

# The Polish SMEs as Intelligent Organizations in an Era of Digital Transformation

Piotr Adamczewski  
University WSB Merito, Poznan, Poland

The impact that the digital transformation (DT) has on businesses, suppliers, and other third parties has increased significantly now. Digital transformation means improving traditional manufacturing processes with the help of digital technologies. The goal of digital transformation is to increase production efficiency and reduce costs, improve the quality of goods and services produced, and quickly adapt to changes in the global market. The state of industrial production is constantly changing due to the instability of global, economic and political decisions, so the adoption and expansion of digital solutions based on Industry 4.0, the Internet of things, machine learning, and other technologies of the future is accelerating. With the help of these technologies, companies are trying to change approaches and find new ways to solve problems. In this article the author analyzed the phenomenon of a complex system of knowledge management with tools as SMAC, AI, IoT and Edge computing in intelligent organizations as a part of intelligent economy. The arguments are illustrated with the results of own research conducted by the author in 2021-2022 in selected SMEs from the Polish Wielkopolska Province and their reference to the general development trends in this area.

*Keywords:* digital transformation, ICT, intelligent organization, SMAC, SME

## Introduction

Digital transformation, the process of integrating digital technology into all aspects of business, is a critical issue for Small and Medium Enterprises (SMEs) worldwide. This transformation is not just about digitizing an existing service, but about innovating and creating new processes, culture, and customer experiences to meet changing business and market requirements. In the SME sector, digital transformation can be a game-changer. It can improve efficiency, increase competitiveness, and create new opportunities for growth. However, it also presents challenges. SMEs often lack the resources and expertise to implement digital technologies effectively. They may also face difficulties in adapting their business models and operations to a digital environment.

In the context of Poland, the digital transformation of SMEs is particularly important. With its dynamic economy and growing tech sector, Poland has the potential to become a leader in digital innovation. However, the adoption of digital technologies among Polish SMEs is still relatively low, and there is a need for greater support and investment in this area. Overall, the digital transformation of SMEs is a complex and multifaceted issue. It requires a comprehensive approach that includes not only technological innovation but also changes in

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Piotr Adamczewski, Ph.D., associate professor, Institute of Management, University WSB Merito, Poznań, Poland.

Correspondence concerning this article should be addressed to Piotr Adamczewski, University WSB Merito, Postalców Wlkp. 5, Poznań 61-895, Poland.

organizational culture, business processes, and strategies. Despite the challenges, the potential benefits of digital transformation for SMEs are enormous, making it a key priority for businesses, policymakers, and stakeholders alike.

The rapid development of digital transformation technology has brought the global community into the digital era. Advanced digital technologies (e.g., the Internet of Things, big data analytics, machine learning, artificial intelligence, and cloud computing) have changed social and industrial activities. Currently, digital transformation is becoming an inevitable reality. This phenomenon was accelerated by the COVID-19 pandemic, which has increased people's online activities due to physical contact restrictions. The impact of the global pandemic has become an important trigger for industry, academics, regulators, and societies in many countries to consider digital transformation as the game changer in boosting sustainable economic growth. Digital transformation is happening massively and has become the power source for corporate management and development, even for micro, small, and medium enterprises in various sectors such as manufacturing, transportation, health, education, and agriculture, as well as the economic and financial sectors.

The rapid development of digital economy activities requires banks to undergo digitalization to stay competitive and relevant in their industry, as digital technologies can improve the bank's business values and propositions from the customer perspective. Digital transformation has become an important issue in the banking sector as it can enlarge customer outreach by servicing without physical branches, marketing differentiation from competitors, and for operational cost efficiency (Apio, Frattini, Petruzzelli, & Neirotti, 2021). The banking sector should adjust its digital capabilities to compete with FinTech, because this new player influences the competitiveness and performance of the banking sector; thus, technology management will directly impact the bank's performance (Annansingh & Sesay, 2022). The digital transformation, which is supported by technology-enabled innovation, also becomes a solution for leveraging financial inclusion for economic development in emerging countries.

Progress in digital technology has led to new business opportunity and changed the way in which organizations create, deliver, and capture value. Traditional companies could fail in operationalizing their digital transformation approach because they believe that they can pursue digitalization simply by applying new ICT technologies. Digitally enabled organizations are supported by emerging digital technologies, which increasingly promise great opportunities for growth. These digital technologies embrace ICT systems such as mobility, analytical systems, and virtualization and are integrated with back-office ICT in order to provide a holistic view of the digital organization. Such initiatives are known as being part of the Digital Transformation (DT) of organizations and require them and their respective management to react on the process of implementation. With the shift to digitalization, organizations cannot focus their behaviour and reaction only on the physical/traditional world. Managers in any organization must be able to recognize and anticipate technology-enabled change, assess its potential and impact, and understand how to leverage digital technology in order to capture and create value for their organizations. Successful management of an organization in a digital era requires rethinking the organizational strategy, business model, and key business drivers (Beckford, 2020).

Competition is accelerating faster than ever before; the rise of digital and FinTech start-ups is changing global competitive dynamics; mobile is becoming the channel of choice; the innovation pipeline and consumer expectations are changing. The technology and competitive landscape are evolving dramatically, and traditional industries and incumbents are challenged to embrace digital transformation. Digital transformation is not an easy process. There are no standard road maps for digital transformation and companies need to overcome various

obstacles to successfully develop digital transformation. The lack of technological and financial resources to invest in new high-tech solutions as well as of digital skills among internal employees, the low awareness of the potential of adopting digital solutions, and the reluctance of management to activate new working and management methods are the most common factors that hinder digital transformation. Often, hiring digital experts and investing in digital technology seems to be the optimal solution to address the challenges of digital transformation. However, this creates only a technological store window, with digital experts remaining isolated and other employees unaware of the reasons for technological transformation. The critical challenge is that digital transformation is not just technology and it requires a radical shift in cultural and corporate attitudes. The real challenge is developing and facilitating the gradual implementation of a company's digital strategy and sharing a digital plan that aligns the company's strategic vision and employees' ambitions (Bergstein, 2019).

The increasing rapid diffusion of digital technologies makes digitalisation a strategic imperative for most organisations. Responding to digitalisation, organisations need to digitally transform themselves by developing and integrating digital technologies across all business units, from structures and products to processes and business models. Therefore, digital transformation can be understood as a holistic transformation process of organisations and entire industries driven by technological developments entailing far-reaching strategic, organisational, and socio-cultural changes. Digital transformation in organisations leads to significant changes that organisations need to manage. On the one hand, organisations can reduce transaction costs and increase revenue by introducing digital technologies. They can generate novel value creation and capture mechanisms by introducing new business models and gaining competitive advantages. On the other hand, introducing digital technologies is a time-consuming, often threatening, uncertain, and potentially costly process.

Nevertheless, digital transformation is essential not only for large organisations but also for small and medium-sized enterprises with their immense importance to the economy (Schwab, 2016). However, they also face specific characteristics (e.g., lack of technological assets) and peculiarities (e.g., resource constraints) that hinder digital transformation. Today, organisations face the challenge of transforming their whole organisational structures and processes in all business units due to the increasing use of novel digital technologies. The resulting changes have fundamentally altered customer expectation and behaviour (e.g., the anticipation of novel ways to interact and engage with customers), putting immense pressure on established firms and disrupting numerous markets. However, digital technologies offer a broad spectrum of new opportunities; many firms are struggling to explore and exploit the potential of new digital technologies and innovations. Given the importance of digital transformation in maintaining organisational competitive advantage, several excellent reviews have taken stock of the rapidly growing literature. Nevertheless, it is striking that many studies focus on individual areas of application fields of digital transformation. Yet, the literature misses a consensus on a generally accepted definition.

### **Intelligent Organizations in the Digital Transformation**

The most important characteristics of an intelligent organization include, among other (Beckford, 2020; Grösser & Zeier, 2012; Schwaninger, 2010; Waltz, 2003):

- fast and flexible operation,
- the ability to monitor the environment,
- the capacity to diagnose early market signals and to react to changes in the environment, and
- the ability to implement new knowledge-based solutions and achieve economic benefits therefrom.

The growing volume of information used in an intelligent organization is accompanied by its increasing importance. Peter Drucker indicated already that traditional factors of production, such as growth, labour, and capital, are losing their importance in favour of a key resource, namely knowledge applied in the creative operation of an organization. It constitutes intangible resources that are related to human actions, whose use may be the basis for gaining a competitive advantage. Knowledge has to be treated as information embedded in the context of an organization and a skill to use it effectively in the organizational activity. It means that knowledge resources are data about its customers, products, processes, environment, etc. in a formalised form (documents, databases) and in non-codified forms (knowledge of staff).

In the practical dimension, the effective collaboration of such elements means the necessity to use advanced ICT solutions. Technical, technological, and organizational innovations, which have appeared in recent years, are all utilised (Adamczewski, 2020). They encompass almost all areas of a modern organization operation, starting from means of transport and equipment, through organization and material and raw material flow management, to the development of system structures that implement business processes, i.e. within logistics systems that are the essence of modern management based on ICT solutions.

The present effect of the ICT evolution in the form of the so-called third ICT platform, has been treated since 2013 as the foundation of the 4th industrial revolution, being the natural development stage of the 3rd revolution of 1969 (its symbol being electronics with its transistor and automated production). The main distinguishing element of new changes has become the redefinition of the present course of business processes that contributes to new operating models of economic organizations facing new challenges to maintain their position and expand on the market further. The industrial revolution of the 4th stage is breaking out due to (Davenport & Mital, 2023):

- the introduction of the all-present digitalization,
- decision processes based on virtual simulations and data processing in real time, and
- machine-machine and machine-man communication.

The digital transformation means a change of the present approach to a customer and a comprehensive process where an organization moves to new methods of operation using the state-of-the-art SMAC digital technology, including social media, mobility, big-data analytics, and cloud computing. However, it has to be kept in mind that the role of digital technologies in that process is to enable the necessary changes and open an organization to new opportunities. Therefore, they should be a tool rather than the aim of transformation. The centre of the process has to be the customer and his needs, as the main driver for manufacturers and service providers. The digital transformation is no longer the method of gaining a competitive advantage—it is becoming a factor that enables to stay on the market (Bergstein, 2019; Chen, Chiang, & Storey, 2018; Clerke & Clegg, 2000).

### **Trends in the Digital Transformation**

Digital transformation is being spearheaded through a combination of software and hardware advancements. While the list of advancements is endless, the most promising technologies fall under one of the four umbrella terms described below briefly (Galliers, Leidner, & Simeonova, 2020; Gartner, 2022; Riche & Hurter, 2018).

#### **The Data Science Trio**

The Data Science Trio refers to three advancements related to data science that are arguably causing the greatest disruptions across various industries at present. These three technologies are:

- Data Analytics and Big Data Analytics refers to a set of qualitative and quantitative methodologies used to study and extract knowledge from raw data and use it to guide business decisions. Big Data refers to gargantuan data sets that contain important information and patterns hidden among large heaps of supplemental data. Both finite data analytics and big data analytics are applicable in virtually any scenario involving a database and sufficiently large amounts of data. Scores of companies are currently hiring armies of Data Analysts to crunch through their datasets and help them improve/organize their practices and services.

- Machine Learning refers to the concept of giving computers the ability to learn on their own without human intervention. The primary usage of machine learning is to teach computers to recognize patterns on their own in cases where human analysis is too slow, expensive, or even impossible. Machine learning has thus seen itself being employed in recommendation engines, market analyses, spam filters, network security solutions, and more. Any organization that has data-based assignments which are large & repetitive (or) involve some form of identification tasks (or) a combination of both the above, should consider exploring machine learning solutions.

- Artificial Intelligence (AI) refers to a computer possessing the ability to perform a task or tasks in a manner that is just as effective or even more effective than a human being doing the same. While machine learning deals with a computer studying data and merely outputting what it has learned, Artificial Intelligence deals with a computer studying data and taking decisions/executing tasks based on certain pre-programmed instructions. AI is best implemented in any scenario requiring high speed and high precision decision making and task execution.

### **Internet of Things (IoT)**

Internet of Things (IoT) refers to a network of interconnected physical devices and sensors that collect data and exchange it with one another using the internet as a communication platform. IoT networks allow for low cost embedded systems to be deployed into physical environments where they can continuously collect information, relay it, interpret it, and act on it accordingly. IoT helps in achieving a scenario where all variables of a physical environment can be mapped and each constituent device's functioning can be made to depend on said variables or outputs from other device(s). For this reason, IoT has found immense value in health-care, smart cities, and smart homes.

### **Remote Work Environments**

High skilled employees are very often not available at the desired location of a firm or may sometimes prefer to work from home. In the digital age, it makes no sense to compromise on talent by restricting hiring & work to a single physical location. Whether it is employees situated halfway across the world in a satellite office, or an employee situated half way across town in their own house, technological advancements such as video calls and internet-connected project management software allow us to send work to employees themselves when the reverse is not possible.

### **Block Chain Technology**

The finance industry is currently undergoing one of its largest transformations in history—thanks to blockchain. Blockchain refers to a distributed global database spanning across millions of computers all over the globe. It is not controlled by any central authority and uses state of the art cryptography to prevent unauthorized access to sensitive information such as transaction history. Blockchains have already been implemented to create cryptocurrencies (e.g. Bitcoin) which are unregulated digital currencies that offer alternatives to traditional currencies. Cryptocurrencies are used widely due to the unmatched security and freedom they offer in trading any amount of money, big or small, without having to face any bureaucratic trouble.

### Other Promising Trends

Beyond the technologies discussed above, there are several other technologies promising digital disruption of legacy industries. Some of the most promising trends are (Beckford, 2020; Apio, Frattini, Petruzzelli & Neirotti, 2021; Siemens, 2021):

Trend No. 1: Operationalizing AI Initiatives—for the majority of organizations, continuously delivering and integrating AI solutions within enterprise applications and business workflows is a complex afterthought. Gartner expects that by 2025, 70% of organizations will have operationalized AI architectures due to the rapid maturity of AI orchestration initiatives. Organizations should consider model operationalization (ModelOps) for operationalizing AI solutions. ModelOps reduces the time it takes to move AI models from pilot to production with a principled approach that can help ensure a high degree of success. It also offers a system for governance and lifecycle management of all AI (graphs, linguistic, rule-based systems, and others) and decision models.

Trend No. 2: Efficient use of data, models, and compute—as organizations continue to innovate in AI, they also need to efficiently use all resources—data, models, and compute. For example, composite AI is currently about combining “connectionist” AI approaches like deep learning, with “symbolic” AI approaches like rule-based reasoning, graph analysis, agent-based modeling, or optimization techniques. The result of combining those techniques (among others) is a composite AI system that solves a wider range of business problems in a more efficient manner.

Organizations can apply generative AI that creates original media content, synthetic data, and models of physical objects. For example, generative AI was used to create a drug to treat obsessive compulsive disorder (OCD) in less than 12 months. Gartner estimates that by 2025, more than 30% of new drugs and materials will be systematically discovered using generative AI techniques.

Trend No. 3: Responsible AI—the more AI replaces human decisions at scale, the more it amplifies the positive and negative impacts of such decisions. Left unchecked, AI-based approaches can perpetuate bias leading to issues, loss of productivity and revenue.

While algorithms can deduce race and gender from proxy parameters, such as typical female names or postal codes with the dominant racial demographics, more implicit bias is difficult to spot. For example, a data scientist might overlook that a number of clicks on the website can be discriminatory against age. AI can perfectly classify a stereotypical Western wedding but be blind to the weddings in India and Africa.

Moving forward, organizations must develop and operate AI systems with fairness and transparency and take care of safety, privacy, and society at large.

Trend No. 4: Data for AI—by 2025, more than 30% of new drugs and materials will be systematically discovered using generative AI techniques. Disruptions such as the COVID-19 pandemic are causing historical data that reflect past conditions to quickly become obsolete, breaking many production AI and ML models. D&A and IT leaders are now turning to new analytics techniques known as “small data” and “wide data.” Taken together, they are capable of using available data more effectively, either by working with low volumes of data or by extracting more value from unstructured, diverse data sources. By 2025, Gartner expects that 70% of organizations will be compelled to shift their focus from big to small and wide data, providing more context for analytics and making AI less data-hungry (Gartner, 2022).

### Case Study of the Polish SMEs

The European Investment Bank’s (EIB) report *Digitalisation in Europe 2020-2021* places Poland below the EU average in terms of digitalisation in four areas: manufacturing, construction, services, and infrastructure—

especially in infrastructure, our country implements significantly fewer digital tools compared to the other EU members (European Investment Bank, 2022). The analysis of specific technology branches included in the aforementioned EIB report shows that the only area in which Poland is nearing the EU average is robotics—Figure 1 and Figure 2. Other branches, i.e., 3D printing, Internet of Things, Big Data, AI, virtual reality, platforms and drones remain below the EU level. The main strength of Poland is industry—many companies from this sector have begun to take measures to embrace digital transformation.

The analysed DESI indicator shows that Poland needs to accelerate its efforts so that enterprises may start availing of the possibilities of digital technologies. In the long term, the measures taken should have positive effects through better connectivity, the higher digital skills of society and workers, and the greater involvement of businesses in the digital economy. Unfortunately, Poland is still lagging behind in this field, although there has been a stable increase in this area as compared to the EU average. In the coming years, this area requires further development and must be integrated with other dimensions, e.g. with the availability of high-speed Internet connections, affordable devices and services of professionals from the ICT sector, and also be supported by development activities stimulated at the national level by public administration.

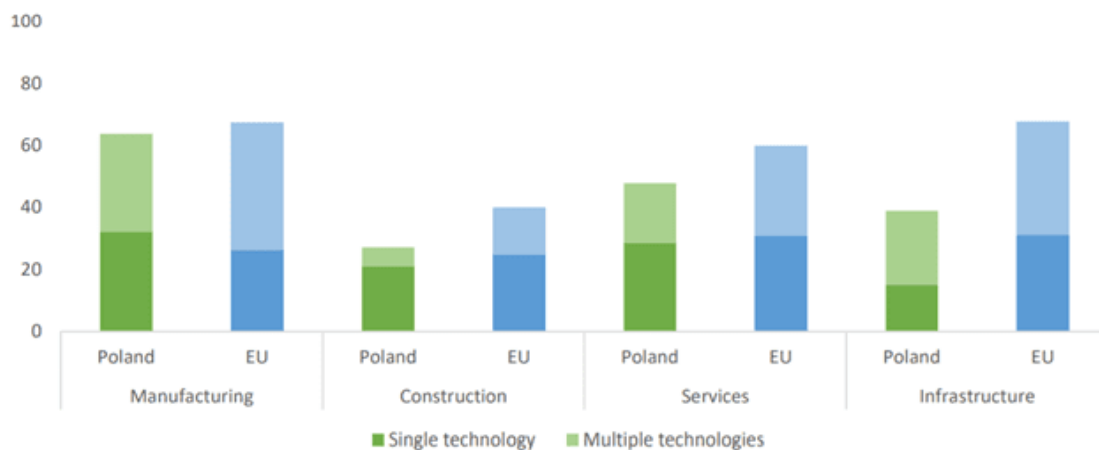


Figure 1. Adoption of digital technologies (% of firms), by sector. Source: European Investment Bank, 2022.

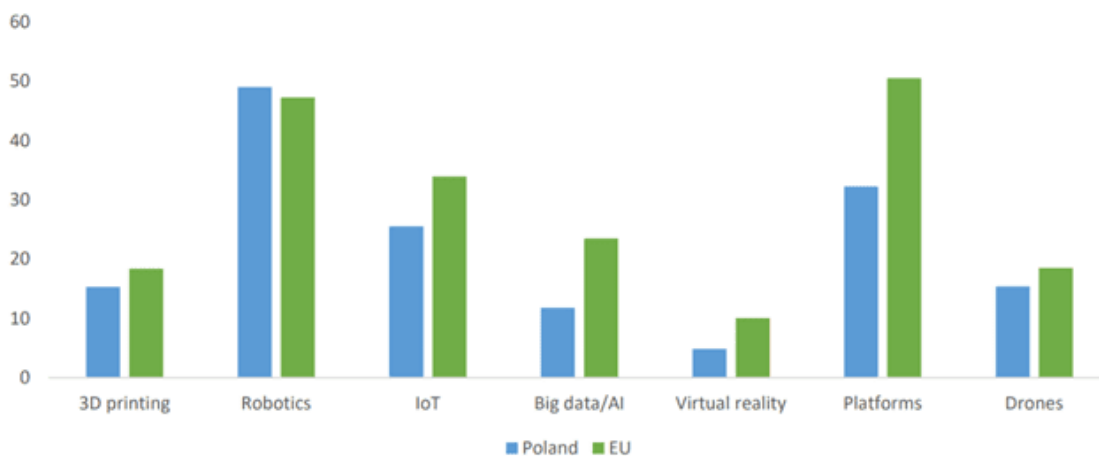


Figure 2. Adoption of different digital technologies (% of firms). Source: European Investment Bank, 2022.

The analysis of enterprises from the SME sector showed that over 44% of enterprises operate on the basis of action plans not exceeding one year. This type of planning was particularly common in micro-enterprises

employing up to 10 people and running a service activity. This was partly due to the specific conditions in which economic entities had to operate and the need for quick adjustments to the changing situation. Digitization acted as an important process in the activities of the analysed enterprises. Every fifth surveyed enterprise had plans to invest in software and digital solutions for enterprises; and wanted to implement these plans within the next year. In the group of enterprises employing from 51 to 250 people, over 75% entities have either already made such investments or plan to carry them out over the course of the coming year. As shown by the analysis of the surveyed enterprises, the most common area of activity and implementation of digital solutions was sales and distribution. This was due to the need during the pandemic to build new distribution channels for products or services through the increasingly important e-commerce market. The benefits were very practical, and in the main closely related to economic conditions. Among the benefits of using digitization, the most frequently mentioned were the desire to increase the enterprise's revenues and a willingness to adapt to the market situation. These types of conditions were directly related to the epidemiological situation in 2020 and the drive to transfer significant areas of activity to the Internet.

Research has shown that the COVID-19 situation has led to significant changes taking place in the economy of enterprises. In every fourth of the analysed enterprises, revenues dropped by more than 20%. An up to 20% decrease in revenues occurred in 28.3% of enterprises. This must have had a negative impact on investments also in the area of digitization. More than half of the analysed enterprises indicated a lack of financial resources as a barrier when introducing cloud solutions. This confirms the hypothesis presented in the introduction.

The COVID-19 outbreak has resulted in a sharp and significant decline in transport, production, and consumption. At the same time, thanks to the development of digitization, it has become possible to work and learn remotely. It turned out in practice that information and communication technologies play an important role in the life of modern people. These technologies become an inseparable part and accompany him in every area of life. They also affect the replacement of energy-consuming working methods and lifestyles with more ecological ones, in line with the idea of sustainable development. It is to be hoped that the research and analysis of issues related to the functioning of digitization in enterprises from the SME sector will allow at least a part to fill the existing gap in the literature. Aspects related to the use of digitization introduced in the era of the COVID-19 epidemic should be permanently included in the strategies of operations of enterprises from the SME sector. Increasing the support for new digital and innovative business models, and the further encouraging of digitization, would help enterprises to enhance efficiency, as well as enabling SMEs to become both more efficient and more competitive.

Research carried out by the author shows that the popularity of ICT support in management processes in Polish SMEs can be presented as follows (percentage of analysed enterprises)<sup>1</sup>:

- finance and accounting—98%,
- human resources—92%,
- warehouse management—89%,
- production management—68%,
- customer relationship management—87%,

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<sup>1</sup> The analyses are illustrated with survey results and direct observations of the author from 2021-2022 in selected 120 SMEs from Wielkopolska province in Poland. The survey sample was made up of micro (9%), small (56%), and medium sized enterprises (35%). Surveyed companies represent a wide range of industries: retail and wholesale trade, discrete and process manufacturing, transport, HoReCa, utilities, finance, construction, telecommunication and ICT.



- office work support—99% (including e-mail 98%), and
- procurement and sale process service—88%.

The readiness of the studied entities to face the challenges of digital transformation is as follows:

- 29% of respondents answered positively, confirming the implementation of such tasks,
- 18% of respondents answered that such actions would be taken soon,
- 21% of responses indicated that such actions would be taken in the near future, and
- according to 32% of respondents such actions were not being conducted and there were no such plans.

As regards the use of SMAC, AI, IoT and Edge computing solutions, the statistics of the analysed entities reflect the general global trend in this respect, i.e. (Riche & Hurter, 2018; Schwab, 2016):

- a cloud is used in 58% organizations (38% of analysed population plans to start using it),
- mobility is utilised in 49% of organizations (with 15% of analysed population planning to launch it),
- analytics is applied by 29% of organizations (while 16% of studied population have plans to start it), and
- social media are declared by as many as 55% of organizations already, and their use in the near future is declared by 55% of respondents.

The development trend of Polish intelligent organizations in AI-solutions is supplemented with the following declared initiatives (Future in the Era of Digital Change, 2021; Siemens, 2021):

- as much as 90% of respondents participating in the survey carried out agreed with the statement that the digital transformation redefines industries in a fundamental way, giving business new opportunities for action, unattainable in the past;

- companies still associate digital transformation only with technological transformation. They forget about other factors (social, environmental, economic, legal, and regulatory) which have a huge impact on changes, and lose sight of the consumers and their needs. This attitude has impact on the fact that digital transformation—despite 20 years of ongoing works—is still ineffective in most cases (research shows that 70% of activities carried out in connection with digital transformation are ineffective);

- 28% of the respondents of the quantitative survey conducted for the purposes of this article found that improving customer satisfaction was a result of a successful transformation. The vast majority (61%) considered improvement of the company's functioning as the primary success of the digital transformation;

- 34% of respondents agreed that their organization, working on transformation analyzes non-technological trend areas (social, economic, environmental, legal, and regulatory) to a large or very large extent. In the largest companies (employing over 250 people) this indicator is even lower and amounts to only 28%;

- 55% of respondents agreed that their organization analyzes technology trends to a large and very large extent. This ratio is even higher for companies employing between 50 and 250 people and amounts to as much as 68%;

- 70% of respondents participating in the survey carried out for the purposes of this report indicated that social factors of change will have a large or very big impact on transformation in their industry. The three most commonly addressed today include privacy, aging society, and digital nomadism. According to the respondents, the most pressing social factors requiring addressing in the next decade will be the culture of nanosecond privacy and aging society;

- 82% of respondents participating in the survey carried out for the purposes of this article indicated that technological factors have a large or very large impact on the process of digital transformation in their organization. The ones primarily addressed today are social media, cloud computing, and automation. In the next 10 years, top three are in turn: artificial intelligence (AI), Big Data, and automation;

- well-chosen technology and dedicated solutions (39% of responses) were considered to be the most important factors enabling success in carrying out the digital transformation. Well-prepared employees came only second (36%). Meanwhile, it is known that even the best technology will not provide success if it does not include engaged and changed people.

The fact of placing a customer in the centre was confirmed by responses about catching up with the dynamically evolving needs of contemporary consumers. Moreover, half of the respondents indicated the necessity to follow the changing expectations of their customers, declaring it to be their top business priority. The continuous improvement of customer satisfaction level is possible mostly owing to investments in new ICT solutions. Only owing to them shopping can be comfortable, fast, and possible at any time and place, while customer service can be effective. It also means the new opportunities in acquiring knowledge about needs, behaviour, and opinions of customers. In general, the above-mentioned study results show that Polish modern business organizations are becoming more confident in using advanced solutions of SMAC systems, to meet the challenges of digital transformation (Adamczewski, 2020; Marz & Warren, 2015; Tiwari, Wee, & Daryanto, 2018).

### **Conclusion**

The dynamic economic changes and the evolution of business relationships devalue traditional sources of competitive advantages in the SME sector, such as capital, infrastructure, access to outlets, and the quality of offered products and services. Modern enterprises that want to compete on the market effectively have to give priority to flexibility of their organization and its ability to implement innovative business models and reorganise logistics processes. Examples of numerous Polish SMEs show that the vision of a business managed in a modern way has come into the dynamic phase of realization, while the effective knowledge management with advanced ICT solutions is growing to the role of paradigm. There is no doubt that reserves still present in the SME sector can be utilised, through supporting its operation with advanced ICT systems with the dominant role of SMAC solutions.

Nevertheless, it has to be remembered that the creation and development of such smart technologies has one basic aim for businesses, namely to accelerate the development pace and improve the quality of offered products and services, while reducing operating costs. Although it seems apparently simple, paradoxically innovation of Polish business organizations from the SME sector is burdened with the concern about the unknown. SMEs are afraid of investing in solutions that are not popular yet. Nevertheless, the strategic vision of the management in such organizations will determine the directions and pace of popularising modern and effective solutions in knowledge management, which may contribute to the improvement of their competitiveness on the global market.

SMAC, AI, IoT and Edge computing solutions open up a new frontier for digital business. This is because virtually every application, service, and IoT object incorporates an intelligent aspect to automate or augment application processes or human activities. Digital representations of things and organizational processes are increasingly used to monitor, analyze, and control real-world environments. These digital twins combined with SMAC and immersive experiences set the stage for open, connected, and coordinated smart spaces. Formal mechanisms to identify technology trends and prioritize those with the biggest potential impact on the business create competitive advantage.

In many countries, there are numerous projects and programmes launched to support the digital transformation of SMEs in cooperation with other institutions and large enterprises. In Poland, systemic proposals

were developed, grouped in five areas: science, finance, cybersecurity, economy, and administration. They are convergent with international recommendations. However, it should be stressed that the changed operating conditions as a result of the COVID-19 pandemic brought about the need for activities supporting small and medium-sized enterprises relating to digital transformation.

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