

## CHAPTER 7

# Digital Customer Service as Challenge for Modern Enterprises

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**Summary.** Digitization and other Industry 4.0 tools are increasingly used not only by companies as bidders but also by customers in purchasing processes. As a result, a new type of digital customer and consumer with specific requirements and expectations towards bidders is being formed. Serving digital customers as one of the main sources of competitive advantage is now becoming a significant challenge for enterprises. The aim of the chapter is to assess the level of advancement of Polish enterprises in the implementation of Industry 4.0 solutions in the context of the possibility of servicing digital customers compared to enterprises from other countries, with particular emphasis on EU member states. The following research methods were used: literature review, secondary data analysis and deductive reasoning. The conducted research shows that Polish enterprises, compared to EU countries, are poorly advanced in the implementation of Industry 4.0 solutions enabling efficient service of digital customers, and the main barriers to the development of modern technologies are financial constraints, lack of professional knowledge and qualified employees. The study contributes to the development of such research areas as: enterprise development opportunities in the era of Industry 4.0, customer service management, competitive advantage in the information age.

**Keywords:** digitization, Industry 4.0, digital client/customer, digital customer service

### 1. Introduction

Digitization as one of the key areas of Industry 4.0 dynamically enters almost all areas of socio-economic life. Enterprises are increasingly using the Internet and digital technologies in production processes and relations with business partners and customers, while customers and consumers are increasingly using mobile devices in the processes of purchasing and establishing contacts with suppliers. Digitization in this area leads to the creation of a new type of customers, the so-called digital customers, who are characterized not only by different behaviour and shopping habits, but also specific requirements and expectations of

offerors. Serving this new category of customers, indicated as one of the significant sources of competitive advantage in the coming years, is becoming a serious challenge for modern enterprises. The purpose of this chapter is to assess the level of advancement of Polish enterprises in implementing Industry 4.0 solutions, in the context of the possibility of servicing digital customers amid enterprises from other countries, with particular emphasis on the EU Member States. The compiled diagnosis can be used to formulate conclusions and recommendations for the socio-economic policy of the state directed at the development of Industry 4.0, to ensure the competitiveness of the Polish economy on the international stage.

The chapter defines the category of digital customers, describes their personality profile, which results in specific requirements towards enterprises and trends in service. Next, the level of digitization of Polish enterprises was analysed, i.e., the use of Industry 4.0 dimensions, most important from the point of view of a digital customer service, such as: the Internet of Things, 3D printing, Big Data, Artificial Intelligence, cloud computing, robotization (Armengaud et al., 2017; Dallasega et al., 2018; Lu, 2017; Pereira & Romero, 2017). In this context, the following research questions were formulated:

- What is the personality profile of the digital customer?
- What are the specific requirements of digital customers and the current trends in their service?
- What is the level of advancement of Polish enterprises, especially from the SME sector, in implementing modern solutions of Industry 4.0 amid the enterprises from other countries, especially the EU members?
- What are the main barriers with implementing Industry 4.0 in Polish enterprises?

The following research methods were used in the study: literature review, analysis of secondary data from professional reports and studies of public institutions, scientific research centres, research and consulting agencies, and deductive reasoning.

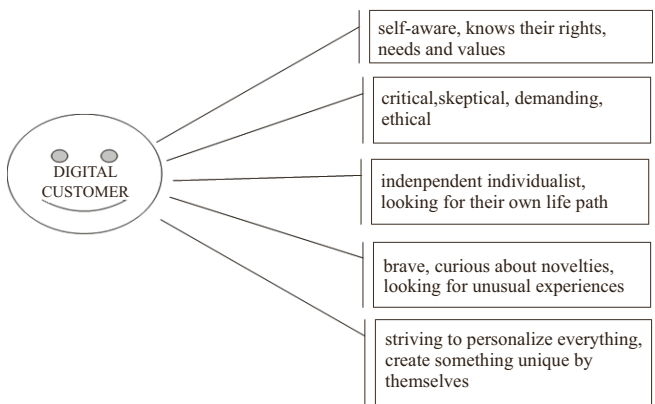
## **2. Who is a digital customer – personality profile**

Digitization and other technologies within the Industry 4.0 are changing and revolutionizing almost all spheres of human activity. Access to the Internet and the use of devices, such as a mobile phones, smartphones or laptops, is becoming more and more common and permanent, especially among the representatives of the Y and Z generations (Krzepicka, 2016; Priporas et al., 2017). Progressing digitization is particularly visible in customer service, both on the B2C and B2B market. This analysis primarily concerns customer service on B2C markets, which is why the terms customer and consumer are used interchangeably. According to Oracle research from 2016 (*W 2020 klienci będą...*, 2016) 78% of brands planned to implement virtual reality solutions for customer service by 2020 and 80% will serve customers via chatbots.

These changes and tendencies cause a new type of customer to emerge, moving freely around in virtual reality, which is characterized not only by new shopping habits and behaviors, but also by a different way of thinking, a different mentality, value system. This is referred to as a digital customer. According to the approach developed by the Joint Research Centre, acting as an agenda of the European Commission, a digital consumer is one that has the so-called digital competences. Digital competences are defined as those, that the

consumer needs to be able to actively, safely and assertively operate on the digital market (Brečko & Ferrari, 2016). It is primarily about the ability to make digital purchase and sale transactions and to play an active and assertive role on the digital market.

The personality profile of the digital customer has been compiled on the basis of an analysis of research on shopping behaviour and habits, as well as the system of values and lifestyle of digital customers, carried out by selected agencies and research centres. These studies show that the digital customer is, above all, well-informed, more aware of oneself and one's needs, as well as a more independent buyer (Gieracz, 2014; Wojciechowska, 2018). Meerman (2015) states that "today, in a world where consumers can collect data themselves, customers are often better educated than the sales representatives, with whom they do business". As a result, the digital customer becomes a determined, confident, more demanding and critical person. Digital customers expect high standards of product quality and service, and having many offers to choose from is less tolerant and understanding for offerors (Badenhorst, 2015). They report and criticise all mistakes, frauds or unfair practices on Internet forums or on social media. They are susceptible to fashion, to emerging trends and is, therefore, characterised by high variability. As a result, the level of loyalty of digital customers towards a brand, store or manufacturer is falling (Badenhorst, 2015; Gieracz, 2014). Digital customers are also characterised by: impatience, pursue of convenience and comfort. They appreciate simple and transparent applications that ensure quick and easy access to the offer and the opportunity to make a transaction (Gieracz, 2014; Wojciechowska, 2018). The digital customer is a brave person, curious about new products, with a high level of requirements for handling and simplifying decisions (Persaud & Azhar, 2012; ShoppingShow, 2014). He is also active and creative, willingly involved in interesting initiatives in the search for new, attractive experiences (Kotarbiński, 2015; Sopramanien, 2011). The digital customer is an independent individualist, strives to personalize everything, wants to express their otherness through unique, one-of-a-kind things, strives to create something unique on their own (Gawlik et al., 2014). Digital customers look for and create their own unique life path that will allow them to meet their individual needs and create e-habits (Fisk, 2014; Mróz, 2013). Figure 1 shows the basis of the personality profile of a digital customer.



**Fig. 1.** Personality profile of a digital customer

Source: (Szwajca, 2019, p. 260)

Summing up, a digital customer may be defined as a customer using the Internet and mobile devices in purchasing processes, his shopping behaviour and habits, as well as the value system and lifestyle, are determined by the functioning on the digital market. In Poland, the number of digital customers is growing every year (*Cyfrowi Polacy...*, 2019; *Polak staje się coraz bardziej cyfrowy*, 2019; *Raport e-Commerce*, 2016). These trends are also confirmed by Deloitte research, which calculated the Digital Influence Factor, illustrating the impact of digital devices on the customer's shopping path. In relation to Polish customers, it was 60% in 2018, which means that during two out of three visits to the shop, customers use a digital device (*Koniec ery dwóch światów...*, 2019).

### **3. Specific requirements of digital customers and trends in their service**

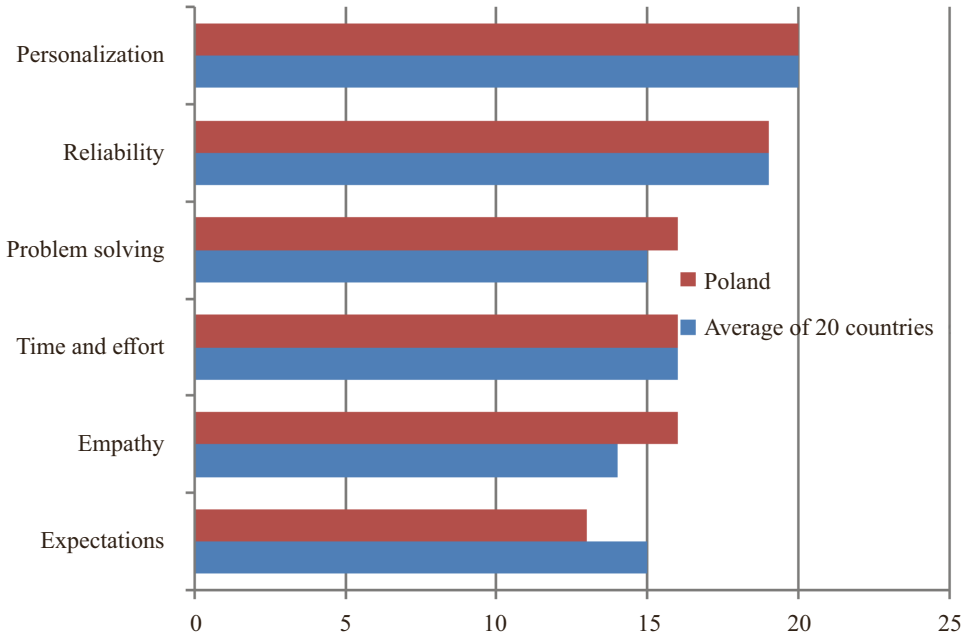
Digital consumers, representing a new way of thinking and acting, as well as a new value system and lifestyle also have other specific requirements and expectations for the enterprise and its offer. Based on the research carried out by KPMG in 2019 (*Czy klient jest najważniejszy?...*, 2019), specific behaviours, expectations and preferences of Polish consumers were identified as a result of ongoing digitization. Digital consumers have been found to:

- evaluate brands not only through the prism of all their direct experiences with this brand, but also other information available in the global digital world,
- shift their expectations, when it comes to excellence of customer experience between industries (e.g., from retail to banking),
- expect a “well-tailored” personalization of products/services and the way they are handled,
- require a “Here and Now” service, where the mobile channel is becoming more and more dominant,
- expect ever greater easiness, convenience and speed in relation to the brand,
- require a consistent offer/service in all communication channels,
- use the possibility of an easy comparison of offers,
- take into account the opinions of individual customers,
- willingly document and “publicise” in the digital space their experiences in relation to the brand (especially negative),
- look for opinions and recommendations of friends/other people.

In 2018 KPMG conducted research on the requirements and expectations of digital customers from Poland and 20 countries from four continents (*[Cyfrowy] klient nasz pan...*, 2019). The surveyed customers, both from Poland and other countries, indicated personalization and reliability as the most important pillars they believe have a decisive impact on recommending a given brand (Fig. 2).

Analysing the results of the above research, it can be concluded that the indication of personalization and reliability is a consequence of digitization in the relations between the enterprise and the customer, as well as the previously discussed digital features of customers. Digital customers, as independent individualists, striving to express their otherness through one-of-a-kind things, expect a personalised offer, tailored to their individual needs and

preferences. They are aware of the fact that, thanks to the use of modern digital technologies (e.g., the Internet of Things, mobile communication channels, social media), the company can learn their personal requirements and prepare the right offer for them.



**Fig. 2.** Importance of six pillars for Polish and foreign digital customers

Source: ([Cyfrowy] klient nasz pan..., 2019)

However, the high requirements of digital customers regarding the enterprise’s reliability result from several premises. First of all, digital customers, moving freely around in the virtual world, are well-educated and aware of their rights and interests. Having access to many sources of information, they are able to verify the truthfulness, honesty and reliability of the company in relation to a given offer quite easily and quickly. Secondly, digital customers, communicate with other users on online forums and social media, seek their opinions (which they generally trust more) and check the reliability of information provided by offerors (Jin et al., 2016; Pfeffer et al., 2014; Viglia et al., 2016). Thirdly, digital customers communicate with the company through many channels and can check their consistency. If the information provided by the company through different channels is divergent, the customer may lose confidence in it.

Dynamic changes and transformations in the requirements and expectations of digital customers lead to the formation of new trends in their service. Simmet (2016) identified seven trends in digital customer service:

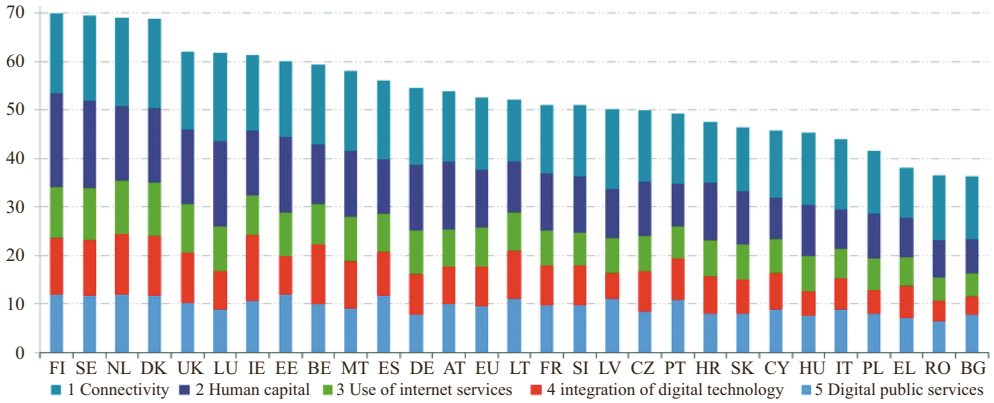
- e-service – service processes are moved from the real to the virtual world, digital communication channels dominate, such as live chat, video, chatbots,
- social media service – customers expect service via social media, such as Facebook or Twitter,

- proactive service – customers expect companies to be active in offering new and complementary offers, thanks to a good knowledge of their needs, which enables the use of such big data technologies or predictive analytics,
- integrated service – thanks to the use of the Internet of Things,
- wearable enabled service – access to so-called wearable devices (e.g. watches, jewellery) enable quicker communication and provide appropriate data about the customer and their features,
- contextual service – personalised service based on the customer’s situation and empathic understanding of their needs,
- virtual service – virtual reality service.

Meeting digital customer requirements and adapting to new trends in their service requires the implementation of various technological solutions developed under Industry 4.0. Technologies, such as 3D printing or the Internet of Things, will move the production closer to the customer. For example, the use of 3D printing allows greater personalization and customisation of products (Arribas & Alfaro, 2018). In turn, the Internet of Things not only creates opportunities to increase the ability to respond more flexibly and faster to customer requirements, but also allows to anticipate the needs and co-create new offers together with the customer. In contrast, the use of data analytics and mobile communication can improve cooperation between partners in supply chains (PwC, 2016a). Many enterprises take up these challenges and take into account the investments in digital technologies in the field of Industry 4.0. in their development plans. This is demonstrated by, among others, data from the Accenture Technology Vision 2019 report (*Accenture Technology Vision*, 2019), according to which over 63% of companies in the world and 60% in Poland declared that they intend to invest in solutions based on artificial intelligence in the near future, whose primary goal will be to create additional value for customers and provide them with a personalized service. Over 85% of the surveyed managers in Poland and in the world have indicated that, in the near future, the companies that will gain a key advantage will be those, that are able to offer consumers products or services perfectly tailored to their individual needs and, at the same time, available “on the spot”. Therefore, the ability to meet the digital customer’s needs should be considered not only a source of competitive advantage, but also a condition for survival on the digital market of the future.

#### **4. Level of digitization of Polish enterprises amid enterprises from selected countries**

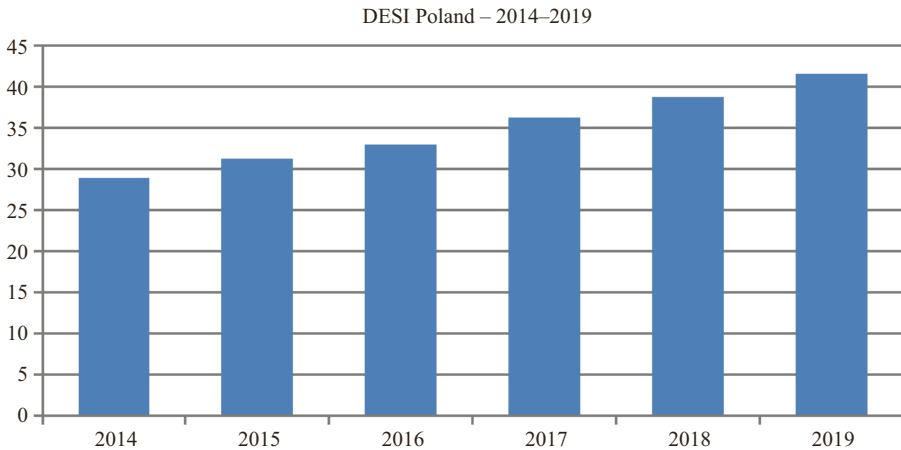
The Digital Economy and Society Index (DESI) analysis can be used to assess the overall level of development of the digital economy in Poland amid the EU countries. DESI is calculated as a weighted average of five dimensions: Connectivity (25%), Human Capital (25%), Use of Internet (15%), Integration of Digital Technology (20%) and Digital Public Services (15%). Each dimension consists of several indicators, which are 34 in total (Digital Economy and Society Index (DESI) 2019, June 2019). Figure 3 presents the ranking of the EU countries by DESI size in 2019.



**Fig. 3.** Digital Economy and Society Index (DESI) 2019 ranking

Source: (<https://ec.europa.eu/digital-single-market/desi>)

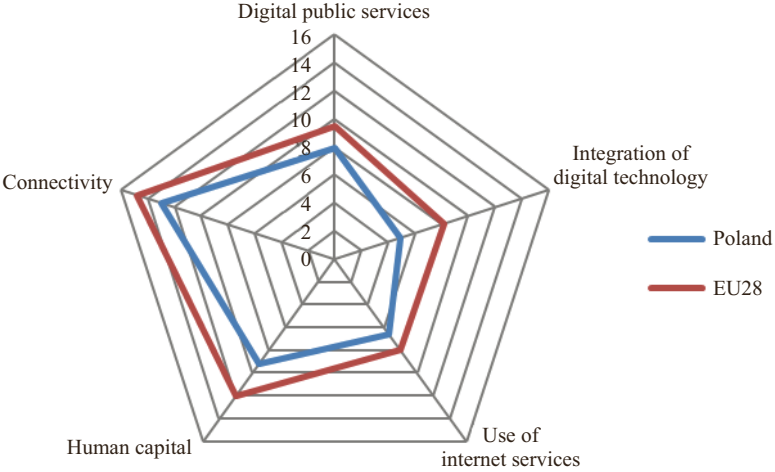
As can be seen in Figure 3, the first four places were taken by the Scandinavian countries: Finland, Sweden, the Netherlands and Denmark. These countries are at the forefront, just behind South Korea, ahead of Japan and the United States of America. Poland was fourth from the end, ahead of Greece, Romania and Bulgaria, and Poland's DESI was significantly lower than the EU average. DESI is calculated for all EU member states since 2014. Since 2014, Poland has significantly improved its DESI index (Fig. 4), but this is insufficient progress, compared to other EU Member States. The 2019 European Commission report indicated that all EU Member States have made significant progress in the digital transformation, with the greatest progress over the past five years being: Ireland, Lithuania, Latvia, Cyprus and Spain.



**Fig. 4.** DESI of Poland 2014–2019

Source: (*DESI country profile (PL), 2019*)

With regard to the five dimensions of DESI, the largest gap separated Poland from the EU average in terms of Integration of Digital Technology and Human Capital, and the smallest distance concerned the Use of Internet Services and Digital Public Services (Fig. 5).



**Fig. 5.** Five DESI dimensions: Poland amid EU average

Source: (*DESI country profile (PL)*, 2019)

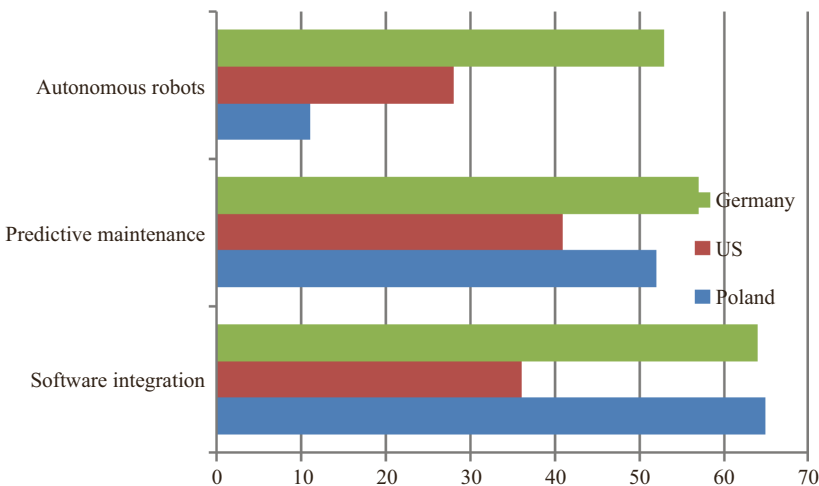
Digitization and implementation of mobile technologies in the field of Industry 4.0 is a fundamental factor for Polish enterprises to ensure proper service of digital customers (also customers on the B2B market), not only on the domestic market. It is also necessary if Polish companies want to maintain and guarantee their participation in international supply chains and international value chains (Ślusarczyk, 2018). Companies and countries that are leaders in the implementation of Industry 4.0, dictating development trends, require their partners' compatibility and appropriate adjustment of the level of technological solutions. In this context, it is worth comparing Poland with Germany because of the strong interdependencies and connections of the economies of these countries<sup>1</sup>. It should be noted, that the idea of Industry 4.0 was created during the fair in Hanover in 2011. Since then, German companies have started intensive design works in this field, to which the federal government joined in 2013 (Godlewski, 2016; Götz & Gracel, 2017). Germany competes with the US for the position of the leader of the fourth industrial revolution, with German companies putting emphasis on production automation, while American companies, on software, development of e-commerce and social networks. The main incentives of Industry 4.0 development in German companies are: the ambitions and competences of engineers, rising labour costs and the lack of qualified employees on the labour market (Götz & Gracel, 2017). In 2019,

<sup>1</sup> Germany is Poland's most important trading partner. According to the data of Statistics Poland (GUS), exports to Germany in 2018 constituted 28.2% of Polish goods exports, and imports – 22.4%. The surplus in turnover with Germany reached EUR 13.7 billion in 2018 (Ambroziak, 2019).



German DESI was larger than Polish DESI by about 13 percentage points (Poland – 41.6%, Germany – 54.4%). The largest disproportions concerned the dimensions of: Integration of Digital Technology, Human Capital and Connectivity.

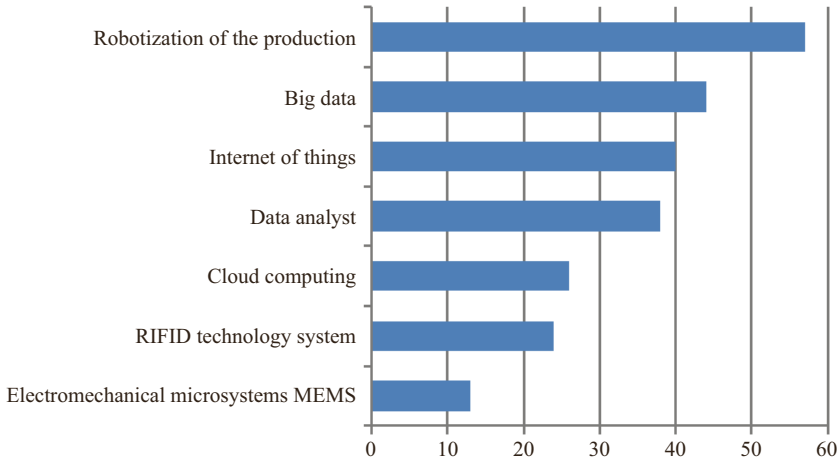
The results of BCG research from 2016 (Dmowski et al., 2016) show disproportions in the level of implementation of selected technological solutions in the field of Industry 4.0 in German, American and Polish enterprises (Fig. 6). As can be seen in the Figure 6, Poland has a very similar level of implementation of software integration and predictive maintenance to Germany. The biggest differences to the detriment of Poland concern the use of automatic robots, in Poland they have been implemented or are planned to be implemented by approx. 26% of companies, and in Germany twice as many, approx. 53%. According to IFR (IFR, 2015), the density of robotization (the number of industrial robots per 10,000 employees) in Poland in 2013 amounted to 19, but was 15 times lower than in Germany (292) and 4 times lower than the average in the European countries. The depth of Industry 4.0 solutions in the areas of analytics and data processing in Poland is assessed at only 5% of the depth of the German market. American companies presented amazingly poor results in virtually all areas.



**Fig. 6.** Selected Industry 4.0 technology solutions implemented or planned within 1–2 years in Germany, US and Poland

Source: (Dmowski et al., 2016, p. 28)

The level of advancement of Polish enterprises in implementing Industry 4.0 technology has been the subject of several other studies conducted by various research centres and institutions in the recent years. Surveys on a sample of 100 managers of large companies (employing at least 250 people) carrying out production activity in Poland were conducted by PwC in 2016. The use of digital technologies was declared by more than half of the respondents and these were mainly: robotization of production lines, use of large data sets and the Internet of Things (Fig. 7).



**Fig. 7.** Use of selected Industry 4.0 tools by large enterprises operating in Poland

Source: (Siemens, 2016)

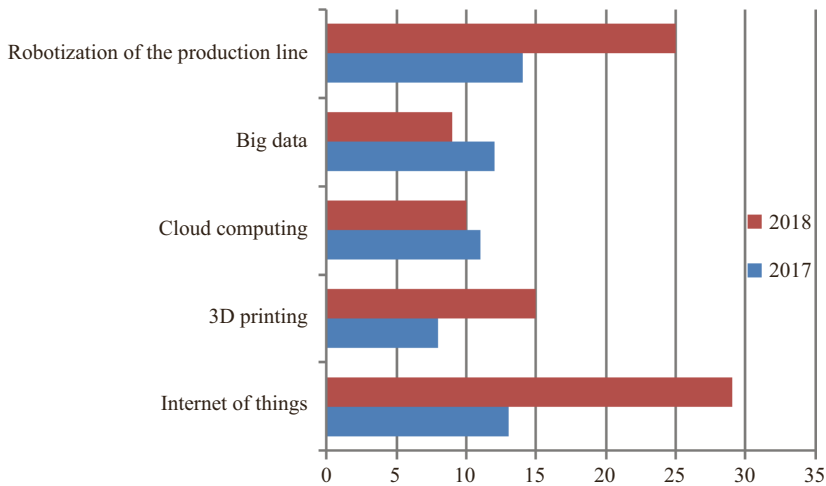
Almost half of the respondents indicated, however, that these solutions are rather used in selected business projects and are not of a systematic nature of operating practice (Siemens, 2016).

Interesting research on the awareness and level of the implementation of Industry 4.0 solutions was conducted on a small sample of Polish and Czech enterprises (large and medium), mainly from the automotive and mechanical industries (Sąsiadek & Basl, 2018). The obtained results indicated that:

- definitely more Czech companies know and operate in accordance with the concept of Industry 4.0 (Czech Republic – 63%, Poland – 34%),
- Polish companies make more use of tools, such as the Internet of Things and Big Data, while Czech companies use robots, mobile devices and cloud computing,
- as the main barriers to the development of Industry 4.0, managers from both Polish and Czech companies indicated: low awareness and knowledge of employees in the field of Industry 4.0, too high costs of implementing Industry 4.0 solutions and the high risk of investing in Industry 4.0.

The problem of digitization and Industry 4.0 solutions is particularly important in the sector of small and medium-sized enterprises, given that they constitute 99% of all companies operating in Poland, generate over 60% of national GDP and employ 70% of the total number of employees (Pałasz, 2017; PARP, 2019). So far, several studies and analyses have been carried out regarding the problem of implementing Industry 4.0 in this sector.

In the years of 2017–2018, Kantar Millward Brown conducted two editions of research among small and medium enterprises (employing up to 250 people), representing various industries from all over Poland. The editions slightly differed in the size and structure of the sample (2017 – 251 companies, including 1/3 medium sized, 2018 – 250 companies, including 1/4 medium sized) and the structure of the questionnaire (Weresa, 2019). The comparison of the results of both editions is, therefore, indicative, but it allows for an overall, estimated assessment (Fig. 8).



**Fig. 8.** Industry 4.0 in Polish small and medium enterprises – comparison of selected elements in 2017 and 2018 (%)

Source: (Weresa, 2019, p. 254)

The obtained results showed that the most commonly used Industry 4.0 solutions are: the Internet of Things, robotization of production lines and 3D printing, although the percentage of companies using them is small (approx. 20–30%). The largest increase in their use in the surveyed companies in 2018 compared to 2017 is also noticeable in these areas. Only about 10% of the surveyed companies declared the use of tools such as big data and cloud computing.

Another example of research in the SME sector is the project entitled “Industry 4.0 impact on the small and medium enterprise sector”, implemented in 2018 (*Projekt “Wpływ Przemysłu 4.0 na sektor MŚP”*, 2018). The project was financed by the Visegrad Fund and concerned enterprises from the Visegrad Group (V4) countries, i.e. Poland, the Czech Republic, Slovakia and Hungary. The project primarily focused on digitization. A survey was carried out among managers from small and medium-sized companies on the use of digitization tools, its importance and implementation barriers. According to most surveyed, the extent, to which digitization is necessary for small companies, primarily depends on the industry, there are industries where services provided directly to consumers cannot be replaced by digital solutions. Despite the rather sceptical approach to the implementation of digitization, most of the surveyed managers, especially from family businesses, micro enterprises and small businesses, use basic tools: they use a computer, smartphone, use several applications to communicate with offices and customers. The main factors inhibiting digitization in small and medium enterprises are: financial problems, insufficient knowledge and competences, fear of threats related to digitization and lack of support from the state or other institutions. According to the respondents, the development of digitization is very expensive and small companies do not have sufficient financial resources or access to sources of financing for such investments. Small and medium business owners, especially the elderly, do not have sufficient knowledge and skills to use modern digital solutions. They have concerns

about the security of operations in cyberspace. They also see no support for any actions towards the development of digitization by the state. Reports from V4 countries have revealed that the strategies for developing Industry 4.0 are macroeconomic, affect large enterprises and are focused on export. In the field of digitization, SMEs would need the so-called positive discrimination.

It turns out, that the barriers in implementing Industry 4.0 in enterprises are universal. According to the results of PwC research from 2016, both Polish and foreign companies, representing countries from all continents, pointed to the same restrictions, although to a different degree (Tab. 1).

**Table 1.** Barriers in implementing Industry 4.0 into Polish and foreign companies

<b>Barriers in implementing Industry 4.0 into enterprises</b>	<b>Answers from Polish companies (%)</b>	<b>Answers from foreign companies (%)</b>
Limited financial resources	34	36
Lack or insufficient access to qualified and talented employees	32	25

Source: own work based on (PwC, 2016a; PwC, 2016b)

The same problems for Polish companies are financial constraints and lack of access to relevant professionals. In global terms, companies are more afraid of difficulties with access to capital for implementing digital investments than of the lack of specialists in this field. In addition to these barriers, Polish companies also indicated: the lack of support from public institutions, the risk of return on investment and fear of cybercrime (Götz & Gracel, 2017; *Projekt "Wpływ Przemysłu 4.0 na sektor MŚP"*, 2018; Weresa, 2019). The Polish branch of BCG conducted research among Polish managers and students of the best technical universities on the potential of Poland to implement Industry 4.0. The obtained results have shown that the vast majority of managers are quite sceptical about this process. The reasons for this approach may be low labour costs, which do not motivate to change, as well as financial restrictions, especially among companies from the SME sector.

As can be seen, the main barriers to the development of Industry 4.0 in Polish enterprises (especially in those small and medium-sized) relate to two issues: financial constraints and a lack of knowledge and competence in this area. To remove these barriers, what is needed is, among others, strong support from public institutions. This is not only about support from the national government and national non-governmental institutions, but also from international institutions such as the EU. The creation of new knowledge needed for the development of Industry 4.0 is financed, among others, from the 7<sup>th</sup> Framework Programme of the EU. An analysis of the use of funds from this programme by the Member States has indicated that Germany, Spain, Italy and the United Kingdom are the most advanced in the use of these resources and research activities in this area. Poland is one of the countries falling behind in the development of R&D in the field of Industry 4.0 (Ciffolilli & Muscio, 2018).

## 5. Conclusions

Digital technologies developed within Industry 4.0, such as: the Internet of Things, 3D printing, big data, cloud computing, Artificial Intelligence and robotization dynamically embrace and change almost all spheres of life, including primarily economic reality. The implementation and use of these technologies by enterprises is becoming crucial to meet the specific requirements of digital customers and new trends in their service. Digital customer service is considered one of the most important sources of achieving competitive advantage in the near future.

The analyses carried out in this chapter show that Polish enterprises are not well advanced in implementing Industry 4.0. In the ranking of the level of digitization of the EU Member States measured by DESI, in 2019, Poland took 25<sup>th</sup> place out of 28 countries, moreover, the distance between Poland and the countries from the top of the ranking, as well as that of the EU average has not decreased in the recent years. Research conducted by various agencies and research centres also indicated a low-level usage of Industry 4.0 technology by Polish enterprises, especially from the SME sector. The main barriers to the development of Industry 4.0 indicated by the surveyed Polish companies were: financial limitations, lack of access to professional knowledge and qualified employees, lack of support from public authorities, fear of risk related to return on investment and fear of cybercrime. Businesses alone are incapable of overcoming these barriers. They need the support of public institutions, both domestic and international.

This is about financial and institutional support to the same extent. As part of financial support, the following solutions are possible: preferential credit, funding for research projects, tax reliefs, guarantee fund, digitisation vouchers. In the field of education and raising qualifications, state institutions and non-governmental organizations could be the initiators and partners in research projects, in the organization of training, workshops, scientific conferences and seminars promoting knowledge and developing skills in the field of Industry 4.0. It is also important to support cooperation between market entities, industry organizations, scientific institutes and universities, exchange of good practices, as well as knowledge transfer and joint projects. Leading countries in the development of Industry 4.0 have already implemented appropriate strategies. An “Advanced Manufacturing” programme was developed in the United States, China has the “Made in China 2025” strategy and the “Smart Nation” initiative was approved in Singapore. In Germany, the “Industrie 4.0” strategy is being implemented under the aegis of the federal government.

The Polish government is also taking initiatives to support the development of Industry 4.0. The Industry Platform of the Future project has been developing since 2018, which aims to support the digital transformation of Polish enterprises in the field of processes, products and business models, using the latest achievements in the field of automation, artificial intelligence, ICT and communication between machines, as well as human and machines. In 2019, the Ministry of Development appointed the Industry Platform of the Future Foundation, which will support cooperation, shape competences, build support networks, coordinate and standardise Digital Innovation Hubs (DIH). Hubs are to operate on the basis of appropriate technological infrastructure (competence centres) and provide access to the latest knowledge and technology, so as to support entrepreneurs in piloting actions, tests and experiments of a given technology (Ministerstwo Rozwoju, 2019). However, there is no central

programme dedicated to the SME sector, which needs special support (*MŚP potrzebują większego wsparcia...*, 2019). A good example here can be the “Digital Strategy 2025”, developed and implemented by the German federal government, assuming, among others, the creation of 20 centres of excellence for craft professions, the creation of 4 SME 4.0 agencies, initiating projects such as “Go-Digital”, financing external consultants, full broadband coverage by 2025 (“Impact of Industry 4.0 on the SME sector” project). On the other hand, institutional support may consist of ensuring digital security, development and implementation of standards, norms and certification, both at the national and international level, e.g., within the EU.

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