

## Article

# Threats and Opportunities in Digital Transformation in SMEs from the Perspective of Sustainability: A Case Study in the Czech Republic

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**Abstract:** Digital technologies represent an important factor in the achievement of the sustainability goals of the European Green Deal. Whether the digitalisation trend will contribute to the sustainable development of societies in the long term depends on how we shape and understand it. The aim of this paper is to create a concept for the management of the threats and opportunities in the digital transformation of SMEs. As part of a broader research project, a complex tool was developed to assess the digital maturity of SMEs, and our paper focuses on one aspect of this tool, which is related to the identification and management of the opportunities and threats that are associated with digital transformation trends. The methodology that was used to develop this paper is based on a pilot survey that involved 154 SMEs in the Czech Republic, 74 of which were used for the follow-up survey on the opportunities and threats. Sixteen key trends were identified, which were then reduced to five latent factors, with their names forming five dimensions. In the cluster analysis, the companies were divided into three clusters, which served as the basis for determining the final cluster centres. The result is a concept for the management of the threats and opportunities in the digital transformation of SMEs. Digital transformation is the broad topic. Therefore, the theoretical overlap of this study can be seen in the narrower focus on the identification and management of the opportunities and threats in digital transformation. In addition, this study focuses on SMEs because there are more than one million small and medium-sized enterprises in the Czech Republic, and they create 54% of the innovative solutions. The practical impact of this study can be understood in the fact that the proposed concept may enable SMEs to more easily manage threats and opportunities in their digital transformation.

**Keywords:** digitalisation; threats; opportunities; digital transformation; SMEs; sustainability



**Citation:** Šimberová, I.; Korauš, A.; Schüller, D.; Smolíkova, L.; Straková, J.; Váchal, J. Threats and Opportunities in Digital Transformation in SMEs from the Perspective of Sustainability: A Case Study in the Czech Republic. *Sustainability* **2022**, *14*, 3628. <https://doi.org/10.3390/su14063628>

Academic Editor: Fabrizio D'Ascenzo

Received: 5 February 2022

Accepted: 16 March 2022

Published: 19 March 2022

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## 1. Introduction

At present, the trend of digitalisation cannot be ignored, and, especially for small and medium-sized enterprises, it creates a barrier to, or, on the contrary, an opportunity for, ensuring their competitiveness and sustainability, not only domestically, but also internationally. The main objectives of digital transformation are to acquire new data and to use the data to reorient old processes. A more data-driven approach creates opportunities to gain new competitive advantages by reorienting business models. Digitalisation is a complex and dynamic process. It is frequently considered to be the fourth major innovation cycle in human history, and it is characterised by its extraordinary power in shaping the

future [1]. In the global context, digitalisation is not taking place uniformly, and it is important to be aware of the differences, which are noticeable, both from a territorial and a sectoral perspective (e.g., territorial differences in the Internet connection, or the potential and evolution of different sectors for digital transformation). In line with the changes brought about by digitalisation, it is also possible to identify different views on the factors that are influencing, and that will influence, in the future, the development of both individual economies and entire integration clusters.

Being digital is a new way of life that is supported by information technology in a modern society, where the production, lifestyles, behaviours, and thinking modes of people take on a new look [2,3]. Especially at present, the digitalisation that is triggered by social media, mobile devices, the Internet of things, and big data changes people's lifestyles and requires businesses to rethink their original operation modes [4].

The COVID-19 pandemic highlighted the competitive advantage that is offered to national economies by the implementation of policies that are dedicated to the digitalisation of the society and the economy [5]. Industry and industry strategy form an integral part of the European Green Deal. The Industrial Strategy 2020 contains a list of measures for strengthening the EU industry's green and digital transformations. Many actions have already been implemented and used. However, the COVID-19 pandemic dramatically influenced the speed of the digital transformation [6]. Green industry, innovations, and digital transformation are the significant drivers for companies, and for their ability to be competitive, not only in the European Union, but also, especially, in the global market [7–10].

In 2022, the European Commission presented a new standardization that is focused on the standards in the single market and globally. The strategy deals with the green and digital economy, and its main aim is to strengthen the European Union's global competitiveness. This novel strategy strives to implement the digital economy in technological applications. The European Commission also published a vision that includes the goals and attitudes that are needed for the successful digital transformation of Europe by 2030 [11].

The European Commission suggests a set of digital principles in order to quickly support, predominately, the following fields: digitally skilled citizens and highly skilled digital professionals by the year 2030; secure, performant, and sustainable digital infrastructures; and the digital transformation of business, and the digitalisation of public services, by 2030. Digital technologies are a significant and differentiating factor for companies in terms of the sustainable and competitive aspects of the global market. European enterprises can benefit from the significant opportunities that are connected to digitisation. Digitisation, sustainability, and technology development are influencing, and perhaps will shape, the European and global business environment in the future [12].

The European Green Deal sees small and medium-sized enterprises (SMEs) as the main engine of digital innovations in various industries. This is the reason why the strategy that is included in the European Green Deal includes reducing barriers and facilitating business conditions for SMEs. The new activities will be of great benefit to SMEs and start-ups in terms of strengthening the single market, reducing the supply dependency, and, above all, accelerating green and digital transformations. Furthermore, the European Green Deal includes measures that are aimed at encouraging SMEs in the areas of resilience enhancement, combating late payments, and supporting solvency [13–16].

Green innovations and digital transformation include ecological and environmental aspects [17]. As for "innovation", the concept implies new initiatives, changes, approaches, or proposals that deal with the social challenges as well [18]. Sustainable and digital innovation occurs in different fields, such as in products, processes, services, and business models. The aim of sustainable innovation is to decrease the environmental impact [19]. The ecological aspect is associated with the term, "eco-efficiency". Eco-efficiency strives to add maximum value with the minimum use of resources and with minimal pollution [20]. Green industry will form the future technologies in manufacturing and will generate high-added-value solutions [21]. These solutions will have a significant impact on the economy and on ecology. From the ecological point of view, it will be possible to realize the more

efficient allocation of resources, such as materials, energy, or water [22]. Moreover, digital transformation and green industry have great potential to improve the social dimension of mankind. The core idea of green industry and digital transformation is to improve the deteriorating economic, ecological, and social conditions in the world by using new industrial technologies and integrating more efficient processes [21]. According to Kamble et al. [23], the Green Industry 4.0 framework consists of the following technologies: the Internet of things; big data analytics; cloud computing; simulation and prototypes; 3D printing; augmented reality; and robotic systems. The framework takes into account the fact that the integration of innovation, together with industrial and economic processes, enable more flexible, economical, and environmentally friendly manufacturing systems [24]. The structural transitions of enterprises to the digital economy include the interaction between the social and technological factors as well, and these factors have a great impact on the working environment [25]. Therefore, the improvement of the social aspects of digital transformation is also very important. At present, digitisation affects almost every aspect of our lives [26,27]. For SMEs, this means that there are not only many opportunities, but that there are also a significant number of threats. The context in which the digital transformation is taking place is also a key issue: How does the ongoing transformation to a digital world contribute, positively or negatively, to a more sustainable world? [28]. What opportunities and threats can we identify in the digital transformation of SMEs? In particular, the response to change needs to be fast, as the strategic window for opportunity is only open for a limited period of time. Digital transformation affects every business sector, and, as investment capital, top talent, and customers shift to network-centric organisations, the performance gap between the early and late adopters of digital transformation is widening. The impacts of the key trends open up a substantial number of opportunities and threats for SMEs. The aim of our paper is to identify the relevant trends, and to develop a concept for managing opportunities and threats for SMEs.

## 2. Materials and Methods

### 2.1. Literature Review

The topic of digital transformation is increasingly appearing in the scientific literature. Many scholars emphasise that the exponential growth of digital technology has led to significant improvements in many business processes and that it plays an important role in innovation [29,30]. Digital technologies increase the speed of innovation and the competitive dynamics and disrupt the organisations' operating environments [31]. The academic literature contains a number of definitions of "digital transformation". Hartl et al. define "digital transformation" as a departure from previous IT-enabled business transformations in its holistic nature and speed [31]. Therefore, change is an unavoidable part of every organization because of rapid global, economic, and digital developments. Change and transformation are essential in order for an organisation to thrive in the digital age. Furthermore, fundamental changes in organisational strategies, structures, and processes are needed for the establishment of the digital transformation [32].

According to Gökalp and Matinez [33], the "digital transformation" may be defined as a disruptive technological achievement that brings new business and operating models to all sectors. In this context, the term, "digital innovation", was coined, which is defined as the creation of market offerings and business processes or models that result from the use of digital technologies. Digital innovation management encompasses the practices, processes, and principles that underpin the effective organisation of digital transformation [34]. Firms use and seek to adopt new digital technologies for various innovation-related purposes at different stages of their innovation processes. It is necessary to examine the opportunities, threats, risks, and implications of using digital technologies, not only for companies, but also for society as a whole. It is important to know how companies need to organise themselves so that these technologies can be applied with the highest benefit [35]. Only an effective green and digital transformation will allow firms to improve their competitiveness in the global market. Digital innovation technologies are associated with the support of

knowledge management processes. These tools have the significant potential to simplify internal and external know-how, and to facilitate the dissemination of knowledge among company employees [36]. Business models are also closely related to digitalisation. Companies must constantly change and improve their business models in order to keep up with competitors, or to gain a competitive advantage for a certain period of time. “Innovation”, therefore, does not only apply to processes or products. It is also applicable to the innovation of business models and all corporate areas in general.

Digitalisation is a significant factor in the optimisation and improvement of business models. Digitalisation, in the business model, helps companies to maximize the benefits and returns of their businesses [37]. Digital technologies are an important factor in achieving the sustainability goals of the Green Deal in many different sectors.

The European Union supports the digital transformation and its tools, and it is about to invest EUR 1.8 trillion in their development in order to accelerate the whole process of this change as much as possible [38]. It will promote new business models and will set minimum requirements in order to prevent environmentally harmful products from entering the EU market. New technologies, sustainable solutions, and breakthrough innovations are essential to the achievement of the objectives of the Green Deal for Europe. In order to maintain its competitive advantage in clean technologies, the European Union needs to significantly increase the large-scale deployment and demonstration of new technologies across sectors and across the single market, while creating new innovative value chains. This challenge goes beyond the capacities of individual Member States. The Commission will support efforts to harness the full benefits of the digital transformation in order to support the green transformation [13–16]. Digital technology is changing people’s lives [39]. The European Union’s digital strategy aims to make this transformation work for people and businesses, while helping to achieve its target of a climate-neutral Europe by 2050.

Interest in digitalisation began to appear in the strategic documents and initiatives of the OECD, the European Union, and of national economies as early as the end of the last decade, and there has now been a huge increase at the global, European, and local levels; for example: the OECD paper, “Digital Economy Outlook 2015”, or the OECD 2016 conference, “Digital Economy: Innovation, Growth and Social Perspectives”, which report that the digital economy offers opportunities for different sectors (industry, public administration, health, environment, etc.), as well as for innovation, and economic growth and well-being; the DESI, which will be used to annually monitor the progress of the digitalisation of SMEs; and the EU Commission’s, Recovery Plan for the Next Generation (2020), which will provide Member States with funding to increase the resilience of their economies, etc.

### The Czech Republic and the Digital Agenda

The Czech Republic has long supported close EU cooperation in the field of the digital economy, with the aim of building a single digital market. In this context, the Czech Republic also emphasises cybersecurity, the protection of privacy and personal data, and the ethical use of new technologies. The agenda focuses on the construction of high-speed infrastructure (5G), cybersecurity and the development of new services that are based on artificial intelligence, and data analysis and access. The Government of the Czech Republic has adopted strategic documents to ensure development in this area and to follow EU trends (e.g., Digital Czech Republic: The Path to the Digital Economy, 2013; Action Plan for the Development of the Digital Market 2013, 2016; Digital Czech Republic, 2018; Strategy for Artificial Intelligence (NAIS), 2018; and other national initiatives and financial instruments).

### 2.2. Methods

A combination of qualitative and quantitative methods was used in order to capture the aspects that are related to the stated objective more broadly [40]. Factor analysis and cluster analysis were used to process the data.

### 2.2.1. Factor Analysis

Factor analysis is a statistical method that is used to explain the variance in the observed variables by using fewer latent variables, or so-called “factors”. The idea is, therefore, to measure something that is not measurable directly. Today, there are two main approaches: so-called “exploratory factor analysis” (EFA), which seeks to identify individual factors (and which generally assumes that each observed variable is “saturated” by each extracted factor), and “confirmatory factor analysis” (CFA), which places certain restrictions on the model (e.g., it limits which items are saturated by which factors). Confirmatory factor analysis is, therefore, a simpler variant of so-called “structural modelling” (SEM). Principal component analysis (PCA) is a broadly applied method for factor extraction and it is the first phase of EFA [41]. The factor analysis explains the linear interdependence of the observed variables by the existence of fewer unobservable factors, which are called “common” factors, and other sources of variability, which are called “error” or “specific” factors, or “residual” or “interfering” components.

Common factors produce correlations between variables, while error factors only contribute to the variance of individual observed variables. Factor analysis is primarily concerned with common factors. The basis of factor analysis is the assumption that the observed covariates’ respective correlations between the variables are the results of common factors, and not of the interrelationships between the variables.

### 2.2.2. Cluster Analysis

Cluster analysis is a technique that is used for partitioning a set of objects into  $k$  groups, such that each group is homogeneous with respect to certain features on the basis of either the similarity or the dissimilarity metric.

Cluster analysis is concerned with partitioning similar entities into clusters. Its aim is to arrange a set of entities into clusters so that the properties of the entities in a cluster are as much alike as possible, while the similar and characteristic properties of the clusters differ as much as possible. Two basic methods exist for implementing a cluster analysis: hierarchical and nonhierarchical clustering. They differ in whether the number of clusters is given beforehand or not. The K-means sum of the squared error criterion is used to determine the distance.

The result of the paper is associated with the project that is funded by the Technology Agency of the Czech Republic, which reports directly to the Government of the Czech Republic. The grant programmes are funded by individual ministries. This output is aimed at the development of a tool for measuring the digital maturity of SMEs within the Czech Republic. This tool was developed with the support of partners, including: the Czech Chamber of Commerce; the Association of Small and Medium Enterprises and Crafts of the Czech Republic; the Research Institute for Entrepreneurship and Innovation of the Czech Republic; and the Institute of Technology and Economics in České Budějovice. The tool has the capacity to assess the general level of the digital maturity of SMEs, which takes the form of a web-based solution, while a combination of qualitative and quantitative procedures was used in its inception. The methodology of this tool allows managers to quickly assess the digital maturity of their enterprises, and to obtain primary answers to questions that are related to the current digital transformation situations of their enterprises. The tool that was developed in this project is currently being tested, and it has been used by a total of 154 companies so far.

This paper focuses on one aspect of this tool, which is associated with the identification and management of the opportunities and threats that are related to the digital transformation trends in SMEs. In the first phase, the focus group technique, with academics and business representatives, was used to identify the relevant trends that are related to the opportunities and threats in the digital transformation of SMEs. There were three focus groups in total, with five people taking part in each of them. The identification of a relevant trend occurred when it was mentioned by at least one of the focus group members, and when the other members confirmed its significance after a proper discussion. In total,

16 trends were identified within all three focus groups. Table 1 contains the full list of the trends.

**Table 1.** Full list of identified trends.

Trend Number	Trend Name
1	Industry 4.0 (digital model of vertical value chains)
2	Industry 4.0 (digital model of horizontal value chains)
3	Automation (technologies that activate autonomous work)
4	Lean production process
5	Digital approach to customer (customer relationships, new services, social networks, mobile applications, e-commerce, etc.).
6	The future of work (new jobs, new competences, or new skills)
7	Technical networking (mobile and cable networks, cloud computing, sensor technologies, smart factories, platforms, remote maintenance, purely digital products, etc.)
8	Digital data (collection and analyses, data-based decision-making process)—the Internet of things and big data
9	Cybersecurity (security of the Internet, point-to-point protocol, data sovereignty, etc.)
10	New risks (those arising from consumer protection, health, and environmental protection)
11	Digital technology and its impact on a company (data—personal security; news and information; algorithms and robots; and places and employment)
12	Sustainability (economic, social, and environmental)
13	The intensifying competitive environment
14	The uniqueness and originality trend
15	Prioritising customer satisfaction over value for the owner
16	Pressure to change (governance and leadership—a culture of constant change and the need for innovation)

In the second phase, a questionnaire was developed to assess the level of the digital transformation of the companies. This questionnaire was targeted at small and medium-sized enterprises. The “threats and opportunities” section of the questionnaire included the following key question: “Which of the following trends do you see as an opportunity or a threat?”. Using a five-point scale, the SME managers and representatives indicated whether they perceived the trends that are listed in Table 1 as threats or as opportunities. The five-point scale offered the following verbal expressions: 1 = A significant threat; 2 = Rather a threat; 3 = Neither a threat nor an opportunity; 4 = Rather an opportunity; and 5 = A significant opportunity. In the context of the research relevance, it is necessary to have a sufficiently large number of respondents. According to Krejcie and Morgan (1970), it is necessary to have at least 384 respondents for a population of one million (confidence level = 95%). In 2019, there were more than one million small and medium-sized enterprises in the Czech Republic, and they created 54% of the innovative solutions. Therefore, SMEs have to be seen as the engine of innovative potential in the Czech Republic [42]. A total of 154 companies completed the questionnaire, but the section on the threats and opportunities was fully completed by 74 companies. This number does not represent the required number of respondents and it should be considered as one of the research limits. A total of 29 firms belong to the category of microenterprises, 26 belong to the category of small enterprises, and 19 belong to the category of medium-sized enterprises. These enterprises mainly fall into the following economic sectors: information technologies; civil engineering; the manufacturing industry; plant and animal production; real property and developers; electrical equipment production; computer, electronic, and optical instrument production; food and beverage production; machinery and equipment production; textile production; the manufacturing of metal structures; motor vehicle repair; research and development; and the manufacturing of basic pharmaceutical products and pharmaceutical preparations.

As the aim of this paper is to create not only a simple, but also a meaningful concept in the management of the threats and opportunities in the digital transformation of SMEs, the principal component analysis was used to reduce the large number of trends. The Varimax rotation with Kaiser normalisation was applied to reduce the factors. After seven iterations, the five latent factors—dimensions occurred, and they formed the basis for the creation of the conceptual scheme. Table 2 contains a breakdown of the 16 original factors into the five latent factors on the basis of the component factor loads. It can be assumed that more than 16 original factors would be identified within the larger international research. Thus, in this aspect, the research results are limiting. The height of the factor loads after rounding to one decimal place was on a scale of 0.5–0.9. This indicates a moderate-to-strong correlation. The names of the dimensions emerged from the expert discussions between the company representatives and the academics from the focus groups, which were also used to identify the 16 trends. The newly formed dimensions were named in order to logically reflect the meanings of the original factors.

**Table 2.** Component factor loads.

Variable Number	Industry 4.0	Digital Systems, Data, and Workflow for Customer Support	Digital Security for Sustainable Development	Competitiveness	Customer Satisfaction and Change Management
1	0.876	0.228	0.069	0.077	0.129
2	0.823	0.259	0.146	0.091	0.040
3	0.749	0.171	0.091	−0.153	0.038
4	0.729	0.047	−0.091	0.311	−0.236
5	0.101	0.849	0.010	0.136	0.261
6	0.144	0.762	0.024	0.273	0.090
7	0.329	0.713	0.261	−0.112	−0.119
8	0.418	0.598	0.185	0.029	0.159
9	0.027	0.117	0.809	0.115	−0.100
10	−0.021	−0.011	0.770	0.145	0.408
11	0.354	0.171	0.560	−0.082	0.259
12	0.111	0.371	0.465	0.359	−0.246
13	−0.068	0.032	0.183	0.803	−0.021
14	0.175	0.246	−0.005	0.757	0.167
15	−0.049	0.248	0.063	0.027	0.781
16	0.368	−0.045	0.308	0.412	0.508

The first dimension was labelled as, “Industry 4.0”, and it includes the following trends: (1) Industry 4.0 (the digitalisation model of the horizontal value chains). This is the flow of information from suppliers to customers, with other stakeholders also being included in this flow. This flow includes processes such as planning, purchasing, production, and logistics, as well as customer relations and satisfaction; (2) Industry 4.0 (the digitalisation model of the vertical value chains). This is the flow of data and information within the enterprise, which includes the optimisation of the internal processes; (3) Automation. This trend includes technologies that activate autonomous work; (4) A lean production process. Real-time data and communications between humans, machines, and systems provide a comprehensive view of manufacturing and allow employees to make real-time adjustments. Lean production processes and automation play key roles within Industry 4.0, and the other two trends directly underlie Industry 4.0. Therefore, the first latent factor was the so-called “Industry 4.0”.

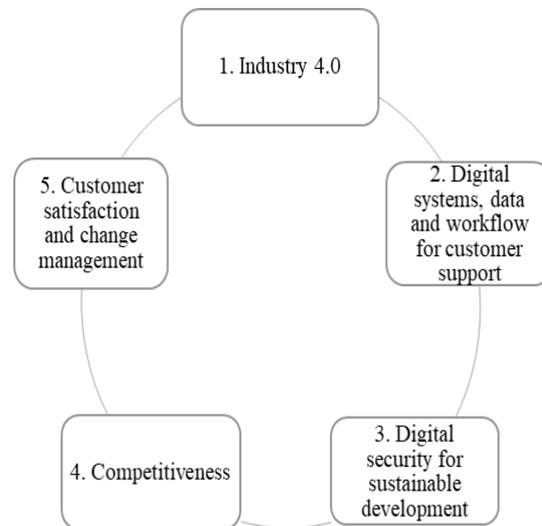
The second dimension was labelled as, “Digital systems, data, and workflow for customer support”, and it includes the following trends: (1) A digital approach to the customer (customer relationships, new services, social networks, mobile applications, e-commerce, etc.). The customer is perceived as central to this factor, as all systems and flows are used to build long-term relationships with the customer; (2) The future of work. The future evolution of work and workflows brings with it new job roles and places new demands on the digital skills and knowledge of employees. These new employee competencies will ultimately lead to higher levels of customer satisfaction; (3) Technical networking. This includes mobile and cable networks, cloud computing, sensor technologies, smart factories, platforms, remote maintenance, purely digital products, etc. These digital networks and systems enable more efficient communication and workflows within companies, and they ultimately have a positive impact on better customer support and satisfaction; and (4) Digital data, which are associated with the collection of relevant data, and their analysis and evaluation. Connecting big data with the Internet of things enables companies to make appropriate decisions and to streamline their communication and interactions with customers [43].

The third dimension was labelled as, “Digital security for sustainable development”, and it includes the following trends: (1) Cybersecurity, which includes the security of the Internet, the point-to-point protocol, data sovereignty, etc. Cybersecurity is the key factor in the digital transformation of enterprises. This factor is related to the fact that businesses and their systems are increasingly being targeted by hackers [44]. Businesses have to spend considerable financial resources to protect their networks, systems, and data. There is a need to continuously invest in security solutions in order to ensure that businesses are able to survive over the long term. Cybersecurity is, therefore, closely linked to the sustainable development of a company; (2) New risks, which arise from consumer protection and health and environmental protection. Businesses must increasingly take into account the new risks that are involved in protecting not only the health of consumers, but also, and above all, nature as a whole. More and more consumers are concerned about the future fate of the planet’s climate, and, in many cases, they prefer to buy green products; (3) Digital technology and its impact on a company. This trend encompasses personal data security, news and information, algorithms and robots, places, employment, and other aspects. This trend is closely linked to the social pillar of sustainable development, with digital technologies increasingly affecting the lives of society as a whole; (4) Sustainability (economic, social, and environmental pillars), which is a logical outcome, as it is influenced by all of the abovementioned trends within Factor 3.

The fourth dimension is labelled as, “Competitiveness”, and it includes the following trends: (1) The intensifying competitive environment, which can be seen as one of the main drivers of the whole digital transformation and of the trends that lead to climate protection; (2) The uniqueness and originality trend, which motivates businesses to differentiate themselves from their competitors and which is the main stimulant to building a long-term competitive advantage. This makes it possible, not only for Czech companies, but also for enterprises within the European Union, to be competitive in the global market, which is one of the main objectives of the European Green Deal.

The fifth dimension is labelled as, “Customer satisfaction and change management”, and it includes the following trends: (1) Prioritising customer satisfaction over value for the owner, which is a cardinal prerequisite for changing the thinking of businesses. Customer satisfaction, of course, brings value for business owners, but it is also closely linked to the problems of climate change, environmental protection, and other green marketing themes [45]; (2) The pressure to change, which encompasses a leadership culture of constant change and the need for innovation. Innovations are the cornerstone of the European Green Deal, and they are also closely bound to customer satisfaction [46–48].

The dimensions that are described above provide the basis for the construction of a concept for the management of the threats and opportunities in the digital transformation of SMEs. Figure 1 illustrates all five dimensions.



**Figure 1.** Five dimensions for managing threats and opportunities in the digital transformation of SMEs.

In the third phase, the nonhierarchical cluster analysis (i.e., the K-means algorithm) was used to design a concept for managing the threats and opportunities in the digital transformation of SMEs.

The number of clusters (k) was predefined, and three clusters were finally selected from the possible variants. Within the cluster analysis, the individual companies were divided into clusters according to whether they perceived each of the 16 trends as an opportunity or as a threat on the aforementioned five-point scale, and according to the overall score (expressed as a percentage) that they obtained when using the tool for assessing the overall level of the digital maturity of the SMEs. In this manner, the final cluster centres were identified. A total of 74 companies, out of a total of 154 firms, were included. A total of 80 companies could not be included in the cluster analysis, as they failed to provide complete data. The number of firms in the first cluster was 42. Table 3 summarises the results of the descriptive statistics.

**Table 3.** Descriptive statistics: the number of cases in each cluster.

Cluster 1	Cluster 2	Cluster 3	Valid	Missing
42.000	5.000	27.000	74.000	80.000

The first cluster has a total score of 57%. These are, therefore, companies that are close to the average level of digital maturity. The second cluster of companies has an overall score of 24%, which indicates a low level of digital maturity. The third cluster has an overall score of 80%, and these are firms that have high levels of digital maturity. Table 4 describes the differences in the perceptions of each trend by the firms, and they are divided into clusters in terms of threats and opportunities.

**Table 4.** Final cluster centres.

Which of the Following Trends Do You See as an Opportunity or a Threat?	Cluster		
	1	2	3
Sustainability (economic, social, and environmental)	3	4	4
Cybersecurity (security of Internet, point-to-point protocol, data sovereignty, etc.)	3	3	3
Automation (technologies that activate autonomous work)	4	4	4
New risks (arising from consumer protection, health, and environmental protection)	2	3	3
Digital technology and its impact on a company (data—personal security; news and information; algorithms and robots; and places and employment)	3	3	3
Pressure to change (governance and leadership—a culture of constant change and the need for innovation)	3	3	3
Digital data (collection and analyses, data-based decision-making process)—the Internet of things and big data	4	3	4
Digital approach to customer (customer relationships, new services, social networks, mobile applications, e-commerce, etc.)	4	3	4
Technical networking (mobile and cable networks, cloud computing, sensor technologies, smart factories, platforms, remote maintenance, purely digital products, etc.)	4	3	4
The future of work (new jobs, new competencies, and new skills)	4	3	4
Industry 4.0 (digital model of horizontal value chains)	4	3	4
Industry 4.0 (digital model of vertical value chains)	4	3	4
Lean production process	3	3	3
Intensifying competitive environment	3	3	3
Uniqueness and originality trend	4	4	4
Prioritising customer satisfaction over value for owner	3	2	3
Total score [%]	57	24	80

### 3. Results and Discussion

The first group comprises firms with an average overall digital maturity score of 57%, and it differs from the other two groups mainly because of the fact that the companies in this cluster perceive new risks more as threats. Another important finding is that these businesses have a neutral relationship with the trend of sustainability in terms of threats and opportunities. The other two clusters of enterprises see sustainability more as an opportunity, or as a significant opportunity. This result may be interpreted as meaning that the enterprises with a low overall digital maturity score (Cluster 2), on the one hand, and the enterprises with a high overall digital maturity score (Cluster 3), on the other hand, recognise that sustainability is of strategic importance to them. They perceive of sustainability as an opportunity that needs to be developed in their strategic goals and plans. On the contrary, the enterprises in Cluster 3 do not consider sustainable development as either a threat or an opportunity. Paradoxically, this approach may mean major complications for them in the future, as they fail to take this very important trend into account. This means that sustainability does not appear to be either a threat or an opportunity in their strategic objectives. From the above results, it may be recommended that companies with average total scores should focus on the third dimension (i.e., Digital security for sustainable development). The second group consists of companies with a low overall digital maturity score of 24%. These are, therefore, firms with very low scores. They differ from the other two groups in several trends. In contrast to this group, the firms in Clusters 1 and 3 perceive of the following four trends as opportunities: (1) Digital data; (2) A digital approach to customers; (3) Technical networking; and (4) The future of work (new jobs, new competencies, and new skills).

All of the above trends fall into the second dimension (i.e., Digital systems, data, and workflow for customer support), which was created as a result of the principal component

analysis. This finding is important from the perspective of the management of the opportunities and threats in the digital transformation of companies. The companies from the second cluster, with the lowest overall score of 24% (from the results that were obtained after using the tool to measure the digital maturity of SMEs), fail to perceive of the four trends mentioned above as either opportunities or threats. From the results that were obtained, it may be concluded that, for companies with low levels of digital maturity, it will be necessary to focus on developing the second dimension (i.e., Digital systems, data, and workflow for customer support) in terms of managing the threats and opportunities in the digital transformation.

The companies from the second cluster further differ from the other clusters in that they also do not perceive the two trends, Industry 4.0 (the digital model of horizontal value chains) and Industry 4.0 (the digital model of vertical value chains), as either opportunities or threats. The other two clusters of companies perceive these trends as opportunities. Both trends fall under the first dimension: Industry 4.0. Overall, it may be summarised that the firms from the second cluster, in terms of their perceptions of threat and opportunity, should start working on their neutral stances, especially in the first and second dimensions. It is important to emphasise that the only possible scenario consists of these firms starting to perceive the abovementioned trends not only as opportunities, but, on the contrary, and as part of their strategic development, also as threats. Threats can also trigger rapid reactions from the companies and they can act as driving forces in the implementation of changes in the context of digital transformation.

Furthermore, unlike the other two groups, the companies from Cluster 1 perceive the trend, "Prioritising customer satisfaction over value for the owner", as a threat. The other two groups of companies perceive this trend as neither a threat nor an opportunity. This finding indicates that the Cluster-1 and -3 firms are more aware that prioritising customer satisfaction over value for the owner is an important prerequisite for the long-term development of firms. Some of the firms from Clusters 1 and 3 even perceive this trend more as an opportunity, or even as a significant opportunity. It is likely, therefore, that satisfying customer needs will increasingly be seen by firms in the future as an opportunity for them to implement their strategic goals in digitalisation and innovation.

The third cluster comprises the firms with a high overall score of 80%, and all of the differences have already been mentioned in the previous discussion.

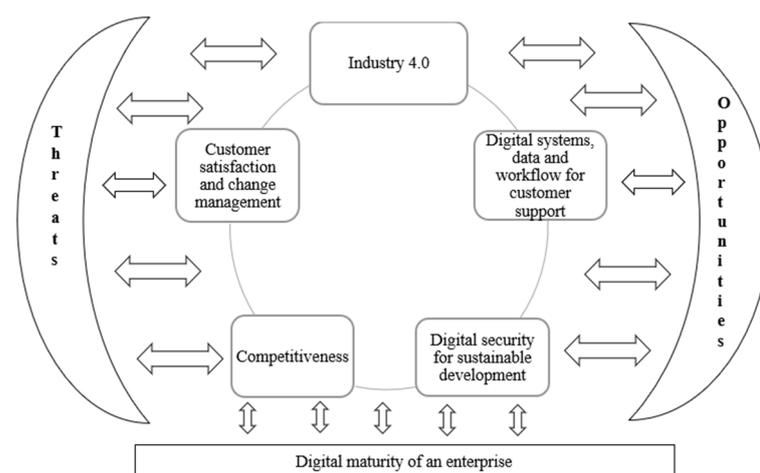
The findings form another part in the development of a concept for the management of threats and opportunities in the digital transformation of SMEs. In the first phase, 16 trends that are related to opportunities and threats in the digital transformation were identified. Subsequently, the SMEs identified each trend as a threat, as an opportunity, or as neither. For the purposes of greater clarity, and for the more effective management of threats and opportunities in the digital transformation, five dimensions were created from these 16 trends by using the principal component analysis. The individual dimensions were logically labelled to reflect the names of the trends that they contain. In the final step, the cluster analysis was used to identify how businesses with different levels of overall digital maturity differ from each other in terms of the perceived opportunities and threats. On the basis of the above-described process, a concept for managing the threats and opportunities in the digital transformation was constructed. This concept is based on five dimensions. In addition, two fundamental forces (i.e., threats and opportunities) had to be added. Finally, another parameter was added to the concept on the basis of the cluster analysis. The different levels of the overall digital maturities of the companies need to be taken into account, as their future practices in the digital transformation of their enterprises may differ significantly. The different arrows in the concept represent the constant interactions between the different dimensions in relation to threats and opportunities. They also illustrate the fact that SMEs need to manage threats and opportunities on the basis of the level (situation) of the digital maturity that they have achieved. The results of the cluster analysis show that SMEs with low levels of digital maturity, enterprises with near-average

levels of digital maturity, and enterprises with high levels of digital maturity, understand the different trends in terms of threats and opportunities, in many cases.

Digital transformation is very costly and time-consuming for SMEs [49,50]. Therefore, SMEs need to clearly identify in their digital strategies which areas of digital transformation are a priority for them. One of the main areas of digital transformation consists in threat-and-opportunity management. On the basis of the trends that represent new opportunities or threats to them, businesses are forced to embrace change and to implement new innovative solutions that are related to digital transformation. It is not only about introducing new software and hardware solutions, but also about innovating processes, methodologies, and business models that are aimed at sustainable products and services for customers [51]. The focus of SMEs on innovation will enable these firms to improve their market positions, and to improve or maintain their competitive advantages [52]. The proposed concept for managing threats and opportunities in the digital transformation will enable firms to better identify and manage the changes that are related to the green and digital transformation [53], and, thus, to have the capacity to become even more competitive, not only in the Czech Republic and the EU market, but also globally.

The main contribution to the field of theory can be seen in the narrow focus on the management of threats and opportunities in the digital transformation of SMEs. There are several studies that focus on the strategic management of the digital transformation of firms. For example, Heavin and Power [54] compare, in their article, three different approaches of enterprises to the digital transformation strategies. They conclude that each enterprise should develop its own digital transformation strategy on the basis of a relevant set of questions that these authors worked out. The set of questions does not focus on the threats and opportunities that are connected to the digital transformation.

An area that is more relevant to the focus of our study encompasses the challenges that are associated with digital transformation. In their paper, Hess et al. [55] propose a conceptual guideline for the decision making of managers in the field of the challenges that are related to digital transformation. The concept includes the following dimensions: digital maturity transformation and value. We see there the most significant intersection with our concept for the management of the threats and opportunities in the digital transformation of SMEs, which is depicted in Figure 2, because our main driver is also the digital maturity of an enterprise.



**Figure 2.** A concept for managing threats and opportunities in the digital transformation of SMEs.

Inside of these dimensions are strategic, tactical, and operational tasks. Their work is based on the following set of challenges: (1) The priorities that are connected to digital transformation; (2) Aggregate data or personalization; (3) The provision of more resources to IT staff vs. more self-service analytics; (4) The storage of all data vs. selecting data to store that serves a specific purpose; (5) Work that is performed by people vs. computing

machines; (6) Security vs. accessibility; and (7) The privacy of individuals vs. the understanding of an individual. This mixture of challenges is retrieved from the work of other authors [56,57].

Challenge 2 corresponds to our dimension—“Digital systems, data, and workflow for customer support”—which is listed in Figure 2. Challenge 5 is broadly similar to our dimension—Industry 4.0—because the “human work vs. computing machines” is an integral part of Industry 4.0. We understand it as the threat that machines will perform the work instead of people. Challenge 6 is connected to our dimension: “Digital security for sustainable development”.

The other dimensions of the proposed concept for managing threats and opportunities in the digital transformation of SMEs take into account not only the IT sphere, but also the social aspect (predominately the dimension: Customer satisfaction and change management). These findings could also be seen in [58].

Several studies deal with the challenges that are connected to digital transformation. Our contribution to the theory should be seen in the narrower and more direct focus on the management of the threats and opportunities in the digital transformation of SMEs.

#### 4. Conclusions

Digitisation affects almost every aspect of our lives, and SMEs have to cope with the opportunities and threats that are connected with it [26,27]. The opportunities and threats that are associated with digital transformation can have positive but also negative impacts on a sustainable world [28]. In the context of these aspects, the findings of this study propose a concept for managing the opportunities and threats that are associated with digital transformation. The main objective of this paper was to create a concept for managing threats and opportunities in the digital transformation. The selected process included three main phases (i.e., the identification of 16 relevant trends that are related to opportunities and threats in the digital transformation of SMEs). Subsequently, the SMEs identified whether each trend represented a threat, an opportunity, or neither of them. In the second phase, five dimensions emerged from these 16 trends by using the principal component analysis. These five dimensions are as follows: Industry 4.0; Digital systems, data, and workflow for customer support; Digital security for sustainable development; Competitiveness; and Customer satisfaction and change management. The individual dimensions were logically labelled to reflect the names of the trends that they contain. In the last step, the cluster analysis was used to identify how businesses with different levels of overall digital maturity differ from each other in terms of perceived opportunities and threats. This procedure served as a basis for the design of the concept for the management of threats and opportunities in the digital transformation.

The results that emerge from the cluster analysis are very significant. In many cases, the SMEs with low digital maturities, the enterprises with near-average digital maturity scores, and the enterprises with high digital maturity scores, have different understandings of the different trends in terms of threats and opportunities. The key findings include that the firms with a low overall digital maturity score (24%) perceive the following trends differently compared to the firms in Clusters 1 and 3: (1) Digital data (the Internet of things and big data); (2) The digital approach to customers (relationship with customers, mobile applications, social networks, etc.); (3) Technical networking (mobile and cable networks, cloud computing, sensor technologies, smart factories, platforms, remote maintenance, purely digital products, etc.); and (4) The future of work (new jobs, new competencies, and new skills). The firms with the lowest overall scores do not perceive the four trends mentioned above as either opportunities or threats. On the contrary, the firms with an average overall score (Cluster 1) and a high overall digital maturity score perceive these four trends as opportunities.

The companies from the second cluster further differ from the other clusters by following two trends, which are, namely, Industry 4.0 (the digital model of horizontal value chains), and Industry 4.0 (the digital model of vertical value chains), and by not perceiving

of them as either an opportunity or a threat. On the contrary, the other two clusters of companies see these trends as opportunities. The results indicate that, for firms with low levels of digital maturity, it will be necessary to focus on developing the second dimension (i.e., Digital systems, data, and workflow for customer support), and the first dimension (i.e., Industry 4.0).

The SMEs with an average overall digital maturity score of 57% (Cluster 1) differ from the other two groups mainly because the businesses within this cluster perceive new risks more as threats. Another valuable finding is that these enterprises have a neutral relationship with the trend of sustainability in terms of threats and opportunities. The other two clusters of enterprises see sustainability more as an opportunity, or as a significant opportunity. This result may be interpreted as an indication that the businesses with a low overall digital maturity score (Cluster 2), and the businesses with a high overall digital maturity score (Cluster 3), are aware that sustainable development is of strategic importance to them. For the enterprises in the second cluster, the sustainability trend does not appear as a threat or as an opportunity in their strategic objectives. From the above results, it may be recommended that the firms with average total scores focus on the third dimension (i.e., Digital security for sustainable development) and aim mainly at the sustainability trend within their digital transformation.

The proposed concept will enable SMEs to more easily manage threats and opportunities in their digital transformations. Businesses will be able to more quickly adopt the necessary changes and innovations that are related to the green and digital transformation. Sustainable products and services for customers need to be implemented not only in large multinational companies, but also in SMEs. These enterprises serve as the primary vehicles of innovation and can make a significant contribution to the achievement of climate neutrality by 2050.

The limitations of the research may be perceived in the fact that it is focused only on SMEs within the Czech Republic. It is obvious that the results of this paper cannot be generalised to large firms, or even to other countries within Central Europe, such as Slovakia, Poland, Austria, Slovenia, or Germany. A distinction needs to be made between SMEs and large firms, as their innovation potentials in the context of digital transformation may differ [59]. Therefore, future research will focus on obtaining more data from more respondents (SMEs). It will be necessary to conduct additional research in other countries within the Central Europe. It will also be beneficial to include large companies in future research. Furthermore, it is essential to support and intensify the digital transformation in all regions of the European Union in order to make European enterprises as competitive as possible in the global market.

**Author Contributions:** Conceptualization I.Š., D.S. and L.S.; methodology I.Š., D.S. and L.S.; software J.V., L.S. and A.K.; validation J.S., A.K. and J.V.; formal analysis I.Š., D.S. and L.S.; investigation I.Š., D.S. and J.V.; resources A.K., I.Š., D.S. and L.S.; data curation I.Š., D.S. and L.S.; writing—original draft preparation I.Š., D.S. and L.S.; writing—review and editing, A.K.; visualization I.Š. and J.S., supervision A.K., J.S. and I.Š.; project administration A.K., J.S. and I.Š.; funding acquisition J.S., A.K. and J.V. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received external funding from the Technological Agency of the Czech Republic.

**Institutional Review Board Statement:** Faculty of Business and management BUT does not require Institutional Review Board (IRB) approval for this type of study and the research conducted due to the fact the research did not interfere with ethics and GDPR.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Not applicable.

**Acknowledgments:** The paper was created within the project TACR number: TL02000215, “Digital Transformation for Business Model Innovations in Small and Medium Sized Enterprises in the Czech Republic”.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Floridi, L. *The 4th Revolution: How the Infosphere Is Reshaping Human Reality*; Oxford University Press: Oxford, UK, 2014.
2. Nicholas, N. *Being Digital*. 1995, pp. 1–252. Available online: [https://www.goodreads.com/book/show/57020.Being\\_Digital](https://www.goodreads.com/book/show/57020.Being_Digital) (accessed on 13 March 2022).
3. Sun, Y.; Yang, C.; Shen, X.-L.; Wang, N. When digitalized customers meet digitalized services: A digitalized social cognitive perspective of omnichannel service usage. *Int. J. Inf. Manag.* **2020**, *54*, 102200. [CrossRef]
4. Bresciani, S.; Ferraris, A.; Del Giudice, M. The management of organizational ambidexterity through alliances in a new context of analysis: Internet of Things (IoT) smart city projects. *Technol. Forecast. Soc. Chang.* **2018**, *136*, 331–338. [CrossRef]
5. Bălăcescu, A.; Pătrașcu, A.; Păunescu, L.M. Adaptability to Teleworking in European Countries. *Amfiteatru Econ.* **2021**, *23*, 683–699. Available online: [www.amfiteatruconomic.ro](http://www.amfiteatruconomic.ro) (accessed on 13 March 2022).
6. Dobrovolskiene, N.; Pozniak, A.; Tvaronavičienė, M. Assessment of the Sustainability of a Real Estate Project Using Multi-Criteria Decision Making. *Sustainability* **2021**, *13*, 4352. [CrossRef]
7. Bulińska-Stangrecka, H.; Bagińska, A. HR Practices for Supporting Interpersonal Trust and Its Consequences for Team Collaboration and Innovation. *Sustainability* **2019**, *11*, 4423. [CrossRef]
8. Nurzhanova, G.; Mussirov, G.; Niyazbekova, S.; Ilyas, A.; Tyurina, Y.G.; Maisigova, L.A.; Troyanskaya, M.; Kunanbayeva, K. Demographic and migration processes of labor potential: A case study the agricultural sector of the Republic of Kazakhstan. *Entrep. Sustain. Issues* **2020**, *8*, 656–671.
9. Prokopenko, O.V.; Kornatowski, R. Features of modern strategic market-oriented activity of enterprises. *Mark. Manag. Innov.* **2018**, *1*, 295–303. [CrossRef]
10. Varyash, I.; Mikhaylov, A.; Moiseev, N.; Aleshin, K. Triple bottom line and corporate social responsibility performance indicators for Russian companies. *Entrep. Sustain. Issues* **2020**, *8*, 313–329. [CrossRef]
11. European Commission. New Approach to Enable Global Leadership of EU Standards Promoting Values and a Resilient, Green and Digital Single Market. European Commission [online]. 2022. Dostupné z. Available online: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_22\\_661](https://ec.europa.eu/commission/presscorner/detail/en/IP_22_661) (accessed on 19 February 2022).
12. Justinek, G. The Economic Power of European Union. Conference on the Future of Europe—A View from Slovenia. p. 18. Available online: <https://futureu.europa.eu/pages/about> (accessed on 13 March 2022).
13. European Commission. *European Industrial Strategy*. 2021. Available online: [https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en) (accessed on 7 August 2021).
14. Razminienė, K.; Vinogradova-Zinkevič, I.; Tvaronavičienė, M. Tracing Relationship between Cluster’s Performance and Transition to the Circular Economy. *Sustainability* **2021**, *13*, 13933. [CrossRef]
15. Europe Ready for the Digital Age: A New Generation of Technologies Is Changing Our Lives. European Commission. Available online: [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en) (accessed on 6 August 2021).
16. Mura, L.; Haviernikova, K.; Machova, R. Empirical results of entrepreneurs’ network: Case study of Slovakia. *Serb. J. Manag.* **2017**, *12*, 121–131. [CrossRef]
17. Franceschini, S.; Faria, L.; Jurowetzki, R. Unveiling scientific communities about sustainability and innovation. A bibliometric journey around sustainable terms. *J. Clean. Prod.* **2016**, *127*, 72–83. [CrossRef]
18. Sánchez-Martínez, J.; Rodríguez-Cohard, J.; Garrido-Almonacid, A.; Gallego-Simón, V. Social Innovation in Rural Areas? The Case of Andalusian Olive Oil Co-Operatives. *Sustainability* **2020**, *12*, 10019. [CrossRef]
19. Schiederig, T.; Tietze, F.; Herstatt, C. Green innovation in technology and innovation management—An exploratory literature review. *RD Manag.* **2012**, *42*, 180–192. [CrossRef]
20. Welford, R. (Ed.) *Hijacking Environmentalism: Corporate Responses to Sustainable Development*, 1st ed.; Routledge: London, UK, 1997. [CrossRef]
21. Stock, T.; Seliger, G. Opportunities of sustainable manufacturing in Industry 4.0. *Procedia CIRP* **2016**, *40*, 536–541. [CrossRef]
22. Kagermann, H.; Lukas, W.; Wahlster, W. Abschotten ist keine Alternative. *VDI Nachrichten*. 2015. Issue 16. Available online: [https://www.dfki.de/fileadmin/user\\_upload/DFKI/Medien/News\\_Media/Presse/Presse-Highlights/vdinach2015a16-ind4.0-Abschotten-keine-Alternative.pdf](https://www.dfki.de/fileadmin/user_upload/DFKI/Medien/News_Media/Presse/Presse-Highlights/vdinach2015a16-ind4.0-Abschotten-keine-Alternative.pdf) (accessed on 13 March 2022).
23. Kamble, S.; Gunasekaran, A.; Gawankar, S. Sustainable Industry 4.0 framework: A systematic literature review identifying the current trends and future perspectives. *Process Saf. Environ. Prot.* **2018**, *117*, 408–425. [CrossRef]
24. Duarte, S.; Cruz-Machado, V. Exploring linkages between lean and green supply chain and the industry 4.0. In *International Conference on Management Science and Engineering Management*; Springer: Cham, Germany, 2017; pp. 1242–1252. [CrossRef]
25. Miron, D. A Multidimensional Approach of the Relationship Between Teleworking and Employees Well-Being—Romania During the Pandemic Generated by the SARS-CoV-2 Virus. *Amfiteatru Econ.* **2021**, *23*, 586–600. [CrossRef]
26. Straková, J.; Korauš, A.; Váchal, J.; Pollák, F.; Černák, F.; Talíř, M.; Kollmann, J. Sustainable Development Economics of Enterprises in the Services Sector Based on Effective Management of Value Streams. *Sustainability* **2021**, *13*, 8978. [CrossRef]
27. Korauš, A.; Gombár, M.; Vagaská, A.; Bačík, R.; Korba, P.; Černák, F. Bitcoin price as one of basic cryptocurrencies in relation to the basic stock market’s indicators. *Entrep. Sustain. Issues* **2021**, *9*, 552–569. [CrossRef]
28. Mihalčová, B.; Korauš, A.; Prokopenko, O.; Hvastová, J.; Freňáková, M.; Gallo, P.; Balogová, B. Effective Management Tools for Solving the Problem of Poverty in Relation to Food Waste in Context of Integrated Management of Energy. *Energies* **2021**, *14*, 4245. [CrossRef]

29. Galati, F.; Bigliardi, B. Industry 4.0: Emerging themes and future research avenues using a text mining approach. *Comput. Ind.* **2019**, *109*, 100–113. [CrossRef]
30. Agostini, L.; Galati, F.; Gastaldi, L. The digitalization of the innovation process: Challenges and opportunities from a management perspective. *Eur. J. Innov. Manag.* **2020**, *23*, 1–12. [CrossRef]
31. Hartl, E.; Hess, T. *The Role of Cultural Values for Digital Transformation: Insights from a Delphi Study*. 2017. Available online: [https://www.researchgate.net/publication/330353915\\_The\\_Role\\_of\\_Cultural\\_Values\\_for\\_Digital\\_Transformation\\_Insights\\_from\\_a\\_Delphi\\_Study?enrichId=rgreq-832e63fac7ba7ae3e198597ebad216c7-XXX&enrichSource=Y292ZXJQYWdlOzMzMzM1MzkxNTtBUzo3MTQ2ODY0OTY1MzA0MzNAMTU0NzQwNTk0Nm4Mg%3D%3D&el=1\\_x\\_2&\\_esc=publicationCoverPdf](https://www.researchgate.net/publication/330353915_The_Role_of_Cultural_Values_for_Digital_Transformation_Insights_from_a_Delphi_Study?enrichId=rgreq-832e63fac7ba7ae3e198597ebad216c7-XXX&enrichSource=Y292ZXJQYWdlOzMzMzM1MzkxNTtBUzo3MTQ2ODY0OTY1MzA0MzNAMTU0NzQwNTk0Nm4Mg%3D%3D&el=1_x_2&_esc=publicationCoverPdf) (accessed on 13 March 2022).
32. Vial, G. Understanding digital transformation: A review and a research agenda. *J. Strateg. Inf. Syst.* **2019**, *28*, 118–144. [CrossRef]
33. Gökalp, E.; Martinez, V. Digital transformation capability maturity model enabling the assessment of industrial manufacturers. *Comput. Ind.* **2021**, *132*, 103522. [CrossRef]
34. Nambisan, S. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrep. Theory Pract.* **2017**, *41*, 1029–1055. [CrossRef]
35. Raguseo, E.; Gastaldi, L.; Neirotti, P. Smart work: Supporting employees' flexibility through ICT, HR practices and office layout. *Evid.-Based HRM A Glob. Forum Empir. Scholarsh.* **2016**, *4*, 240–256. [CrossRef]
36. Gastaldi, L.; Radaelli, G.; Lettieri, E.; Luzzini, D.; Corso, M. Professionals' use of ICT in hospitals: The interplay between institutional and rational factors. *Int. J. Technol. Manag.* **2019**, *80*, 85–106. [CrossRef]
37. Westerman, G.; Calm ejane, C.; Bonnet, D.; Ferraris, P.; McAfee, A. Digital Transformation: A roadmap for billion-dollar organizations. *MIT Cent. Digit. Bus. Capgemini Consult.* **2011**, *1*, 1–68.
38. Sch afer, B.; Gasparon, M.; Storm, P. European Raw Materials Alliance—A new initiative to increase raw material resilience for a greener Europe. *Miner. Econ. Raw Mater. Rep.* **2020**, *33*, 415–416. [CrossRef]
39. The Digital Economy and Society Index (DESI): DESI 2020. European Commission. Available online: <https://digital-strategy.ec.europa.eu/en/policies/desi> (accessed on 6 August 2021).
40. Blaikie, N. A critique of the use of triangulation in social research. *Qual. Quant. Int. J. Methodol.* **1991**, *25*, 115–136. [CrossRef]
41. Polit, D.F.; Beck, C.T. *Nursing Research: Generating and Assessing Evidence for Nursing Practice*; Lippincott Williams & Wilkins: Philadelphia, PA, USA, 2008.
42. Ministerstvo Pr umyslu a Obchodu: Zpr ava o V yvoji Podnikatelsk eho Prostred ı v  eske Republice v Roce 2019. 27 January 2021. Available online: <https://www.mpo.cz/assets/cz/podnikani/regulace-podnikani-a-snizovani-administrativni-zateze/snizovani-administrativni-zateze-podnikatelu/2021/1/Zprava-2019.pdf> (accessed on 21 February 2022).
43. Ge, M.; Bangui, H.; Buhnova, B. Big Data for Internet of Things: A Survey. *Future Gener. Comput. Syst.* **2018**, *87*, 601–614. [CrossRef]
44. Maglaras, L.A.; Kim, K.-H.; Janicke, H.; Ferrag, M.A.; Rallis, S.; Fragkou, P.; Maglaras, A.; Cruz, T.J. Cyber security of critical infrastructures. *ICT Express* **2018**, *4*, 42–45. [CrossRef]
45. Mart ınez, P. Customer loyalty: Exploring its antecedents from a green marketing perspective. *Int. J. Contemp. Hosp. Manag.* **2015**, *27*, 896–917. [CrossRef]
46. Peracek, T.; Vilcekova, L.; Strazovska, L. Selected problems of family business: A case study from Slovakia. *Acta Polytech. Hung.* **2020**, *17*, 145–162. [CrossRef]
47. Prokopenko, O.; Omelyanenko, V. Intellectualization of the Phased Assessment and Use of the Potential for Internationalizing the Activity of Clusters of Cultural and Creative Industries of the Baltic Sea Regions. *TEM J.* **2020**, *9*, 1068–1075. [CrossRef]
48. Mura, L.; Hajduov a, Z. Measuring efficiency by using selected determinants in regional SMEs. *Entrep. Sustain. Issues* **2021**, *8*, 487–503. [CrossRef]
49. Blasco, M.F.; Moliner-Vel azquez, B.; Servera-Franc es, D.; Gil-Saura, I. Role of marketing and technological innovation on store equity, satisfaction and word-of-mouth in retailing. *J. Prod. Brand Manag.* **2017**, *26*, 650–666. [CrossRef]
50. Kobtseva, O.N.; Shichiyakh, R.A.; Sidorchukova, E.V.; Novoselova, N.N.; Novoselov, S.N.; Morkovkin, D.E. Organizational and economic features of import substitution formation and realization in the conditions of spatial restrictions. *Int. J. Appl. Bus. Econ. Res.* **2017**, *15*, 25–35.
51. Sebastian, I.M.; Ross, J.W.; Beath, C.; Mocker, M.; Moloney, K.G.; Fonstad, N.O. How big old companies navigate digital transformation. *MIS Q. Exec.* **2017**, *16*, 197–213. [CrossRef]
52. Gil-Gomez, H.; Guerola-Navarro, V.; Oltra-Badenes, R.; Lozano-Quilis, J.A. Customer relationship management: Digital transformation and sustainable business model innovation. *Ekon. Istra ivanje* **2020**, *33*, 2733–2750. [CrossRef]
53. Peter, M.K.; Kraft, C.; Lindeque, J. Strategic action fields of digital transformation: An exploration of the strategic action fields of Swiss SMEs and large enterprises. *J. Strategy Manag.* **2020**, *13*, 160–180. [CrossRef]
54. Heavin, C.; Power, D.J. Challenges for digital transformation—Towards a conceptual decision support guide for managers. *J. Decis. Syst.* **2018**, *27* (Suppl. 1), 38–45. [CrossRef]
55. Hess, T.; Matt, C.; Benlian, A.; Wiesb ock, F. Options for formulating a digital transformation strategy. *MIS Q. Exec.* **2016**, *15*, 123–129.
56. Tiersky, H. *5 Top Challenges to Digital Transformation in the Enterprise*. Forbes. 2017. Available online: <https://www.cio.com/article/234486/5-top-challenges-to-digital-transformation-in-the-enterprise.html> (accessed on 13 March 2022).

57. Newman, D. *Top 10 Trends for Digital Transformation*. Forbes. 2016. Available online: <https://www.forbes.com/sites/danielnewman/2016/08/30/top-10-trends-for-digital-transformation-in-2017/> (accessed on 13 March 2022).
58. Pelletier, C.; Cloutier, L.M. Challenges of digital transformation in SMEs: Exploration of IT-related perceptions in a service ecosystem. In Proceedings of the 52nd Hawaii International Conference on System Sciences, Maui, HI, USA, 8–11 January 2019. Available online: <https://scholarspace.manoa.hawaii.edu/handle/10125/59934> (accessed on 13 March 2022).
59. Fedushko, S.; Peráček, T.; Syerov, Y.; Trach, O. Development of Methods for the Strategic Management of Web Projects. *Sustainability* **2021**, *13*, 742. [[CrossRef](#)]