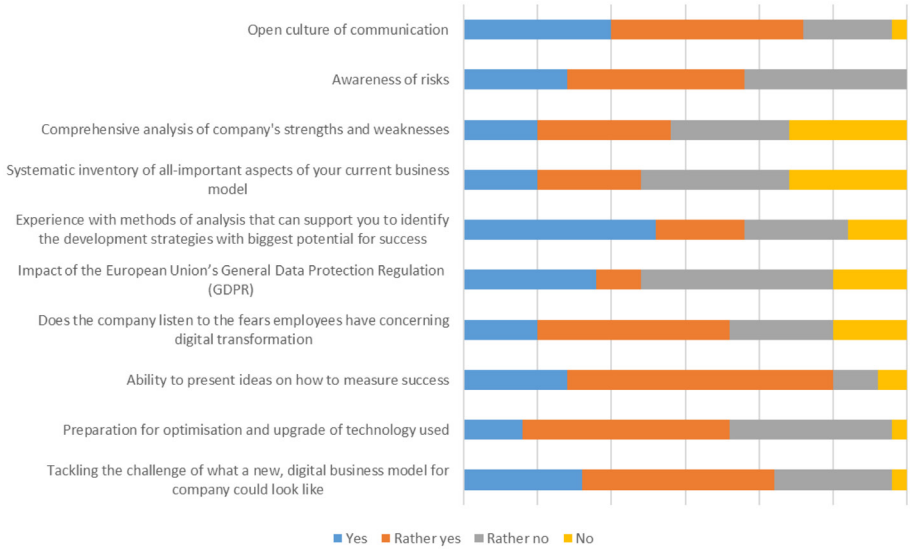

Figure 6. Readiness for digitalisation of SMEs

Source: Own research

The second part of the survey was related to high education institutions and consultancy organizations. The questionnaire was completed by 24 participants – 5 each from Croatia and Poland, 3 each from Italy and Germany, 2 each from Slovenia and Ukraine and 1 each from Austria, Belgium, Hungary and Spain (Figure 7).

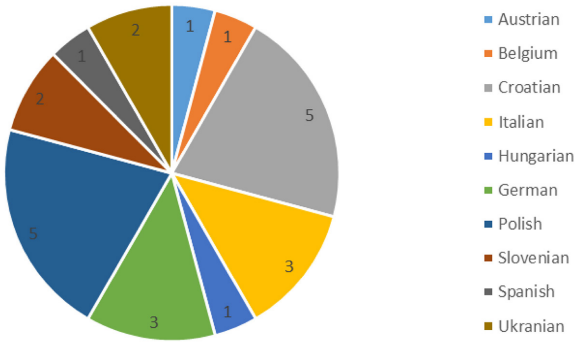

Figure 7. Nationality of participants
Source: Own research

Most of the participants in the survey are related to high education institutions and consultancy organizations, 71% are females and 29% are males (Figure 8).

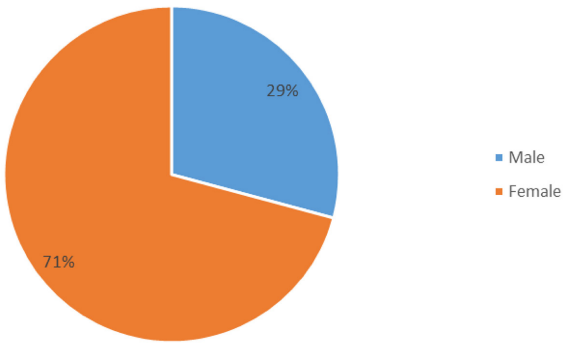

Figure 8. Gender of participants
Source: Own research

As in the previous part of the research, the second part of the questionnaire was related to 4.0 technologies and participants were first asked whether they are familiar with 4.0 technologies. Of most of the participants, 37% are familiar with 4.0 technologies, followed by 33% who are rather familiar and 17% who are not familiar (Figure 9).

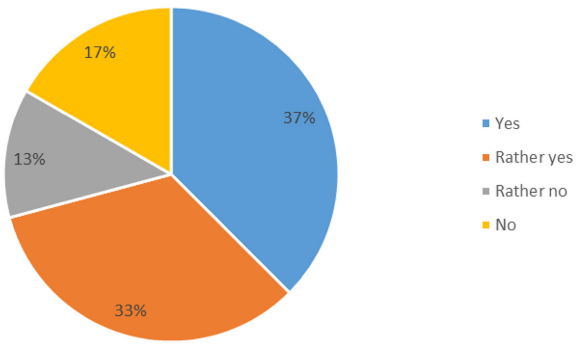

Figure 9. Familiarity with 4.0 technologies
Source: Own research

A Large majority of respondents, 67% think that 4.0 technologies are important for industry and especially traditional sectors, such as furniture, 29% of participants find it rather important, and 4% rather unimportant. No one thinks that 4.0 technologies are not important (Figure 10).

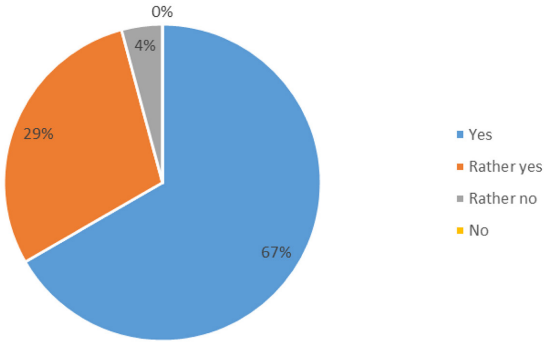

Figure 10. Importance of 4.0 technologies for industry and traditional sectors
Source: Own research

According to participants, the most important technology is robotics (70.83% of participants find it most important), followed by the Internet of Things (62.5%) and 3D printing and manufacturing (58.33%). The least number of participants (33.33%) think that Blockchain is the most important technology (Figure 11).

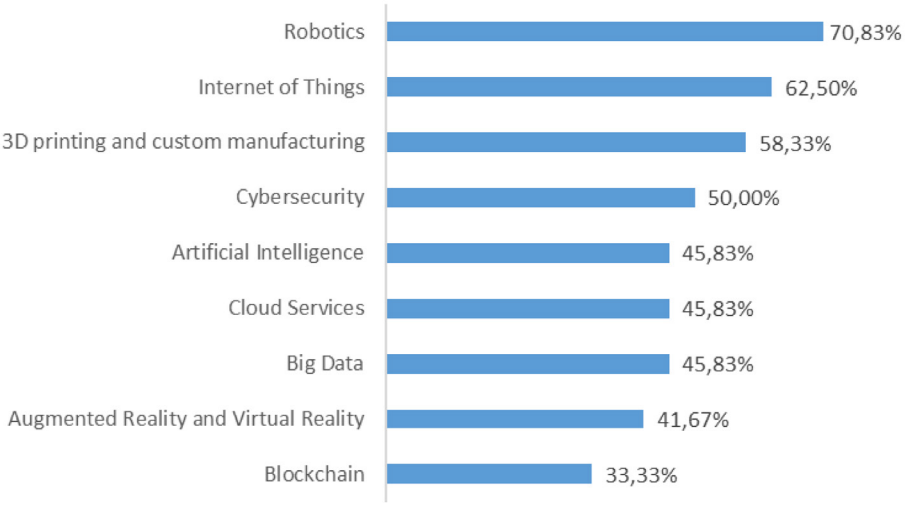

Figure 11. Importance of technologies
Source: Own research

The biggest barrier to the successful implementation of industry 4.0 technologies in the furniture and related sectors, according to the participants, is the lack of digital transformation strategy and leadership (66.67%). It is followed by a lack of skills and knowledge among staff (62.5%), reluctance to change and new technologies adoption (50%) and cost of technologies (50%) (Figure 12).

In the following set of questions, participants were asked to, regarding their experience, assess the situation in SMEs regarding the readiness for digitalisation. Firstly, the participants were asked to assess whether the companies from furniture and related sectors are equipped with a thought-out strategy for improving the online experiences of their customers (Digital customer experience, DCX). Most of the participants think that companies are rather not equipped with the strategy. Similarly, most of the respondents find that companies from furniture and related

sectors are rather not equipped with a thought-out strategy to optimise and obtain benefits of social media, while 10 respondents answered rather yes to this question.

Companies from furniture and related sectors, according to most of the participants rather do not have an open culture of communication so that challenges and successes in the course of digital change can be quickly and transparently made accessible to all those involved. Also, regarding the experience of respondents, most of them, find that companies from furniture and related sectors are rather not aware of all the different risks they are exposed to. Regarding the question of whether the companies from furniture and related sectors are regularly carrying out a comprehensive analysis of all the company's strengths and weaknesses, 14 participants answered rather no.

Figure 12. Main barriers to the implementation of 4.0 technologies
Source: Own research

Half of the respondents think that companies from furniture and related sectors are rather not equipped with a systematic inventory of all-important aspects of their current business model. On the other hand, answers to the question of whether companies from furniture and related sectors know the implications of the European Union's General Data Protection Regulation (GDPR) are quite diverse – 9 participants consider that they rather know the implications, 7 believe that they rather do not know, while 6 participants consider that companies know the implications of the GDPR. Most of the respondents believe that leaders of SMEs rather not consider the fears that their employees have concerning digital transformation and they rather not try to analyse those fears for the implementation of a proper digital transformation process.

Also, most of the participants, believe that companies are rather not systematically dedicating attention to all of the technological changes that could shape their branch of business in the future. To the question of whether they believe that companies already dedicated enough attention to the question of what a new, digital model for their company could look like and which customers they would like to address in the future, 11 participants answered rather no and 8 participants answered rather yes. The last question of this set of questions was whether participants think that managers of SMEs would support their employees if they choose to pursue a degree program towards digitalisation and half of the respondents answered rather yes, 6 rather no, and 5 yes. The results of the part of the questionnaire related to the assessment of readiness for digitalisation are presented in Figure 13.

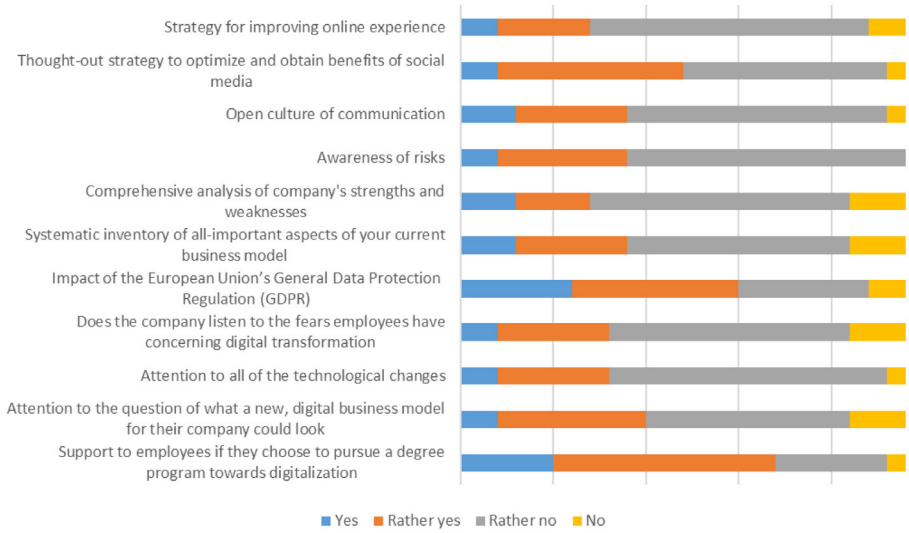

Figure 13. Assessment of the readiness for digitalisation
Source: Own research

4. CONCLUSION

Recent scientific research shows that the annual scientific production in this domain grows by 80.53% and has seen a sharp rise since 2016 (Bin, Hui, Qifeng, Ke 2021). Furthermore, recent studies estimate that the digitalization of products and services can add more than 110 billion Euro of annual revenue in Europe in the next five years.

In 2020, only 1% of EU enterprises with at least 10 persons employed reached a very high level of digital intensity while 14% reached a high level. The majority of the enterprises recorded low (46%) or very low (39%) levels. Compared to 2018, the Digital Intensity Index (DII) has seen a general improvement at the EU level, with increases at both very high (+5.0 percentage points (pp)) and high (+0.4 pp) levels. Eurostat data show that 9% of the EU's large enterprises had a very high DII and 42% a high level, while only 2% of medium-sized companies registered a very high-intensity level and one-quarter (25%) a high DII. Only 0.4% of small enterprises reached a very high digital intensity, with only 12% scoring a high DII.

According to one of the targets of the EU's vision for digital transformation, at least 90% of the EU's small and medium-sized enterprises (SMEs) should reach a basic level of digital intensity by 2030. The basic level entails the use of at least four technologies and includes enterprises with low, high and very high DII. In 2020, three out of five SMEs (60%) in the EU reached at least a basic level of digital intensity, against 89% of large enterprises.

The goal of our survey is to develop and implement an innovative training programme for SMEs regarding 4.0 technologies. The first step of the development of the programme was market research that was conducted in the form of questionnaires. Questionnaire was completed by 30 participants from different sectors, different roles in organisations and different lengths of professional experience. The results of the questionnaire showed that most of the participants are familiar with 4.0 technologies and find it important. The most important technologies are robotics, 3D printing and Cloud Services, big data, and IoT, while Blockchain and artificial intelligence are considered less important for digital transformation. The main barriers to the implementation of 4.0 technologies are lack of skills and knowledge among staff and the cost of technologies.

Readiness for digitalisation process, that includes the existence of thought-out strategy for improving the online experience of customers, culture of communication, awareness of risks, carrying out a comprehensive analysis of company's strengths and weaknesses, systematic inventory of all-important aspects of current business model, experience with methods of analysis, impact of GDPR, reaction of the company to the fears of employees, as well as the being able to present ideas, preparation for future challenges and preparation for implementation of new business model, is at quite high level. Also, the fact that most of the SMEs have an expert for digitalisation also supports that they are ready for digital transformation.

The results of the questionnaires show that 4.0 technologies and related skills are already important and will become of even greater importance. However, SMEs are still not completely ready for digital transformation and there a strong need for further education and training in all of these areas was expressed. The analysis of the questionnaire showed that 4.0 technology skills are still not quite present in the educational system.

The conclusion of the analysis of current skills, knowledge and qualifications regarding digitalisation is that the new and innovative programme regarding 4.0 technologies is necessary in order to use all of the advantages of digital transition, such as cost reduction and improved efficiency. This analysis showed that it is important to include 4.0 technologies in education and training to ensure having an educated and qualified workforce.

REFERENCES

Barann, B., Hermann, A., Cordes, A.-K., Chasin, F., Becker, J. (2019*). Supporting Digital Transformation in Small and Medium-sized Enterprises: A Procedure Model Involving Publicly Funded Support Units*. Proceedings of the 52nd Hawaii International Conference on System Sciences. https://scholarspace.manoa.hawaii.edu/items/1aeecab6-77d6-43c2-a251-1725d001dbd6

Bin, M., Hui, G., Qifeng, W., Ke, Y. (2021). A Systematic Review of Factors Influencing Digital Transformation of SMEs. Turkish Journal of Computer and Mathematics Education, Vol. 12. (11). https://doi.org/10.17762/turcomat.v12i11.6102

COM(2020) 103 final. (2020). *An SME Strategy for a sustainable and digital Europe*. Brussels: European Commission. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A103%3AFIN

European Commission. (2021). *Annual Report on European SMEs 2020/2021 - Digitalisation of SMEs SME Performance Review 2020/2021.* Luxembourg: Office for Official Publications of the European Communities. https://ec.europa.eu/docsroom/documents/46062

European Investment Bank. (2019*). Financing the digitalisation of small and medium-sized enterprises.* Luxembourg: European Investment Bank. https://www.eib.org/attachments/thematic/financing_the_digitalisation_of_smes_summary_en.pdf

European Union, Digital Skills and Jobs Platform HTTPs. (2021*). An SME Strategy for a Sustainable and Digital Europe*. https://digital--skills--jobs-europa-eu.translate.goog/en/actions/european-initiatives/sme-strategy-sustainable-and-digital-europe?_x_tr_sl=auto&_x_tr_tl=hr&_x_tr_hl=en&_x_tr_pto=op,wapp

EUROSTAT. (2021). *How digitalised are EU's enterprises?* https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20211029-1

González-Varona, JM, López-Paredes, A., Poza, D., Acebes, F. (2021). *Building and development of an organizational competence for digital transformation in SMEs.* Special Issue:

Ensuring Sustainability. New Challenges for Organizational Engineering, Vol 14 (1), Pages 15-24. https://jiem.org/index.php/jiem/article/view/3279

Henderson, D. (2020). *Demand-side broadband policy in the context of digital transformation: An examination of SME digital advisory policies in Wales*. Telecommunications Policy, Vol. 44 (9). https://doi.org/10.1016/j.telpol.2020.102024

Koumas, M. , Dossou, P.E., Didier, J. Y. (2021). *Digital Transformation of Small and Medium Sized Enterprises Production Manufacturing*. Journal of Software Engineering and Applications, Vol.14 (12), Pages 607-630. DOI: 10.4236/jsea.2021.1412036

Lokuge, S., Xiaoxia Duan, S.)2021). *Towards Understanding Enablers of Digital Transformation in Small and Medium-Sized Enterprises*. 2021 Australasian Conference on Information Systems. https://arxiv.org/abs/2111.05989

Łukasz, S., Cpiotr, P. (2020). *The concept of building a digital transformation model for enterprises from the SME sector*. LogForum, Vol. 16, (4), Pages 593—601. https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-39ae032e-f4e9-4af4-a8a6-204c9697bf64

OECDiLibraray. (2021). *The Digital Transformation of SMEs.* https://www.oecd-ilibrary.org/industry-and-services/the-digital-transformation-of-smes_bdb9256a-en

Oettinger, G. H. (Speaker). (2015). *Europe's future is digital*. Hannover Messe. https://ec.europa.eu/commission/presscorner/detail/fr/SPEECH_15_4772

Pihir, I., Križanić S., Kutnjak, A. (2019). *Digital transformation of marketing in small and medium-sized enterprises - review of existing research*. CroDiM : International Journal of Marketing Science, Vol. 2. (1), Pages 125-134. https://hrcak.srce.hr/clanak/340959

Regulation (EU) 2021/694. *Establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240.* European Parliament, Council of the European Union. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0694&qid=1623079930214

Rismayani, R., Wahyuningtyas, R., & Disastra, G. M. (2021). *Resource-based framework for assessing cooperative institutional's global competitiveness as small medium enterprise (SME).* Linguistics and Culture Review, 5(S1), 1436-1448. https://doi.org/10.21744/lingcure.v5nS1.1723

Sinyuk, T., Panfilova E., Pogosyan, R. (2021). *Digital transformation of SME business models as a factor of sustainable socio-economic development*. International Scientific Forum on Sustainable Development and Innovation (WFSDI 2021). https://doi.org/10.1051/e3sconf/202129501028

Sticha, V., Zellera, V., Hickinga, J., Kraut, A. (2020). *Measures for a successful digital transformation of SMEs*. Procedia CIRP, Vol.93, 2020, Pages 286-29. https://doi.org/10.1016/j.procir.2020.03.023

Ulas, D. (2019). *Digital Transformation Process and SMEs*. Procedia Computer Science, Vol. 158, 2019, Pages 662-671. https://doi.org/10.1016/j.procs.2019.09.101