

Article

The Impact of COVID-19 on Sustainable Business Models in SMEs

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Abstract: Businesses have been exposed to various challenges during the global pandemic, and their response to this disruption has impacted their resilience as well as their chances to overcome this crisis. Small and medium-sized enterprises (SMEs) are changing their business models in order to adapt to this changing environment. Service-based industries have been hit particularly hard. This research investigates how SMEs operating in service industries have been coping with the disruptions caused by the COVID-19 pandemic. This research aims to gain insights into which transformation drivers they have focused on and which technologies they have selected as a means to respond to the disruption. These insights regarding SMEs are then explored according to their influence on the redefinition of sustainable business models in SMEs. The review data was analyzed via a customized research framework that contains three dimensions and 30 subconcepts. The results show the distribution of drivers and technologies across service sectors. They are organized into a Business Model Canvas and could be considered useful for academia and practitioners. The highly unpredictable environment allows for only a few feasible strategic approaches regarding an SME's decision on to follow incumbents, to become a challenger, or to reinvent themselves based on their own transformation drivers and readiness to apply digital technologies.

Keywords: SMEs; COVID 19; service sector; transformation drivers; digital technologies; business model



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1. Introduction

The global health crisis that started in 2020 impacted businesses of all sizes and in all industries. Although some industries have shown a certain level of resilience or even found a new operating niche, most small and medium-sized entrepreneurs in the services industry found themselves in “new normal” operating environments. The negative impacts of the pandemic have been reported in all spheres of life, and have had economic, political, social, and psychological consequences [1–3]. However, the strongest impact has been on human health and the perception of human health [4]. In order to slow down the pandemic, several countries have suspended business activities, and have adopted social distancing in order to reduce human-to-human transmission of COVID-19. This has led to lockdowns, reductions in consumption, the closure of communities, and the elimination of businesses [1]. Numerous economic experts see this pandemic as a metaphorical “black swan” event, “that is, a surprising, unpredictable event of great significance and severe consequences that dramatically changes the political and economic environment” [5] that may cause business failures [6,7]. Technology professionals refer to this as a global disruption, which can be seen as an opportunity or as a challenge to transform business models or implement new technology as a support for business processes. According to Walsh (2020), regardless of their size, numerous companies, large, medium, and small, are, “succumbing to the effects of the coronavirus”. The year 2020 has been projected to “set a record for so-called mega bankruptcies” of many companies (taken from [7]). Moreover, as mentioned, “Things have changed, and the future is uncertain” [8]. The high

unpredictability of the business environment in combination with the high malleability [9] demands for a strategy for change, whereby a total renewal could also be seen as a viable option.

New strategy approaches for small and medium-sized enterprises (SMEs) should help increase the likelihood of overcoming the impact of the pandemic since SMEs have been badly hit financially due to their limited resources and expertise [10]. Based on a common understanding of factors that could impact how businesses are coping with their survival, an approach with three dimensions could be of interest. First, the operating industry and sectors within the industry influence the exposure of SMEs because SMEs tend to be more concentrated in sectors that have been directly affected by COVID-19 response measures (e.g., retail and services). They are typically more credit constrained than larger businesses [11]. For this reason, focusing on how SMEs respond to all challenges posed by a pandemic made sense, especially in the service sector, which has been severely impacted by lockdowns in most countries. Second, various transformation drivers set the course of response and form the direction of transformation. Third, as a means of raising effectiveness, exponential technology development in previous years was seen as a promising tool. At that time, digital technologies did not find a strong and widely based application in the SME sector; however, due to the COVID-19 disruption, SMEs are now trying to avoid a total shut down of economic activities by introducing digital technologies that were not considered a high priority earlier. All three dimensions are in-line with the transformational scenarios seen before the COVID-19 disruption, and could form a solid sustainability framework for changing business models of SMEs.

Based on these three dimensions of coping with the disruption caused by the COVID-19 pandemic, this article aims to provide insights into the following research questions:

- What drives SME transformation in the service sector, and which technologies are being selected to respond to the pandemic disruption?
- How does the operating service sector, transformation drivers, and selected technology influence the redefinition of sustainable business models in SMEs?

To achieve the aim of finding academic and practical implications for making SME business models more sustainable, a comprehensive literature review was performed to bridge the gap in understanding how this pandemic affected the existing business models of SMEs. Collected data was analyzed and its impact on business models was explored. This corresponds with the structure of the paper. First, the theoretical background and the research framework are presented in order to introduce the dimensions and their subconcepts used in the review. The next section presents the literature review results and gives an overview of most important findings. The review results are presented in the context of a business model's transformation in order to support the sustainability of businesses. The discussion and conclusions are given at the end.

2. Theoretical Background

The theory of business [12] states that all organizations have to take into consideration three types of assumptions affecting their way of doing work: assumptions relating to the organizational environment, assumptions relating to the accomplishment of the mission, and assumptions about the competencies and resources enabling the fulfillment of the mission. Further on though, the theory has to be rethought, especially when the organization has experienced a great success or failure. The COVID-19 pandemic has exposed great flaws in the current business models and operations of many SMEs. The theory of business enables organizations to rethink their three elemental assumptions when the business environment becomes chaotic [13].

A business model presents what benefits an organization provides to its customers and partners, as well as how benefits flow back into the organization in the form of revenue [14]. Business models present the current or future state of organizations, showing simple and easy to understand illustrations of some or all aspects of the how they do business, and how they communicate with others in that same field of work [15].

There is no single, or generally agreed on, definition of the term “business model”, but, as the study made by [16] shows, most definitions can be interpreted in a way such that a business model is a model representing an organizational system, an organizational unit characteristic represented in an abstract way, or as an individual means adjusted to an author’s representation.

Business Model Canvas—BMC [17], is the most commonly used business model framework (as shown in [18–20]). The use of BMC goes beyond the creation of a business model. It helps in organizing management and in improving each of the nine business model elements, namely: relationships with customers, customer segments and channels (related to customer definition and understanding); key partners, activities, and resources (directed towards crucial organizational factors improvement); value proposition (that refers to the core of innovations within the product or service); and costs and revenue streams (which refers to the financial component of the model).

The roots of innovation in business models have been examined in [21]. Their research has shown that “knowledge absorptive capacity, organizational agility, and top management mindfulness” are influence factors. They have a significant impact on creating changes within business models. If they are incorporated within the innovation process with care, newly created and improved business models can serve a mediation role between those factors and the improved performance of organizations. The sharing of knowledge connected to new ways of creating and delivering value through emerging technologies has a significant role in improving companies’ performance as well; regardless of whether it is implemented through organizational platforms for knowledge exchange on the corporate governance level [22], or the use of a specific technology. Authors [23] describe how Artificial intelligence (AI) can be used for building a knowledge management system that changes organizational culture and directs innovation towards creating better business performance. Thereby, the knowledge about how new technologies can contribute to better business models, and consequently better performance, can start as an internal process. For example, it can come from the employees of the organization itself. Alternatively, it can also start as an external process, coming from other stakeholders involved in the value creation and delivery process [24].

According to the researchers in [25], the development of a completely new or enhanced version of an existing business model is a strategic venture, which usually results from “(a) certain previous concepts evolving, mainly due to technological advancements, (b) the achievement of social/user acceptance for previous concepts, generating economies of scale or the snowball effect, and/or (c) disruptive and breakthrough innovations”. The disruptive innovations are defined as rather passive entities [26] that “prevent something, esp. a system, process, or event, from continuing as usual or as expected” [27]. In this manner, the global COVID-19 pandemic is a passive entity because organizations have no influence on its appearance or spread; nevertheless, they have to act accordingly and rethink (or rebuild) their business models.

Sustainable business models, as by definition “simplified representation of the elements, the interrelationship between these elements, and the interactions with its stakeholders that an organizational unit uses to create, deliver, capture, and exchange sustainable value” [28], have become the focus of many studies, due to the knowledge gap relating to how to determine elements focusing on the transformation of business models [29]. Thereby, the business model should be a result of organizational innovation for sustainable processes [30].

According to the bibliometric analysis of research done so far, made by [31], sustainable business models are mostly presented in the Journal of Cleaner Production, which is published by three prominent institutions in business management—Technische Universiteit Delft, the University of Cambridge, and Lunds Universitet. The focus of research is on: “(1) sustainable business models and innovation, (2) sustainable business models and circular economy, (3) sustainable business models and value creation”, which brings this study on a justified path of research in line with these previous analyses and research.

The literature review on sustainable innovation made by [32] has considered published work from three perspectives; namely: (1) internal–managerial, showing that what an organization does in its strategic and management planning has a great impact on innovations and the development of novel business models; (2) external–relational, proving that sustainable innovation results from collaboration among all stakeholders involved and; (3) performance evaluation, whereby organizational measurement values can be used to evaluate innovation as well. Another initiative for sustainable performance improvement was presented in [33], pointing out the possibility of using integrated reporting and integrated thinking (for combining financial and nonfinancial indicators). This is considered a significant contribution to sustainable development initiatives such that it demonstrates how the company can use its own resources and capital to generate value for itself and all stakeholders connected to its operations. The study [34] explains the impact of organizational and environmental context factors on technology usage in small and medium-sized manufacturing firms in developing countries. It shows that the support of top management and competitive pressures influence decisions on using e-commerce. For two other factors from this study—government support and adoption costs—no significant influence was confirmed due to, among other reasons, the availability of appropriate government policies and funding, and the cost-effectiveness of online e-commerce platforms [34].

The influence of the pandemic on sustainable business models has been identified to be one of the emerging trends in research about the impact of disruptions on sustainable business models [31]. This has been recognized by other authors as well. Thereby, the influence of either one or a combination of several digital technologies, driven by different change initiatives in one or several industrial sectors in the pandemic era have been investigated. In [35], the use of artificial intelligence in agriculture has been evaluated in regards to it being successful in developing sustainable business models, as it can contribute to reducing the influence of the environment. As well, when AI is combined with other digital technologies, it can promote digital communication and collaboration, and can contribute to achieving the social distance measures related to the COVID-19 pandemic. Transformation from traditional to additive manufacturing based on Industry 4.0 technologies, researched in [36], shows that through performance measurement methods sustainable business models can be achieved. It enables “optimizing material consumption, creating new shapes, customizing designs and shortening production times”. Lastly, aviation is one industry that has experienced many risks and vulnerabilities connected to the pandemic. Stakeholders in this industry should consider how to achieve a balance between short-term help and resilience to other disruptions in order to overcome future crises [37]. Brought by the pandemic, the unpredictability and the uncertainty in which businesses operate are influencing severely the “environmental, economic, technological, educational and training, and social” dimensions [35] when rethinking business models and enabling or raising sustainability.

3. Methodology and Data Collection

The literature review was conducted in the following steps: performing a search of relevant research databases and platforms, constructing a research framework for a qualitative analysis, applying the qualitative analysis framework, and exploring the impact on the business model by relying on Business Model Canvas [17].

In order to visualize the steps of the methodology applied in this research, a model showing the sequences of activities that need to be performed along with the optionality in the sequences, is given in the process model in Figure 1. The model is created in accordance with BPMN 2.0. Ref. [38] using the Bizagi Process Modeler [39]. Vertical swim lanes are showing the main steps of the methodology.

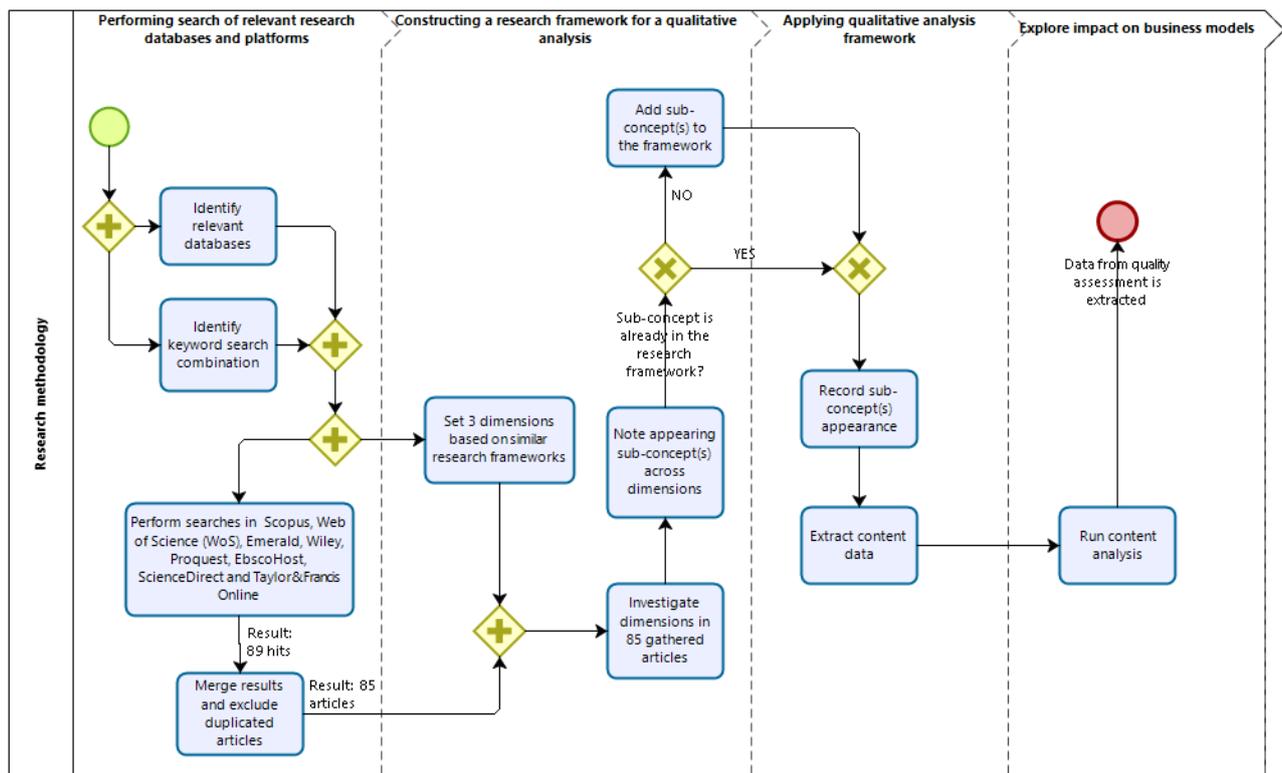


Figure 1. Research methodology scheme.

The model in Figure 1 shows the steps represented as activities (blue rectangles) in sequences starting in the upper left corner of the figure (green circle). The first two activities of identifying relevant databases and keyword search combinations could start in parallel (yellow rhombus with “+” sign). They had to be finished before performing searches in the databases and platforms, and before creating the main dimension constructs. Therefore, the literature gathering process started with the identification of relevant databases for this research where the following databases and platforms were selected: Scopus, Web of Science (WoS), Emerald, Wiley, Proquest, EbscoHost, ScienceDirect, and Taylor and Francis Online. The search strategy was based on the keyword combination: ‘SME’, ‘entrepreneurship’, ‘service sector’, ‘pandemic’, and ‘COVID-19’. It was conducted in December 2020. The search resulted in a total of 89 hits. After merging all 89 papers, duplicated papers were excluded, leaving 85 different papers for further analysis. Parallel to the search, the dimensions of the research framework (Figure 2) for the study were constructed based on the goal to investigate the three dimensions of how SME’s are coping with the challenges posed by the disruption. The three dimensions included: (1) Scope dimension related to the operating service sector, (2) Driver dimension related to the change driving force, and (3) Technology dimension related to selected technology for responding to disruptions in the market. The research framework was inspired by similar existing frameworks [40,41], which have been proven to identify the implications relating to both theory and practice. Relevant meta-data (e.g., authors, title, journal, year of publication) and content analysis data across the three dimensions from the selected 85 papers were extracted and coded. Based on the three dimensions, the gathered scientific literature was investigated for appearing subconcepts across dimensions. Each time a new subconcept was recognized, it was added to the framework and recorded (activities with yellow rhombs with “×” signs). Finally, the content of the articles was extracted and analyzed.

The content analysis of gathered papers about service sectors was filtered in 12 identified groups (subconcepts in Table 1): healthcare, financial, retail, education, entrepreneurship, franchising, food, travel and transportation, tourism, the entertainment sector, and lastly the general services group (i.e., no specific service sector or referred to as general services). Some publications referred to more than one service sector; therefore, the sum of matching publications to sectors presented as frequencies across all service groups was greater than the number of analyzed papers (85).

Table 1. Content analysis in the scope dimension in relation to its focus on the service sector.

Subconcepts	Frequency	Publications
SC01: Healthcare sector	7	[1,42–47]
SC02: Financial sector	4	[1,48–50]
SC03: Retail sector	2	[1,51]
SC04: Education sector	9	[1,8,52–58]
SC05: Entrepreneurship sector	33	[1,2,4,6–8,11,43,48,57,59–81]
SC06: Franchising sector	1	[1]
SC07: Food service sector	6	[1,61,82–85]
SC08: Fashion sector	2	[1,86]
SC09: Travel/transport sector	6	[3,45,57,82,87,88]
SC10: Tourism sector	10	[3,45,57,82,87,89–93]
SC11: Entertainment sector	3	[82,94,95]
SC12: General services	29	[10,44,47,56,89,93,95–117]

Since transformation drivers are the least explicitly stated dimension in the gathered literature, its subconcepts were derived as the following: Organizational driven changes, Customer driven changes, Technology driven changes, Financially driven changes, and General social changes (Table 2). Similar to the content analysis on the operations of the service sector, it was possible to match a publication's content to more than one driver. As a result, the sum of frequencies across all drivers is greater than the number of analyzed papers.

Table 2. Content analysis in the transformation driver dimension.

Subconcepts	Frequency	Publications
TD01: Organizationally driven changes	53	[1–4,6–8,10,11,42–46,48,54–60,62,64–68,70–74,76,78,80,81,86,87,90,91,97–99,102–104,106,111,113–116]
TD02: Customer driven changes	56	[1,3,6,8,42–47,49–59,61,62,64,66,68,70–73,76,78,81,82,84–90,92,94,95,97–99,103–106,108,111–113,117]
TD03: Technology driven changes	34	[2–4,6,8,11,42,43,50,52,54,55,57–59,62,64,66,67,70,79,87,88,94,97,99,101,103,105,113–117]
TD04: Financially driven changes	43	[1,3,4,7,8,10,43,45,48,50,60,62,64,66,68,70,72,74,76–78,80–83,86,88,91,93,95,97,100,101,103,106,107,109–112,114,116,117]
TD05: General social changes	58	[2,3,6,8,44–47,49–51,53,55,57,58,61–63,65,66,68–70,72,75–77,80–86,88–98,101–105,107–110,112,113,115,117]

Content analysis on the technology dimension revealed 13 technology subconcepts: Artificial intelligence, Internet of Things, Big data and data analytics, Cloud computing, Virtual reality, Augmented reality, Deep learning, Blockchain, 3D scanning/printing, Social media and platforms, Autonomous robots, Mobile technology, and Digital innovative technologies in general. Similar to the content analysis of the other two dimensions, it was possible to match the publication's content to more than one technology. As a result, the sum of frequencies across all technologies in Table 3 is also greater than the number of analyzed papers.

Table 3. Content analysis in the technology dimension.

Subconcepts	Frequency	Publications
TC1: Artificial intelligence	18	[4,42,43,47,49,52,55,58,59,62,79,88,97,99,103,113,115,117]
TC2: Internet of Things	10	[4,42,43,47,58,59,97,99,103,115]
TC3: Big data and data analytics	8	[4,42,43,58,59,99,103,115]
TC4: Cloud computing	6	[42,43,47,99,103,115]
TC5: Virtual reality	11	[42,43,47,57,58,89,91,93,97,103,108]
TC6: Augmented reality	5	[42,52,55,95,103]
TC7: Deep learning	3	[43,58,59]
TC8: Blockchain	6	[43,48,59,99,115,116]
TC9: 3D scanning/printing	4	[4,42,97,103]
TC10: Social media and platforms	28	[1,4,8,43,44,51,54,55,58,61,64,66,68,69,72,77,79,86,92–95,104–106,108,111,115]
TC11: Autonomous systems/robotics	10	[42,58,62,79,85,88,97,103,108,115]
TC12: Mobile technology	24	[1,4,43,46,47,49–51,57–59,66,79,91,93–95,97,99,104,105,108,111,116]
TC13: Innovative tech. in general	37	[2,3,6,7,10,11,45,53,56,60,63,65,67,70,71,73–76,78,80–84,87,90,96,98,100–102,107,109,110,112,114]

The research framework in Figure 2 shows the starting three dimensions along with the subconcepts in each dimension derived from the gathered literature. Subconcepts were added each time a new one appeared, which could not be systemized under existing ones. Therefore, the subconcepts do not include all possible options (which is most evident in the technology dimension), but only those which appeared in reviewed articles.

The substructure allows for a comparative approach and distribution measuring of subconcepts. It also allows for the identification of correlative dimension matches. Although keeping a neutral perspective was aimed, the set of appearing subconcepts can be seen as a limitation of this research, along with the comprehension objectivity.

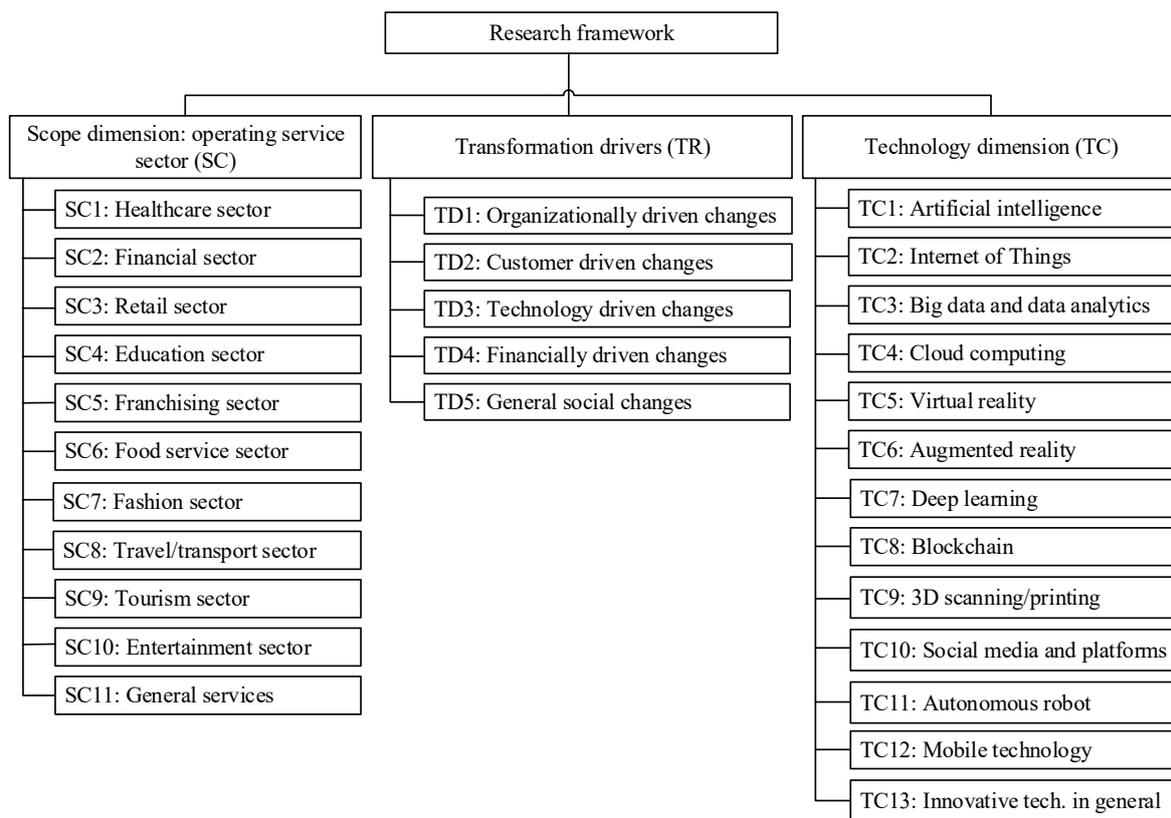


Figure 2. Research dimensions and subconcepts.

4. Results

The analysis data presented in previous section in Tables 1–3, show the content matching the three dimensions and their subconcepts through reported transformations in regard to scope, i.e., operating service sector, transformation drivers, and digital technologies selected for transformational support. From the content analysis of 85 publications in relation to the three dimensions and their 12 sector subconcepts, 5 driver subconcepts and 13 technology subconcepts, 526 records of publications matching the subconcepts were analyzed, where each publication had to be matched to at least one subconcept in each of the three dimensions. Based on the findings from the literature review, the impact on business models is explored via Osterwalder’s Business Model Canvas [17].

4.1. Reflection on the Scope Dimension in Relation to Focus on the Service Sector

The content analysis in the scope dimension in relation to its focus on the service sector in Table 1 shows that most publications are related to profit-oriented entrepreneurship and to services in general. Tourism, education, healthcare, food, and Travel/transport are sectors that are most often explicitly reported about in the recorded scientific publications. Financial, entertainment, fashion, retail, and franchising sectors are not the subject of focus in many scientific publications. They appear only in a few articles.

Agility is critical for SMEs. It allows them to deal successfully with these economic, political, social and psychological challenges. SMEs need to cultivate capabilities and skills in order to leverage their flexibility in responding to market needs and social demands. They need to quickly adjust their operations [62]. The market context or sector within which SMEs operate, may influence their readiness of adjust, and how the business model can be transformed [4].

Some sectors have become more vulnerable than others during the COVID-19 pandemic. Travel, tourism, hotels, hospitality, aviation, restaurants, retail, public entertainment, education, and sports were the sectors with the highest disruptions to business while other

sectors such as food, healthcare, pharmaceuticals, and information technology seem to be less vulnerable [1–3,7,43,45,59,82,87,97,99]. Some sectors were challenged by specific issues in regard to social changes, which has been demonstrated through the example of sharing platforms. These platforms aim to offer sustainable production chains and new consumption behaviors, and provide budget-based and environment friendly alternatives [86]. Meanwhile, some challenges have become common for more sectors. For example, in the transportation or tourism industry [87] and in the fashion industry, the sharing paradigms experience the same potential challenges, e.g., hygiene and health risks—associated with close or skin contact; psychological and social risk—related to the need for social distancing; and a lack of trust in service providers. The impact of challenges may also magnify during this pandemic. Customers' needs, buying habits, purchasing, decision making, and routines have changed demand patterns as customers are now working more from home. Various social and professional events have been postponed, cancelled, or held virtually in online environments. Due to these changes, some industries profited and experienced a greater demand (e.g., fashion and rental platforms). However, during the COVID-19 pandemic, the concern is that the current layout of demands and the initiatives that are being implemented to respond will eventually be disrupted again [86]. Since the impact of the COVID-19 disruption was different depending on particular sectors, SMEs operating in these sectors have responded differently to the challenges ahead of them in terms of focusing on a transformation driver and by applying different technological solutions.

4.2. Reflection on the Transformation Driver Dimension

The content analysis in the transformation driver dimension shows that most occurrences are related to the general social changes as a driver, which can be understood in a way that SMEs strongly focus on their environment and their role in society. Social changes are closely followed by the customer and organizational drivers. This means that SMEs are aware of the significance of customer centricity, internal organizational capacities, and maturity. Financial elements and issues are drivers for roughly half of the publications, and in this study they are considered even more relevant than technology as a driver. Technology as a driving force in boosting SME's resilience during COVID-19 was the least cited driver.

The significant shift of business operations into online environments has been witnessed during 2020 due to changes in consumers' purchasing behavior as a result of national lockdowns and restrictions on movement. In order to make this shift, SMEs have had to fully utilize all available digital technologies, learn new skills, and acquire knowledge that is needed to operate in new digital-oriented environments. Most countries have had to balance between restrictions and protection instruments for their economies during the COVID-19 pandemic. The restrictions and their duration impacted businesses regardless of their size and operating industry. The mitigating relief measures aimed to protect employment and ensure the continuation of production and service activity in this period is considered to be short term. The focus of relief initiatives is, therefore, oriented on protecting present businesses. The long term effects of the pandemic on economic activity have yet to be handled [75]. Financial aid as economy-relief instruments should be fast and focused enough to give numerous SMEs a chance to survive. Nevertheless, financial support is not a guarantee that survival is given. New services, new models of delivering services, new means and channels of consuming services (e.g., entertainment), new collaboration options in communities, i.e., all that impacts the value proposition customers need and expect, is required. To effectively capitalize on opportunities, companies need appropriate, as well as often new, organizational capabilities. Concerning behavior they need to have the readiness for innovation, and operate in an entrepreneurial mindset [62]. Lastly, social changes can also drive SMEs to transform. Transformation allows them to become resilient.

Besides focusing on transformation drivers, initiatives for transformation can also arise from trends in the SME's operating context. These trends include competitor trends, market trends, and other environmental trends. These trends seem to influence SMEs

differently now during the COVID-19 disruption than they did previously. This sounds promising for further research, such that it contributes to understanding the behavior of competitors and how market paradigms have shifted during this crisis.

4.3. Reflection on the Technology Dimension

The content analysis in the Technology dimension shows that most occurrences are related to innovative technologies in general. Social media and platforms (with appearances in 28 publications) and mobile technologies (in 24 publications) are the two most commonly appearing technologies in this study; followed by artificial intelligence (in 18 publications). Virtual reality, Internet of Things, and autonomous systems/robotics are mentioned in 10 of the 85 publications. Other technologies in this framework appear only a few times.

Service sectors that have been more affected had to adjust significantly more. They have had to change their business models, business strategies, and operations. SMEs have had to seek and find opportunities to reinvent themselves or their services, develop new business strategies, and deliver remote operations by digitizing business activities. Many SMEs have had to go digital, meaning that they had to switch to virtual operations to sustain competitiveness, productivity, and business performance. They have also had to implement a techno-economic paradigm, which features digitalization, robotization, and the formation of smart businesses. Many of the new digital technologies can be considered disruptive for some market players. At the same time though, they can be considered a tool for success for others during the pandemic [4,42,43,103].

Digital technologies can have different impacts on different sectors. This also depends on the countries and regions where the SME operates. The potential to make the transition to industry 4.0 can vary [97] and can lead to technological, economic, social, and cultural changes, as well as changes in the class structure of societies [103]. The selection of appropriate technology as a response, depends on the driver transforming operations, as well as on the applicability of the technology in the core processes of SMEs.

4.4. Sector–Driver–Technology Relations

In order to explore the appearances of triplet combinations in “sector–driver–technology,” all 526 records from the qualitative content analysis were isolated and listed. Numerical values (available in Appendix A) were used to create visual representations in the form of bar charts (Figures 3–5) and are not intended to be statistically analyzed. Bar chart visualizations are given since the goal is to ensure that the findings can be easily read and understood as guidelines. The lack of a bar in the bar chart is read in a way such that the content analysis of the publications in this research were not recognized to report on the appearance of the subconcept in a dimension. The visualizations present results in following matter:

- In Figure 3: The distribution of operating service sectors (SC) in relation to transformation drivers (TD) and selected technologies (TC); e.g., SC10: The tourism sector was mostly reported to be driven by TD05 and TD02. The SMEs in this service sector relied on TC13 and TC5.
- In Figure 4: The distribution of transformation drivers (TD) across operating sectors (SC) and selected technologies (TC): e.g., Driver TD02 was the most important driver of change in SC01, and the most important responding technology was T10.
- In Figure 5: The distribution of technologies (TC) across operating service sectors (SC) and as means of transformation by focusing on drivers (TD): TC10 was the technology that was selected the most often for service sector SC04. It was used to address transformations which were driven by TD05 general social changes.

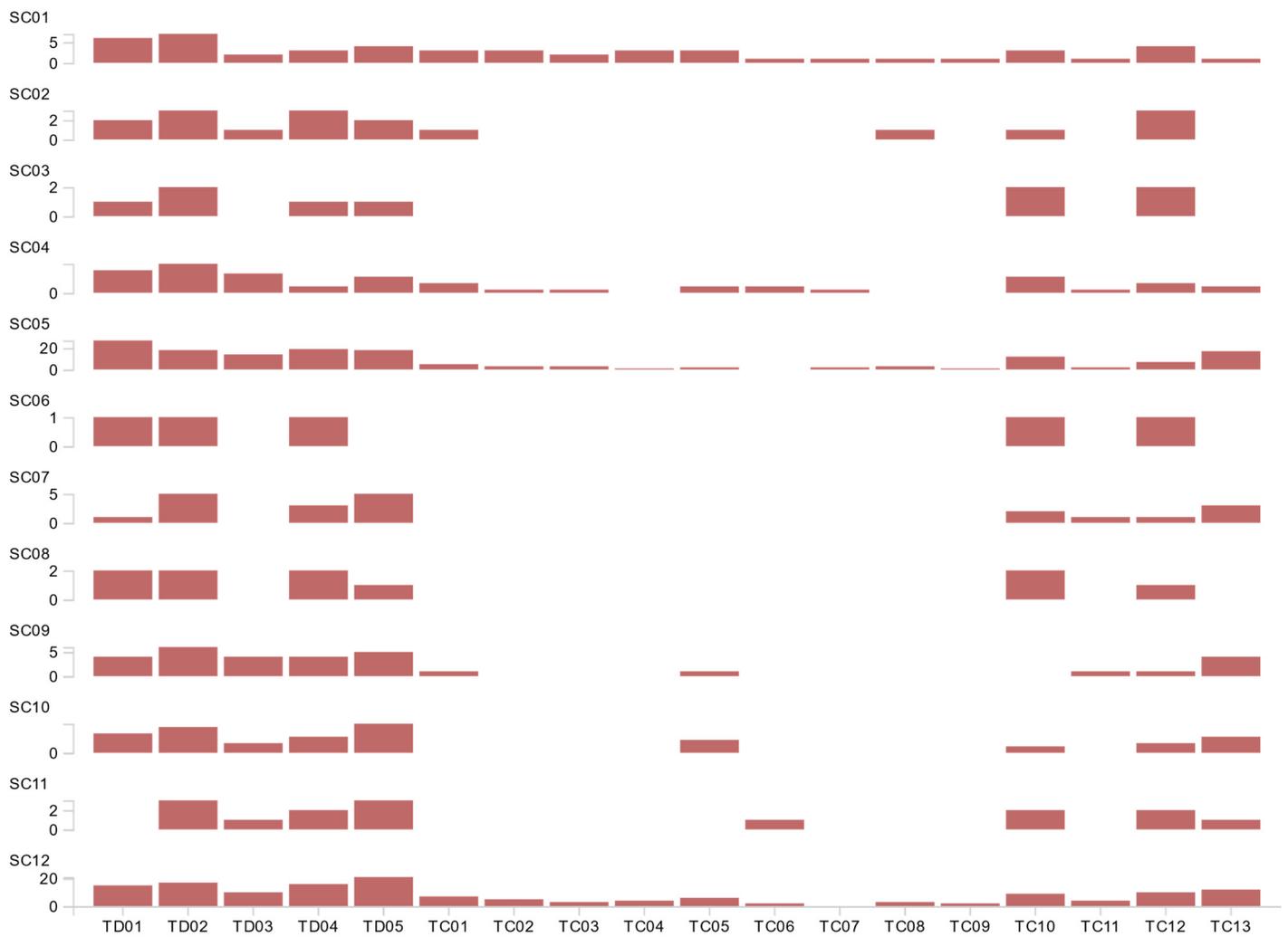


Figure 3. Service sectors (SC) in relation to transformation drivers (TD) and selected technologies (TC).

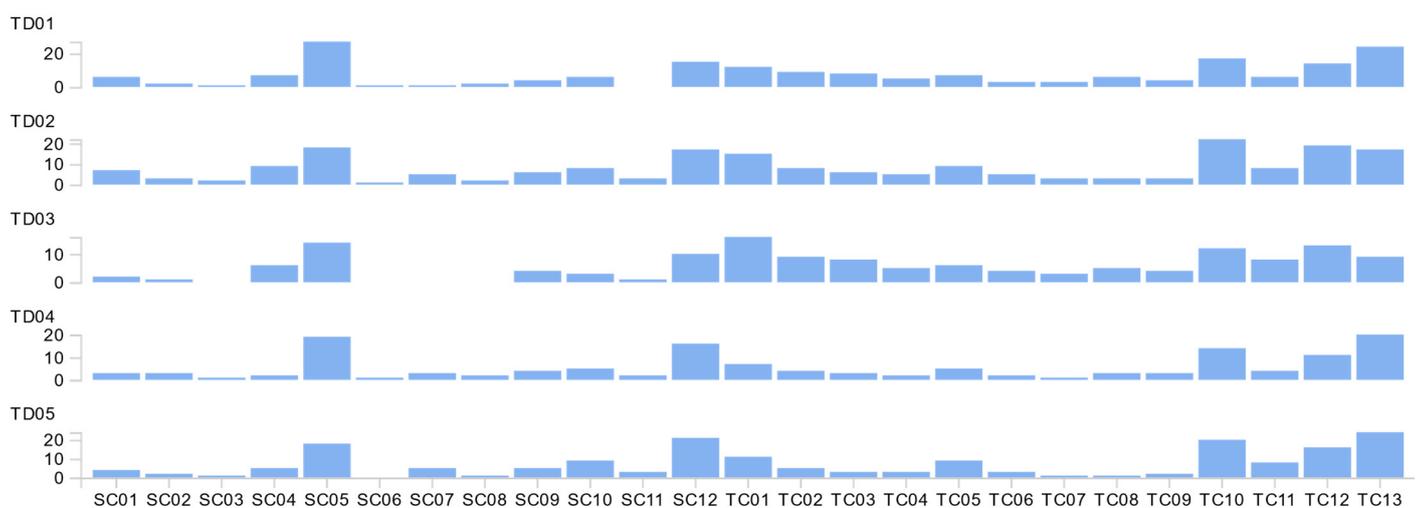


Figure 4. Transformation drivers (TD) across operating sectors (SC) and selected technologies (TC).



Figure 5. Technologies (TC) across operating service sectors (SC) and transformation drivers (TD).

The triple-dimensional combinations presented in the bar charts in Figures 3–5 are limited to publications published in 2020, and can be indicative of SMEs responses to the disruptions caused by the pandemic. Furthermore, the results are considered in the context of business models in order to explore their impact on the redefinition of the elements of business models.

4.5. Impact on Business Models

The adaption of SMEs and their business models (redefined by relying on digital technologies) aims to ensure continuity and improve business activities during lockdowns. Even if the implementation of digital technologies that support business activities was not planned and decided involuntary, it leads gains in terms of competitiveness and resilience [4]. Digital Darwinism, as mentioned by [118], condemns organizations to shut down if they fail to adapt to changes faster than the available technologies and the environment do. That means that SMEs have to use their advantages in terms of size and flexibility to incorporate new strategies and new business models for sustainable business operations [59]. This will enable them to survive.

Every crisis, regardless of the origin, has an immediate effect on financial markets as well. So, one of the biggest problem facing SMEs when they need to transform their existing business model, and consider new one, may be acquiring the needed capital. If this pandemic lasts longer, businesses may run out of money (if they have not already) [48]. SMEs face very specific and unique problems regarding access to external capital. This relates to their informational opacity and their ownership structure. These problems are often compounded by a lack of physical and tangible assets that can be used as collateral against loans. This means that many SMEs are overly reliant on internally generated funds to capitalize on their operations and provide the necessary liquidity to fund their day-to-day operations.

Uncertainty caused by the COVID-19 pandemic has resulted in new ways of understanding the paradigm of entrepreneurship [2,7]. This is especially the case when we combine the pandemic with accelerating digital transformation [97]. This is important to consider since SMEs play a vital role in fostering innovation, economic growth, and reducing unemployment [100].

Competitiveness in operating industries puts pressure on SMEs to continuously create new innovative value propositions and become more resilient in relation to industry incumbents [4]. Due to this, they also need to consider possible collaborative work with other SMEs in the same sector or field of work [119]. They can do this by adopting digital technology. In this period of COVID-19, the pandemic can actually trigger SMEs in any industry to create new strategies and set the stage for long-term growth and market leadership [43]. Adopting digital technologies can also help SMEs to enhance the digitization of internal operations and processes, to improve performance effectiveness and efficiencies, to reengineer business models, to ensure business survival or even to enhance business process innovation [43].

In order to analyze the research described in Sections 4.1–4.4, in terms of how the operating service sector, transformation drivers, and selected technology influence the redefinition of sustainable business models in SMEs in practice, we rely on Business Model Canvas—BMC [17].

This subchapter tries to define in which of the nine elements a special emphasis should be made. This has been conducted in order to contribute to enabling better organizational resilience and perform faster adapting processes, as well as improve further disruption response, sustainability, and growth. To do so, three (3) steps need to be implemented:

1. The operating service sector, in which the organization (creating the new business model) is working in, need to be identified.
2. Technologies within this specific sector, which are already used by other companies, can then be sorted out. In that way, the technologies have the potential to be considered for use such that they change the value proposition of the product or service that needs to be improved or redefined. The number of appearances of each technology can be the decision factor, whereby the organization can choose to use the technology with the highest number of appearances and be the Follower SME. Alternatively, it can choose one of the technologies with the fewest number of appearances (if possible 0) and be the Challenger SME. These strategy operationalization options are described in more detail in the discussion chapter.
3. The transformational driver, which initiated the change, indicates which of the nine elements of BMC is the most important one. The framework for positioning the five subconcepts of the transformational driver dimension has been found and broadened from the initial business model option (BMO) matrix, defined by [120] and previous research on influence of digital transformation drivers onto the BMO matrix dimensions [121]. For each positioned driver, the number of appearances within the investigated operating service sector is again the decision factor, whereby the one with the highest number of appearances indicates which BMC element should be given the greatest emphasis.

In Figure 6, the positioning of the transformational drivers has been conducted, whereby some drivers can have an impact on more than one of the nine BMC elements. The same figure shows an illustrative example, where a company is active within the tourism sector (SC10). In this example, 10 of the explored papers in this research are referred to. The blue text in Figure 6 highlights specific values for the sector in the example.

Operating sector (number of publications in total): SC10: Tourism sector (10)		Implemented digital technologies (number of matches in publications): TC5: Virtual reality (4); TC10: Social media and platforms (2); TC12: Mobile technology (3); TC13: Innovative tech. in general (5);		
Key Partners TD01: Organizationally driven changes (6) TD05: General social changes (9)	Key Activities TD01: Organizationally driven changes (6)	Value Propositions TD03: Technology driven changes (3)	Customer Relationships TD02: Customer driven changes (8)	Customer Segments TD02: Customer driven changes (8) TD05: General social changes (9)
	Key Resources TD01: Organizationally driven changes (6)		Channels TD02: Customer driven changes (8)	
Cost Structure TD04: Financially driven changes (5)		Revenue Stream TD04: Financially driven changes (5)		

Figure 6. Positioning transformation drivers into Business Model Canvas (BMC) elements via an illustrative example.

The technologies applied as reported from 10 publications are: TC5—Virtual reality (4 of 10); TC10—Social media and platforms (2 of 10); TC12—Mobile technology (3 of 10); and TC13—Innovative technology in general (5 of 10). The transformation was mostly driven by TD05—General social changes (9 of 10), then by TD02—Customer driven changes (8 of 10), which leads to a conclusion that Key partners and targeted Customer segments are elements of the BMC that have to be considered with special care and attention.

5. Discussion and Recommendations

The results of this research could be useful for both academia and in practice. The following subsections show the discussion on managerial and academic implications, comparable studies, as well as policy recommendations.

5.1. Academic Implications

Academia can use the results as means to direct future research in three ways:

1. Investigating more in-depth how specific drivers interact together and explore if the focus on more than one driver causes complementary or opposite effects on the business model redefinition. To give an example of this issue, creating new customer-oriented value propositions often increases the complexity of business processes, which can have an effect on organizational elements, such as the need for new skills and competencies. If these two initiatives are intertwined, it would have a positive impact on the sustainability of SMEs. In other words, if the customer initiative is not followed by organizational initiatives, this could have a negative impact on a SME's resilience and sustainability.

2. Investigating new technology options and the application of possibilities in service sectors where according to the review results no reported cases have been found (blanks in Figures 3–5) or where certain technologies have not been considered within this review (due to methodology described in Section 3, which is referring only to technologies reported at least once in gathered publications).
3. Applying the research methodology to other sectors (or possible new disruptions), and investigating how other sectors have responded to the disruptions in their operations and markets.

Digital transformation initiatives have been thoroughly investigated in this recent period. Technology development is exponentially growing, and it sets the stage for the digital environment in which businesses operate. This research shows that SMEs have shifted their focus from technology driven transformation towards more socially-related driven transformation initiatives. Social media and platforms, as well as mobile technologies, were technologies most often selected as a tool for the transformation of channels of communication and/or service delivery. A possible explanation for this can be found in the common use and experience of service providers and consumers with these broadly available technologies. Yet, other technologies may result in more impacts; however, they are not so commonly used by the broader broad public due to the complexity of the technology, lack of competencies among the public on its use, long implementation periods, the need for additional equipment, etc. Building more easy-to-use technology solutions with short implementation periods and that are oriented towards enabling desired value propositions would contribute to supporting SMEs in their efforts to quickly respond to disruptions. More research is needed to identify typical scenarios relating to the implementation of technologies in SME's operating sectors. Further research is also needed to support the development of appropriate and feasible methodologies for designing sustainable business models.

5.2. Managerial Implications

Overall comprehensiveness and scale was not the focus of this research, but this study succeeded in gaining timely and actual insights into alternative approaches used by SMEs to cope with the pandemic. At the strategic level, out of five strategic approaches defined [9], the only ones referring to a highly unpredictable environment are feasible in the pandemic crisis faced by today's businesses include: the followers (adaptive approach), the challengers (shaping approach), or a total redefinition (the renewal approach). The operationalization of the strategic approach selected is offered through the process of business model redefinition. Each of the options for SMEs brings potential benefits and risks:

1. The follower SME decides to follow the way competitors from the same service sector operate, which puts a certain driver in focus. It implements similar technologies, like the others (following the results in Figures 3–5). When implementing the same technology solutions, they can benefit from choosing an off-the-shelf solution or a "one size fits all" solution. This would constitute a fast response to the changing market and customer behavior. On the other side, this "blending in" with competitors means that the SME cannot differentiate itself. This is a risk, and it depends on the readiness of the SME to apply the same digital technology.
2. The challenger SME can benefit from filling the "blanks" in Figures 3–5 in order to differentiate itself and offer a value proposition that is different than the others. This custom value proposition can arise from a different driver focus and/or from applying a technology which others did not consider. Customization-driven technology solutions pose a risk in the short-term, but they also offer to build accompanying skills and competencies, which can be beneficiary for long-term resilience and sustainability.
3. The "reinvent myself SMEs" (those who are applying the renewal strategy approach) could rethink their operating service sector if the driver and technology niches, as well as existing specific skills and competencies, can be identified. This approach has

the potential to bring big benefits, but it is also the most risky (which is in accordance with the entrepreneurial spirit of SMEs).

In regular environments, SMEs struggle on deciding when and how to balance between the exploitation of existing products or services and the exploration of new ones (referred as strategic ambidexterity [122]). Unstable and unpredictable environments force SMEs to rethink their business strategy and change their operating model. In the COVID-19 disruption, strategic ambidexterity has cascaded into operational processes in terms of changing purchase and inbound logistics scenarios, new ways of providing services, and the development of alternative delivery channels. SMEs rely on existing paradigms, but they are also exploiting new possibilities. The flexibility of SMEs and their agile response can be seen as an advantage in relation to large businesses concerning strategic ambidexterity. Nevertheless, they often lack competences and capacity to take advantage of the situation. Building capacities and competencies for future growth opportunities should be a priority when business activities are reduced due to health measures.

5.3. Reflection on Comparable Studies

As mentioned in the theoretical background, business models developed under theory of business have been the focus of academia and practitioners in their research, with an exponential growth. Business model canvas [17], Digital transformation compass [123], Digital matrix [124], Digital vortex [125], and many other frameworks and methods have been developed in order to help organizations understand and improve their way of doing business. These frameworks and methods also contribute to allowing SMEs to adapt better and faster to disruptions affecting their work, such as new digital technologies being regarded as standards in their operating industry, economic crises, and/or the COVID-19 pandemic.

Among many recent studies that have been performed on how the pandemic has influenced business models, the previously mentioned research put attention on the use of artificial intelligence in the agri-food industry [35], the influence of additive manufacturing on the sustainability of business models [36], and the impact of the COVID-19 pandemic on aviation [37]. When comparing the research in this paper with the other research, they all lead to common conclusions despite that fact that they are dealing with different technologies, sectors, and drivers. The current situation has led many companies to rethink their business models, try to learn from others, as well as focus on environmental, sectoral, economic, technological, and social factors that influence the way business is done.

5.4. Policy Recommendations

A limitation of this research is clearly the fact that the results are based solely on secondary sources, i.e., the publications reporting on this issue cannot be seen as comprehensive. In future studies, this type of qualitative research could be performed by surveying SMEs directly. In this case, the results could also be used for improved targeting of aid and funding initiatives. Balancing between “open business—closed business” health measures and at the same time building future capacities can be exhausting for SMEs in many respects, i.e., financially and non-financially. Mitigating relief measures in form of financial aid can help retain employment and contribute to the continuation of business activities only temporarily. Nonfinancial measures in the form of improving digital competencies, designing customer journeys with higher social interactions, developing new and more sustainable ecosystems and alliances, creating new value propositions oriented towards the quality of life, and a safe and sustainable work environment should be the focus of long-term policies.

6. Conclusions, Limitations, and Future Research

The limitations of this research can be found in the broad scope of the study because the term “Service sector” is a generic concept. Moreover, the analysis was conducted without focus on specific country or region. Furthermore, the study is based only on

scientific literature from academic databases and platforms, which tends to lag behind other professional reports. On the other hand, the aim of the paper is not to offer an overall comprehensive literature review on the global level, but to gain insights into what has been reported so far in scientific publications about how SMEs are responding to the recent disruption (relating to the COVID-19 pandemic). It also investigates drivers and technologies that are strategically relevant for SMEs when they decide on an approach to redefining their business models.

These insights could be helpful to academia and professionals when planning, designing, and steering further scientific or professional research in more detail on industry sectors of interest, on interactions of drivers, or on specific technologies. Further research could be directed towards examining SMEs' response scenarios and designing feasible methodologies for the development of sustainable business models.

This research aimed to investigate how SMEs operating in the service industry were coping with the COVID-19 disruption and to gain insights into drivers and technologies which impacted their response to the COVID-19 pandemic. The literature review showed that the focus of transformational initiatives of SMEs during the COVID-19 disruption slightly shifted from technology to social, customers, and organizationally driven changes. This relied on social media platforms and on mobile technologies. The choice of technology could be related to the SME's existing equipment, basic digital competencies to use these technologies, as well as on already established digital communication channels with customers. Lack of resources and expertise [10] connected to the use of more advanced technological solutions could also play role, and this should be taken into account by policymakers when defining new policies relating to future support measures.

According to [23], innovation challenges that arise from including digital technologies like artificial intelligence in developing sustainable business models can have "ethical, social, economic, and legal aspects", which should be addressed in relation to the Sustainable Development Goals proposed in the United Nations 2030 Agenda. In this context, the collaboration of scholars, professionals, and institutions in continuing research and "implementing a public–private partnership network to anticipate and manage the profound social changes connected to the digital revolution" [23] is mandatory for achieving sustainability. Gaining new competencies, enhancing knowledge and experience, and building alliances and ecosystems with stakeholders can be performed during lockdowns, i.e., when businesses cannot operate. Academia and consulting professionals should also contribute more in accordance to their role in the community, offering more lifelong learning programs via open online platforms, performing research, development, and innovation oriented projects in cooperation with different stakeholders. Innovation in creating sustainable business models for delivering services, remote operations, means of substitution and channels of service delivery, innovative collaboration environments, and new service consumption opportunities enable and improve the value proposition. SMEs often need external inputs on these matters.

The influence of COVID-19 motivates SMEs to rethink their core competencies, seek new opportunities, and redefine sustainable business models in a more intense and timely manner. Strategic ambidexterity in shorter cycles, balancing between measures and concentrating on building innovation is not limited to only SMEs in this period. Developing new competencies, improving experience management, and enhancing the experience of professionals (including academia, consultants, etc.) regarding the application of new technologies within business models during this period is an essential regional development need over the long-term. By focusing on this, SMEs will not just survive this disruption. They will emerge capable of adopting new technologies, and become more competitive under these challenging conditions.

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Appendix A

Table 1. Appearances of service sectors (SC) in relation to transformation drivers (TD) and selected technologies (TC).

Sector	TD01	TD02	TD03	TD04	TD05	TC01	TC02	TC03	TC04	TC05	TC06	TC07	TC08	TC09	TC10	TC11	TC12	TC13
SC01	6	7	2	3	4	3	3	2	3	3	1	1	1	1	3	1	4	1
SC02	2	3	1	3	2	1							1		1		3	
SC03	1	2		1	1										2		2	
SC04	7	9	6	2	5	3	1	1		2	2	1			5	1	3	2
SC05	27	18	14	19	18	5	3	3	1	2		2	3	1	12	2	7	17
SC06	1	1		1											1		1	
SC07	1	5		3	5										2	1	1	3
SC08	2	2		2	1										2		1	
SC09	4	6	4	4	5	1				1						1	1	4
SC10	6	8	3	5	9					4					2		3	5
SC11		3	1	2	3						1				2		2	1
SC12	15	17	10	16	21	7	5	3	4	6	2		3	2	9	4	10	12

Table 2. Appearances of transformation drivers (TD) across operating sectors (SC) and selected technologies (TC).

Driver	SC01	SC02	SC03	SC04	SC05	SC06	SC07	SC08	SC09	SC10	SC11	SC12	TC01	TC02	TC03	TC04	TC05	TC06	TC07	TC08	TC09	TC10	TC11	TC12	TC13
TD01	6	2	1	7	27	1	1	2	4	6		15	12	9	8	5	7	3	3	6	4	17	6	14	24
TD02	7	3	2	9	18	1	5	2	6	8	3	17	15	8	6	5	9	5	3	3	3	22	8	19	17
TD03	2	1		6	14				4	3	1	10	16	9	8	5	6	4	3	5	4	12	8	13	9
TD04	3	3	1	2	19	1	3	2	4	5	2	16	7	4	3	2	5	2	1	3	3	14	4	11	20
TD05	4	2	1	5	18		5	1	5	9	3	21	11	5	3	3	9	3	1	1	2	20	8	16	24

Table 3. Appearances of technologies (TC) across operating service sectors (SC) and transformation drivers (TD).

Tech	SC01	SC02	SC03	SC04	SC05	SC06	SC07	SC08	SC09	SC10	SC11	SC12	TD01	TD02	TD03	TD04	TD05
TC01	3	1		3	5				1			7	12	15	16	7	11
TC02	3			1	3							5	9	8	9	4	5
TC03	2			1	3							3	8	6	8	3	3
TC04	3				1							4	5	5	5	2	3
TC05	3			2	2				1	4		6	7	9	6	5	9
TC06	1			2							1	2	3	5	4	2	3
TC07	1			1	2								3	3	3	1	1
TC08	1	1			3							3	6	3	5	3	1
TC09	1				1							2	4	3	4	3	2
TC10	3	1	2	5	12	1	2	2		2	2	9	17	22	12	14	20
TC11	1			1	2		1		1			4	6	8	8	4	8
TC12	4	3	2	3	7	1	1	1	1	3	2	10	14	19	13	11	16
TC13	1			2	17		3		4	5	1	12	24	17	9	20	24

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