

Case Study of applied digital technologies in SMEs in Poland, Denmark and Germany

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Introduction

As the previously conducted, extensive, literature analysis illustrates, the digital transformation of business processes is very multifaceted. The possibilities, intelligent, digital and the combination of digital and analog (mesh) activities provide companies with the opportunity to generate competitive advantages. These technological trends of digitalization include technologies such as artificial intelligence (AI), Internet of the Things (IoT), cloud computing and digital application methods such as general Information and communication (ICT) tools in the form of websites or the integration of social media.

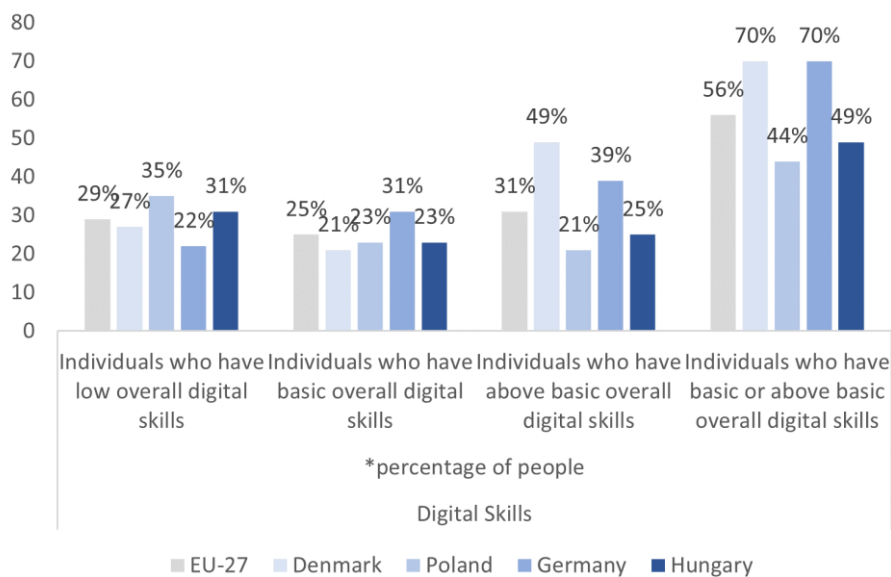
This case study provides an insight into the application of digital technologies and methods in three selected *IClinSMEs* partner countries, namely Germany, Denmark, and Poland. This analysis compares the results of the European Commission's data on digital inclusion (Eurostat 2021a-g) with the results of the project's survey of SMEs in the partner nations.

Based on this analysis, versatile and profound results will be elaborated, which will be used in the further course of the *IClinSMEs* project as a basis and decision support for the development of targeted training contents for the promotion of customer-based innovations in SMEs with the help of digital solutions. To allow this to be achieved, the first step is to analyze the digital skills of the population in the selected countries. This knowledge forms the basis for the application and use of the many opportunities offered by digitization. This is followed by a description of the general integration of information and communication technologies in SMEs. The analysis of the application of digital technologies starts with cloud computing, followed by Internet of the Things and the application of social media methods in SMEs. Closely related to this is the application of artificial intelligence and big data analytics in order to be able to evaluate and process the collected information efficiently and in a targeted manner with the help of digital technologies. To create a comprehensive picture, data from the European Commission will first shed light on the aforementioned topics, followed by the practice-oriented survey results of this project.

Digital skills

As mentioned, the presence of digital skills in the population is considered a basis for successful digital transformation and integration. As the European Commission's data reveals, the majority of the Danish, Polish and German residents indicated that they have basic or above basic general digital skills. Thus, an important milestone in the application of digital methods has already been reached. However, it should be emphasized that the Polish population has a lower percentage of basic or higher digital skills compared to the EU-27. When looking at individuals who reported basic skills, Denmark, Hungary and Poland are below the EU-27 average, with 21 and 23 percent of respondents, respectively (figure 1). This might be reasoned by the fact that Denmark, for example, has a higher percentage of individuals who have a higher level of digital skills (Eurostat, 2021a).

Figure 1 Assessment of digital skills, in percent of people, 2019



Source: Eurostat (2021a)

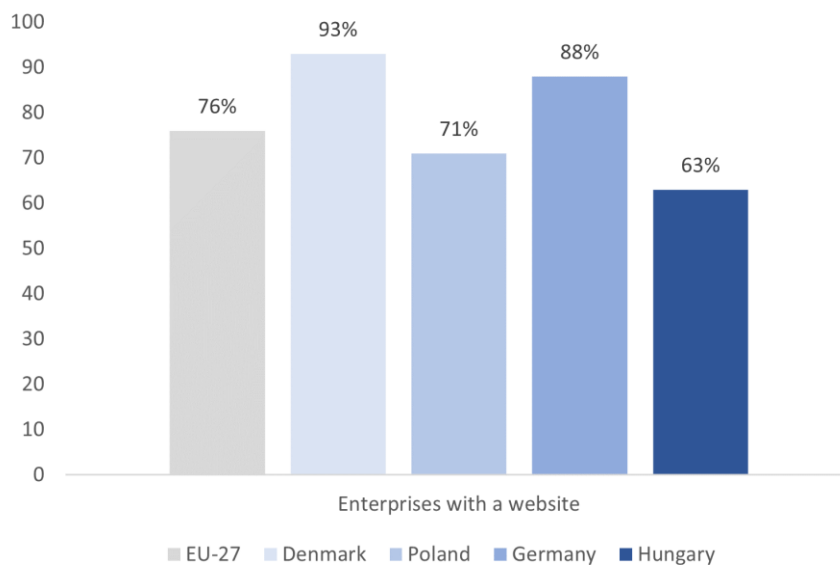
General integration of Information- and Communication technologies

The analysis of the general integration of ICT shows that 93 percent of Danish enterprises have their own website. Denmark is thus the front-runner of the three countries considered, closely followed by Germany, where 88 percent of enterprises stated that they had company websites.

Bringing up the rear are Hungary and Poland, where 63 and 71 percent of companies operate a website, below the EU-27 average of 76 percent, see Figure 2 (Eurostat, 2021b). A similar trend can be seen in the use of computers with internet access at work. Here, too, Denmark leads the comparison with a share of 75 percent of all employees. While Germany, with a share of 56 percent of all employees, is just above the EU-27 average of 54 percent, Poland, with 48 percent, and Hungary, with 42 percent, are situated below the EU-27 average (figure 3) (Eurostat, 2021c).

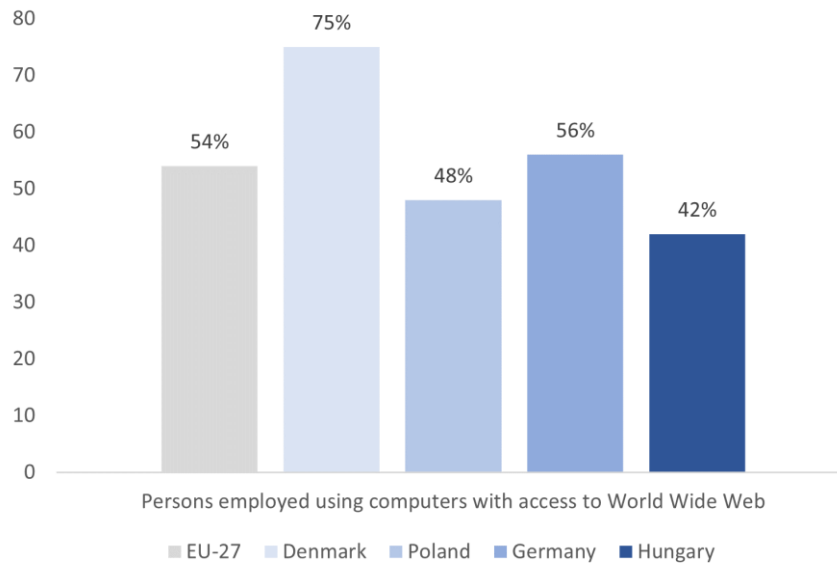
These results are to be interpreted against the background of the industry-specific economic structures of the respective countries. Structural aspects of the individual economic systems can thus justify the use of websites. Nevertheless, the existence of a corporate website represents an initial communication opportunity for sharing corporate information and contacting customers with the help of this digital technology.

Figure 2 Web presence, in % of companies, 2020



Source: Eurostat (2021b)

Figure 3 Employees with access to the internet, in %, 2020

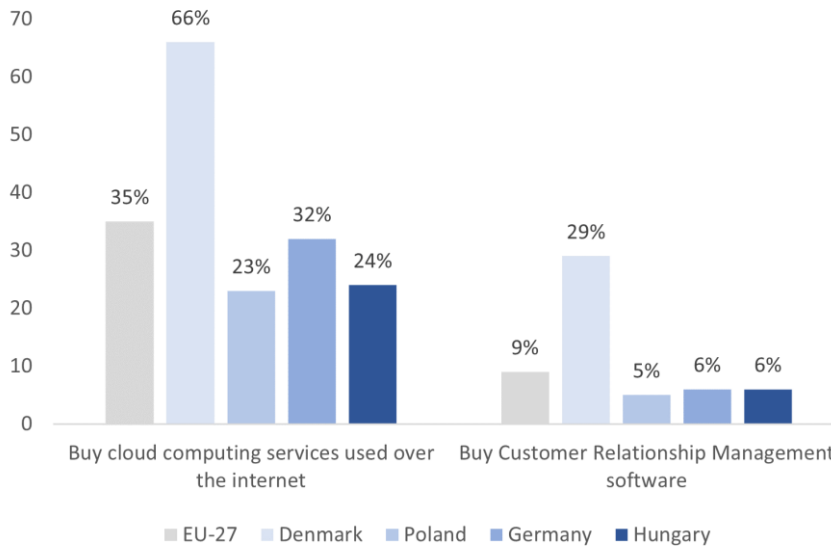


Source: Eurostat (2021c)

Integration of Cloud Computing

The integration of cloud computing in SMEs offers a wide range of advantages, such as location- and time-independent access to data, reduced investment costs for (server) hardware, or the use of IT infrastructures without high administration costs (Scopevisio, 2021). The use of cloud systems thus offers SMEs in particular, which often face difficulties in implementing digital solutions due to a lack of resources or specialist IT knowledge, an opportunity to use them in a resource-saving manner. As figure 4 illustrates, these benefits are not yet widespread among SMEs. For example, 66 percent of Danish companies use this digital technology to digitize internal processes, while 32 percent of German SMEs, 23 percent of Polish SMEs and 24 percent of Hungarian SMEs use this technology. Against this background, 29 percent of Danish SMEs said they use cloud computing for customer relationship management. Thus, Denmark is far ahead of Poland (5%), Germany (6%) and Hungary (6%) in the use of cloud computing for customer relationship management (Eurostat, 2021d).

Figure 4 Use of Cloud Computing, in % of SMEs, 2020

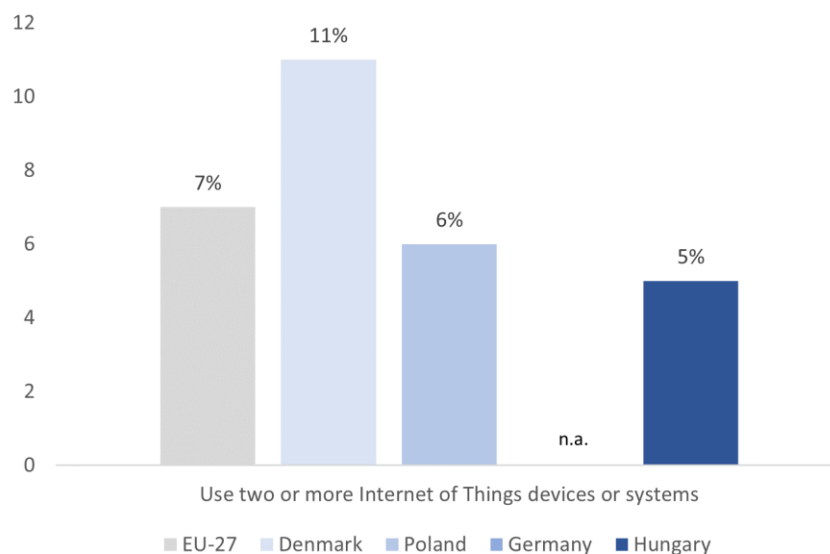


Source: Eurostat (2021d)

Integration of the Internet of Things

IoT is one of the technologies that enable companies to equip physical objects (e.g., machines, robots) with sensors that record and transmit real-time data via the internet and is primarily used to automate processes. As figure 5 illustrates, the use of IoT in SMEs is not yet very widespread (Eurostat, 2021e).

Figure 5 Integration of Internet of Things, in % of SMEs, 2020

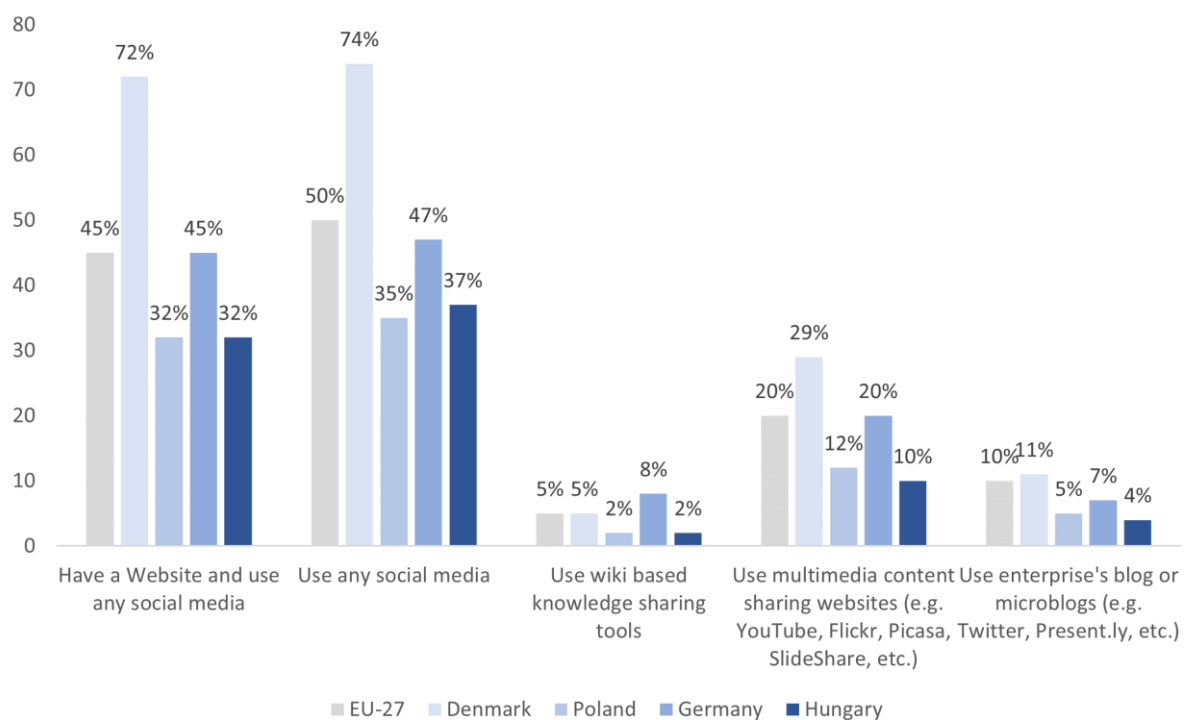


Source: Eurostat (2021e)

Application of Social Media

The application of social media methods offers great potential for integrating customers into the business processes of SMEs using digital methods and thus enabling customer-based innovations. However, as the analysis of Eurostat data shows, a large number of SMEs in Germany and Poland have not yet recognized or implemented this potential of social media and its positive influence on the competitiveness of companies. Once again, Denmark stands out as the frontrunner in the use of social media, with 74 percent of SMEs using it, far above the EU-27 average of 50 percent. A detailed look at the social media platforms used reveals that content sharing websites such as YouTube and Flickr are frequently used by SMEs. In addition, blogs are used by 11 percent of Danish SMEs, 5 percent of Polish SMEs, 4 percent of Hungarian SMEs and 7 percent of German SMEs to communicate company content to the outside world and to establish contact with customers. The use of wikis is not widespread in the countries under review in 2019 (Eurostat, 2021f).

Figure 6 Use of Social Media, in % of SMEs, 2019

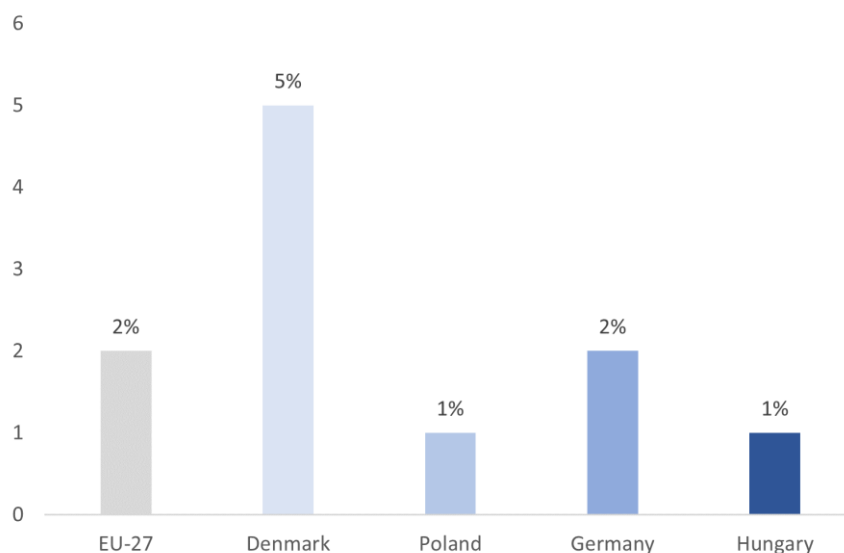


Source: Eurostat (2021f)

Use of Artificial Intelligence

As indicated in the literature analysis, Artificial Intelligence (AI) refers to a growing data processing ability of computers to perform activities without the influence of human intelligence. This leads to the opportunity to process large data sets which may improve efficiency of internal processing and data analytics. As figure Seven illustrates, only some SMEs in Denmark (5 percent), Poland (1 percent), Germany (2 percent) and Hungary (1 percent) yet have the expertise or financial and time resources to integrate this technology (Eurostat, 2021g). Again, this may also be reasoned by structural characteristics of industries.

Figure 7 Data analysis via Machine Learning, in % of SMEs, 2020



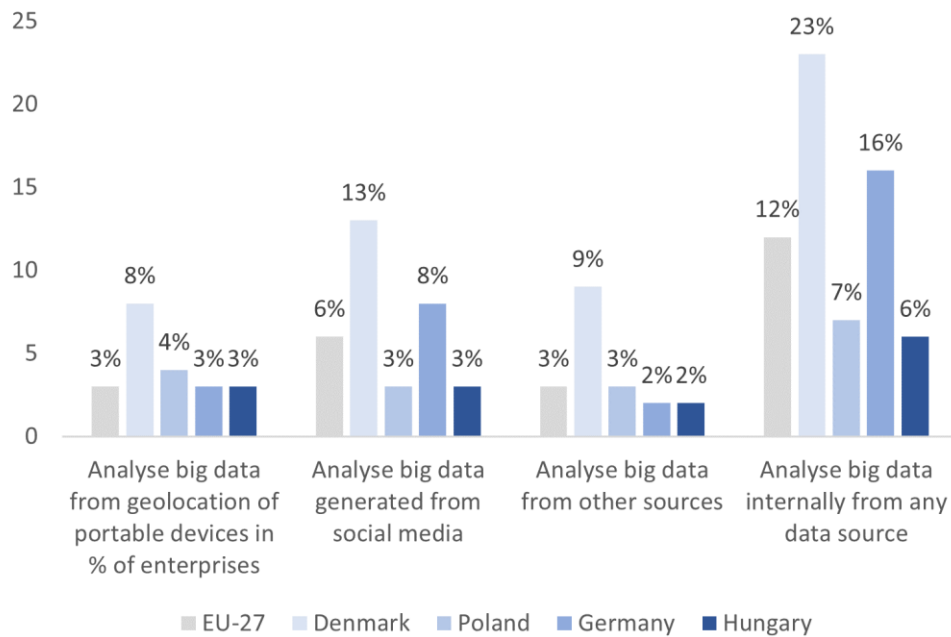
Source: Eurostat (2021g)

Big Data Analytics

Collecting internal and external digital company data offers a variety of opportunities to get to know one's customers better by means of Big Data Analytics and to identify their needs, concerns and wishes. Thus, changes in demand can be identified using data analytics and customer-based innovations can be developed. This agile digital method is used by 8 percent of Danish SMEs, 4 percent of Polish SMEs and 3 percent of German and Hungarian SMEs to identify the regionality of their customers. In addition, Big Data is primarily applied by Danish SMEs (13 percent) to analyze data sets collected in the course of social media activities. Only 8 percent of German SMEs and 3 percent of Polish and Hungarian SMEs use this option. The most prevalent use of Big Data

Analytics in the countries of interest is implemented to evaluate internal processes (figure 8) (Eurostat, 2021h).

Figure 8 Use of Big Data Analytics, in % of SMEs, 2020

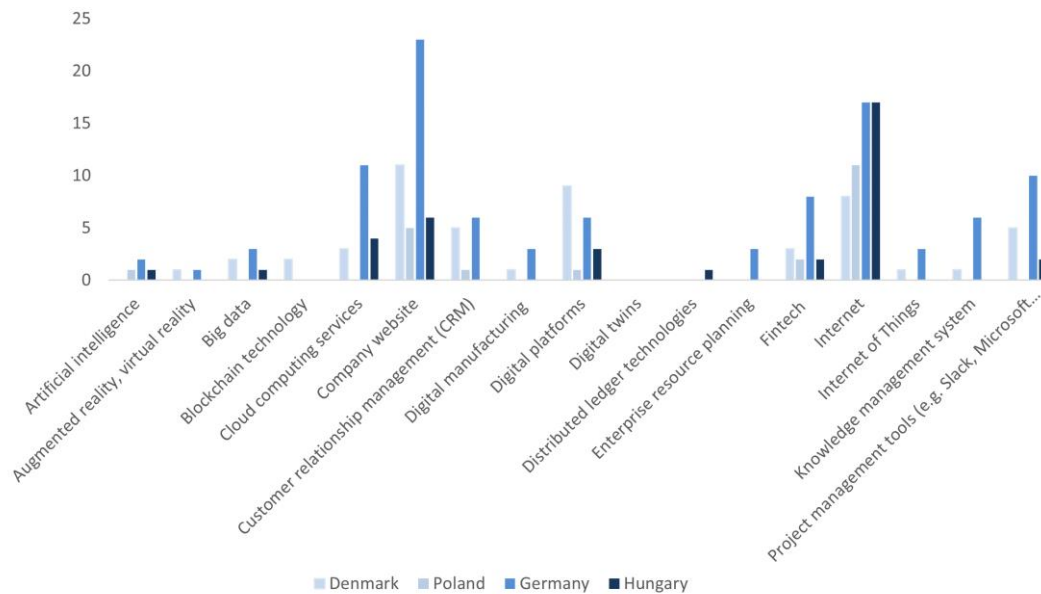


Source: Eurostat (2021h)

Survey results – Applied Digital Technologies in Denmark, Germany, Poland and Hungary

A total of 99 participants answered the survey. Looking at the countries relevant for this analysis, 15 participants from Poland, 14 participants from Denmark, 26 participants from Hungary and 27 participants from Germany can be considered for the study. Micro-enterprises make up the largest share of survey participants, but responses from large companies are also included in the sample. Against this background and due to the small number of participants, the following analysis results are not scientifically representative. Therefore, the following analysis should be seen as a starting point on which further surveys and analyses can be built if required.

Figure 9 Applied digital tools in SMEs

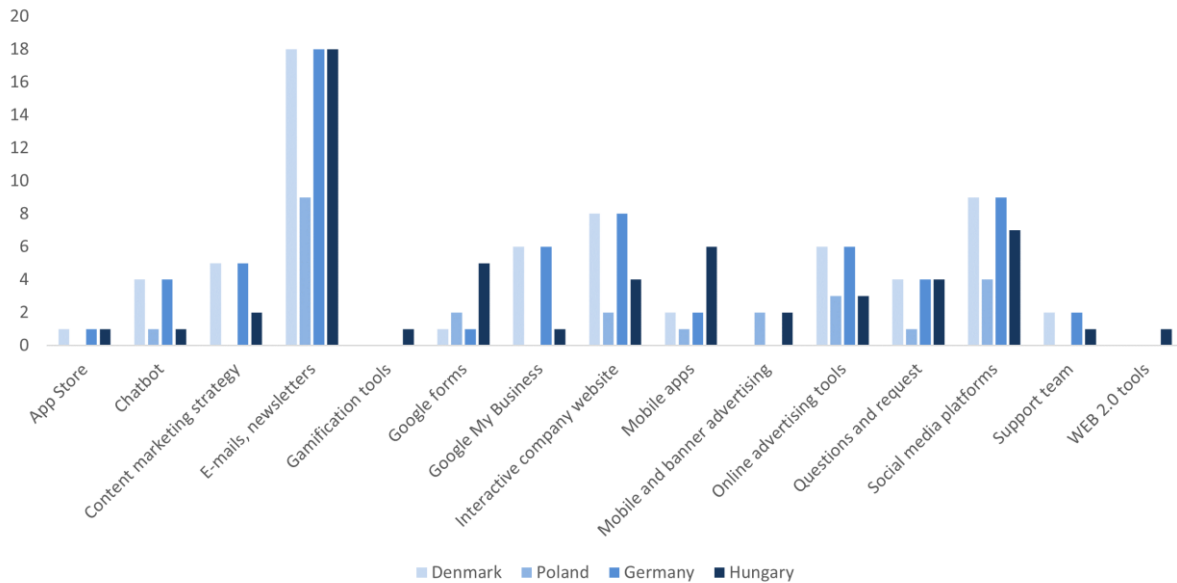


Source: ICIinSMEs survey, 2021

As illustrated by Figure 9, 17 of the German and Hungarian companies stated that they use the Internet in their daily business, while 11 of the Polish participants also mentioned this. Bringing up the rear when considering this technology is, surprisingly, Denmark with 8 mentions, although this is in line with the majority of Danish participants. The use of cloud computing services does not seem to be very widespread in the countries considered. While 11 companies in Germany stated that they use this technology, 3 Danish and 4 Hungarian companies did. The Polish participants all stated that they had not used this technology so far.

The same applies to the Internet of Things. While none of the Polish or Hungarian participants stated that they use this technology, one Danish and three German companies indicated that they do. Likewise, the use of technologically sophisticated Artificial Intelligence is not widespread in the countries under consideration. While 2 German companies use this technology, one Polish and one Hungarian company each stated that they implement this technology, but the technology is not used in any of the Danish companies surveyed. However, if we look at the analysis and evaluation of data generated in the course of digital activities, 2 Danish companies use Big Data to get to know their customers better and to evaluate the collected information for their benefit. The same is true for three German and one Hungarian company. None of the participating Polish companies stated that they use this method of analysis.

Figure 10 Used communication channels in SMEs



Source: ICI in SMEs survey, 2021

The use of social media as a communication channel by SMEs is widespread in the countries under review. Nine of the German and Danish companies each stated that they use this technology to communicate with customers. In addition, 7 of the Hungarian companies surveyed use this digital communication option, as do four Polish companies. Furthermore, Figure 10 illustrates that 8 of the participating SMEs from Denmark and Germany have a corporate website. Two of the Polish companies stated that they operate a website and four of the Hungarian companies have their own corporate website. Furthermore, as can be seen, e-mails and newsletters are the most widely used technologies in all countries to ensure and implement communication with customers.

Conclusion and recommendation

All in all, it can be concluded that there is hardly any consensus on the use of digital tools in the countries surveyed - Denmark, Hungary, Germany and Poland. While the use of, for example, emails, newsletters, corporate websites or social media platforms already seems to be widespread among the companies participating in the survey, there is still a wide range of further possibilities for companies to use resource-efficient digital solutions to increase or initiate customer-centric innovations. As the survey revealed, one main hurdle, the availability of internet in the regions considered, seems to have been overcome, revealing many potentials of developing digital methods

and tools for customer-centric innovation in SMEs. Based on the results, it also makes sense to initiate an exchange between the countries considered, e.g., to exchange best practices and individual solutions and thus learn from each other.

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