

# Pandemic-driven business model sustainability: a review

*Denis Klimanov and Olga Tretyak*

Graduate School of Business, HSE University, Moscow, Russian Federation

## Abstract

**Purpose** – This paper aims to review and summarize the findings of research dedicated to studying the process of building sustainable business models (BM) triggered by development of COVID-19 pandemic.

**Design/methodology/approach** – Bibliometric analysis is performed to identify the papers most relevant to the topic. The authors review the findings of more than 50 papers from Scopus database published between 2020 and 2022 dedicated to studying BM during COVID-19 pandemic, as well as papers dedicated to sustainability phenomenon and most cited BM research.

**Findings** – The paper identifies the gap in defining BM sustainability and contributes to better understanding of this phenomenon by demarcating it from traditional environment-based United Nations agenda. It also describes why network-based approach to BM helps to better address sustainability aspects. The paper demonstrates how representation of a networked BM by three levels of analysis (namely, structure of a BM, interaction mechanism between BM actors and results of their interaction) is organically connected to the key milestones of the value creation process (value definition, value creation, value distribution and value capture) and shows how these three levels can be used to analyze and structure the practical changes proposed in COVID-19-oriented BM. Finally, the paper summarizes key findings of the studies dedicated to BM during the pandemic and structures key insights in relation to building sustainable BM.

**Research limitations/implications** – The results of the paper contribute to developing theory around BM sustainability as well as provide insights for business practitioners on how to adjust BM during the crisis. At the same time, many insights shown in the paper are industry specific, which limits their generalizability, as well as consequences of the pandemic are still not fully clear. Therefore, the authors argue that future research should be primarily focused on developing generalizable measurement frameworks to evaluate the antecedents, process and results of BM adaptation.

**Originality/value** – The paper strengthens theoretical foundations for the research focused on BM sustainability and helps businesses to better manage the adaptation in the fast-changing environment.

**Keywords** Business model, Sustainability, COVID-19 pandemic

**Paper type** Literature review

## Introduction

Managing business models (BM) through the COVID-19 pandemic helped to learn businesses from various industries a lot of valuable insights. While first months of the pandemic triggered companies to find quick solutions allowing them to survive in the fast-changing environment, many of the changes done for the BM appeared to have a long-lasting impact spanning the boundaries of the pure crisis management (Björklund *et al.*, 2020; Rapaccini *et al.*, 2020).

We can observe that a large body of literature, including that from multiple well known consulting companies (such as McKinsey, BCG and Accenture) is dedicated to industry reviews focusing on particular business challenges and ways to overcome them in the new pandemic and post-pandemic context. For example, Accenture drew attention to the changing consumer profiles, arguing that companies have to re-learn who their consumers are (Standish and Bossi, 2020). McKinsey also has published a large series of research on how Covid 19

impacts business and overall economy performance (Diedrich *et al.*, 2021). All these examples thoroughly document how COVID-19 impact is materialized and how to react on this to sustain and survive well beyond the pandemic.

We can also observe new forms of cooperation between organizations emerging during the pandemic. New partnerships have been formed even between competing companies in response to the pandemic crisis – a simultaneous cooperation and competition, known as coopetition, occurred throughout multiple industries and even within global networks (Hani and Dagnino, 2021). We can learn from various sources about such examples as supermarkets sharing resources and capabilities, pharmaceutical companies working together for health-related outcomes or technological companies cooperation to reduce the threats imposed by the pandemic (Crick and Crick, 2020).

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If we consider these trends in context of BM research, taking into consideration multiple views on how BM can be defined and what are the key components of BM, it becomes clear that we should assume BM as a phenomenon, where value is co-created by a wide range of market players, which interact along the whole process of value creation, distribution and capture. This approach opposes the traditional single firm view, which centers all the value-related processes and activities within the boundaries of a single firm. This understanding of a BM is a core assumption of network-based approaches to BM, which assume that there are various stakeholders connected with dyadic and indirect relationships, including innovative and collaborative relationships, competitor relationships or even conflicts between actors (Easton and Araujo, 1992). It is assumed that stakeholders outside single firms become active players in open BM rather than passive receivers of closed BM (Coombes, 2023). Therefore, network approach to BM becomes even more important in context of COVID-19, as the pandemic triggered creation of new partnerships, intensified collaboration between market players and even cooptation (Crick and Crick, 2020).

To summarize, we can argue that BM management in COVID-19 is different from business as usual not just because a large part of it is dedicated to managing crisis situations, but also because the value, which serves as a central element of a BM, and value creation processes are redefined. This happens due to a number of reasons:

- Customers care about their safety and wellbeing as never before, and we can observe how the structure of customer needs is changing and reprioritized (Donthu and Gustafsson, 2020; Kang *et al.*, 2021; Ritter and Pedersen, 2020). Companies respond to this with multiple solutions, including digitalization of business processes and customer interactions (Favoretto *et al.*, 2022).
- Companies enter new partnerships to survive and grow, cooptation becomes an essential element of many BM during COVID-19. Value co-creation between various market players (suppliers, manufacturers, distribution channels, end consumers and even competitors) becomes key to success (Crick and Crick, 2020).
- Because of that we argue that network-based approach to BM becomes central to clearly understand the essence of changes, which BM undergo, as well as value creation and value delivery mechanisms that are used in response to changing business environment and customer needs.

Based on what was mentioned above, in this paper we would stick to the network-based BM understanding, assuming that BM spans the boundaries of a single firm and represents a set of actors jointly creating and capturing value, such as suppliers, manufacturers, distribution channels as well as end consumers. This understanding is supported by multiple well-known papers in the area (Nenonen and Storbacka, 2010; Dubosson-Torby *et al.*, 2002; Shafer *et al.*, 2005) as well as multiple recent research (Coombes, 2023; Carlborg *et al.*, 2021).

Further in the paper, we apply BM definition which is synthesized from the most cited research dedicated to BM (Klimanov and Tretyak, 2014): *BM deals with the process of creating and delivering value to the consumer, formed by multiple actors interacting in the market. This process in turn acts as a source*

*of revenue for the actors, and also demonstrates the specific structure (or architecture) of companies' interactions. At the same time BM may differ by capture mechanisms applied to the value jointly created by interacting companies.*

While going through the fourth year of the global COVID-19 pandemic, which has already affected life of the majority of the world's population, we understand that there is a clear need to search for the effective approaches to adapt BM to the crisis situations. This is explained by the need of businesses to survive during and grow beyond the point when pandemic is over. This statement is supported by the fact that close to one third of small businesses just in the USA, the World's largest economy, have closed as a consequence of the pandemic (Nichols, 2021). The companies are continuously searching for more resilient BM, sustainable to the global crises. Looking at the research, which is dedicated to managing BM during and after COVID-19, we can observe that the essence of what is understood under sustainability and sustainable BM is redefined (Gereffi *et al.*, 2022). Sustainable BM become less linked to the traditional environment agenda and primarily is connected to the ability of companies to withstand and manage the crisis. Value creation, which is the central element of BM, receives a new focus in the pandemic context, which is primarily to address changing customer needs rather than consider environmental damage. Therefore, companies are rethinking the value by using different means, including engaging in new interactions and forming new partnerships, applying new interaction mechanisms with their customers and partners. Because of that we assume that sustainability and sustainable BM require conceptual clarity in the context of COVID-19 pandemic in particular and global crises in general.

Therefore, the current paper is focused on revisiting the understanding of sustainability and sustainable BM by systematizing and summarizing the knowledge collected throughout 2020–2022 on creating BM sustainable to the global crises given the specific example of COVID-19 pandemic. To achieve the major goal of the paper the following research subgoals have been addressed:

- Define what is understood under “sustainability” and “sustainable BM,” given the range of papers dedicated to managing BM during COVID-19. How the network perspective helps to better understand sustainable BM?
- Define the focus areas of the key studies – what are the major questions that they address and industries they cover? What are the changes in BM during COVID-19 that help to achieve sustainability?
- Define how the changes in BM aimed at achieving sustainability are connected with its network components and what contribution this brings to better understanding BM?

To achieve the goals described above, the paper is divided into the following sections. We start by outlining the methodology of the research describing how the literature was selected. This is followed by a brief description of article sources and semantic analysis of paper titles to define the core focus areas of the papers. Then we discuss the major arguments of the papers and how they contribute to better understanding of managing BM during the pandemic. Next section is dedicated to exploring the essence and redefining sustainability and sustainable BM in context of COVID-19 in particular and global crises in general.

We connect the outputs of the argument to the network-based perspective on BM. Finally, we explore what means and solutions are offered by the papers to achieve sustainability and build sustainable BM and link them back to the network-based perspective on BM to better conceptualize understanding of BM in context of global crises.

### Outlining the methodology of literature selection and exploring major focus areas of COVID-19 business model research

To fulfill the goals of the research, we focused on exploring key academic literature that is dedicated to studying the questions and specifics of BM adaptation during the pandemic. For this purpose, we extracted the relevant literature from Scopus abstract and citation database. As we initially would like to address the broad scope of literature regardless the subject domain, type of source or number of citations, as well as to deep dive into the key parts of the papers (purpose, methodology, findings, originality and value), our search request was based on the following criteria:

- “Business model” in title, abstract or keywords
- “COVID-19” or “coronavirus” or “pandemic” in title, abstract or keywords

The search results returned the total of 740 papers matching these criteria. All the papers were published between the period of 2020 to 2022. The number of papers in 2020 was 116, in 2021 it increased to 361 and in 2022 we already found 264 papers, while the extraction of the articles happened in August 2022, meaning that this significant number of publications was representing only seven months and may easily overrun the results of the previous year. This is quite logical, given the fact that there is more and more evidence generated by the businesses across different markets that can be studied for better understanding of the pandemic BM adaptation phenomenon and to create theoretical and practical contributions to BM topic in general.

In terms of knowledge domains, we can observe that the majority of publications is published in sources that are classified as business and management, social sciences, computer science and economics (Figure 1). While the categories in this list are not fully mutually exclusive (e.g. management science can also be treated as part of social sciences), the list helps to understand what are the roots for theoretical foundations of these studies, which will be discussed later in this paper.

After reviewing the contents of the papers, which were brought by our search request, we filtered 50 papers that most fit our research goals (brief summary of each paper is provided in Appendix). These goals, as mentioned earlier in the introduction, include revisiting sustainability phenomenon in context of global crises, connecting network perspective on BM and understanding of how sustainable BM are created and managed and finally showing how the changes that studies propose to make in BM help to improve their sustainability. Therefore, we looked at the following criteria to filter the most relevant papers for our study:

- Relevance of the topic to the purpose of our study – e.g. many papers were not actually dedicated to studying BM, or BM were not the major topic of the paper.

- An overwhelming majority of the papers represented case studies of various industries and geographies. As our paper is not geography or industry specific, we excluded multiple duplications (exploring same industries and geographies) when saw that their findings do not contribute new knowledge to our argument.
- Finally as the least important criteria, we used the number of citations that the paper has to date. We understand that, as these are the studies that appeared in the journals very recently, this is not the criteria that allows to fairly evaluate their importance, however it may provide some understanding of how much the paper is attractive for the research society to date. To confirm that, we see that the papers, which we finally selected, represent more than 70% of total citations for the whole set of extracted papers.

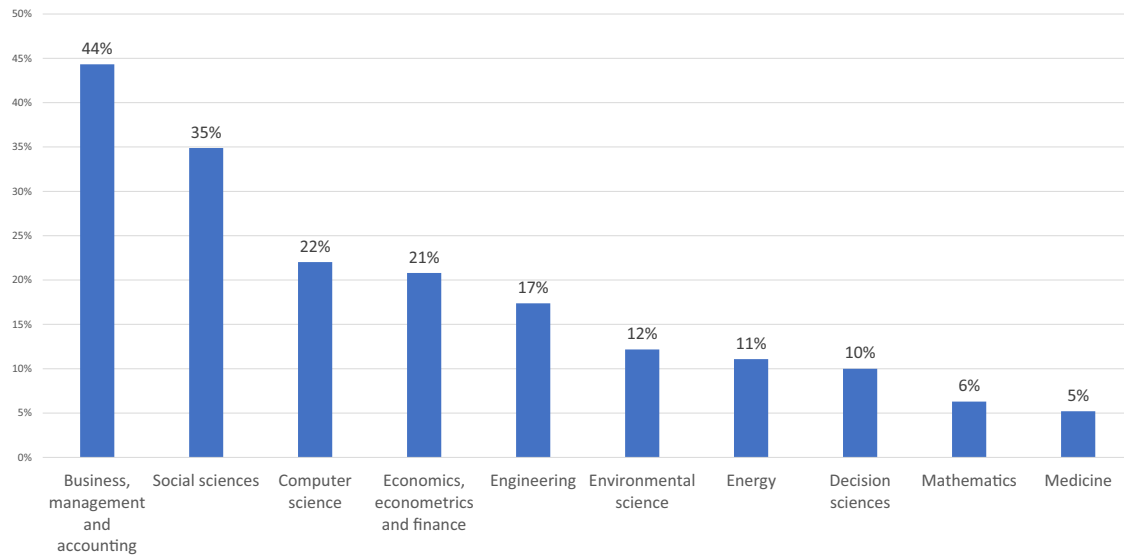
While analyzing the titles of this paper selection we performed a semantic analysis of the text and highlighted the semantic core, which can provide an idea on the key terms used and discussed by the authors. Besides obvious matches with the initial article search criteria, we can observe that many articles are focused on studying the impact of the pandemic on BM as well as different crisis management approaches, resulting in innovation or transformation (including digital) of BM and building sustainable BM. The results are shown in Table 1.

As we can also observe from the semantic analysis, the authors are primarily covering the questions related to building innovative BM that are able to address the unexpected changes along the value chain. These changes primarily impact consumer behavior, while consumers are getting used to the changing way of life (Mehta *et al.*, 2020; Leone *v*2020; Gavilan *et al.*, 2021; Dirsehan and Cankat, 2021; Dsouza and Sharma, 2021; Sánchez-Teba *et al.*, 2020).

We can argue that changing consumer behavior acts as one of the key aspects of network-based BM that forces their adaptation in times of crisis. The specific questions include how consumers are getting used to the lockdowns and what businesses do to make their lives easier, whether and how the new BM should be reinforced post-COVID to keep them sustainable. The changes are also analyzed in context of specific restrictions and regulations imposed by local authorities, which as we know very much differed from country to country and even within the specific country, so the specific solutions are proposed based on the context of the analyzed market. The authors examine changing consumer behaviors in context of industries primarily hit by the pandemic [such as restaurants and food (including online food platforms), travel and entertainment] and propose new approaches to BM innovation that help to retain customers, maintain and increase brand satisfaction and loyalty.

We also observe multiple attempts to describe BM transformation and innovation from the angle of a post-Covid world, to try to look beyond the current crisis and propose a roadmap for the essential changes that businesses should accomplish (Gurbuz and Ozkan, 2020). Multiple directions for BM innovation are being proposed, such as redesigning existing products, designing alternative digital products and services, rethinking delivery channels and mechanisms and looking for strategic positions and partners in the new ecosystem (Seetharaman, 2020).

**Figure 1** BM publications by research domain (based on Scopus data)



Source: Authors' own work

**Table 1** Semantic analysis of paper titles

Term	Frequency of mentions (from total number of words) (%)
COVID-19, pandemic, coronavirus	7.9
Business model	2.3
Crisis	1.5
Impact	1.1
Innovation	1.2
Sustainable	0.9
Transformation	0.9
Small business	0.6
Strategy	0.6
Digital transformation	0.6

Source: Authors' own work

Digitalization of business operations, products and services becomes a major standalone topic discussed in the literature (Priyono *et al.*, 2020; Di Vaio *et al.*, 2020; Amankwah-Amoah *et al.*, 2021; Akpan *et al.*, 2022). Even before the pandemic it became evident that tech companies, such as Apple, Alphabet, Microsoft, Amazon, Facebook and Alibaba, rule value across the globe (Chakravorti *et al.*, 2017). Along with the change in consumer behaviors, the pandemic forced most of the companies to digitize on a much faster pace. The fundamental shift in consumer needs and habits was most evidently observed in 2020, when the pandemic was at its full swing. For example, Accenture highlighted at that time that more than 50% of consumers were uncomfortable about visiting public places, at the same time they used and expected to continue using home delivery, in-app ordering and virtual consultation (Standish and Bossi, 2020). Given the Covid-19 body of literature analyzed in the current paper, we can observe several directions that authors touch when they speak about digitalization, such as:

- the ways of how digital technologies help companies to lower the costs of doing business and to make complex

business decisions with applying big data and advanced analytics (Akpan *et al.*, 2021);

- how the level of a company's digital maturity impacts the way companies digitize their business processes, from becoming fully digitalized firms to outsource digital capabilities to business partners (Priyono *et al.*, 2020);
- how the organizations should be prepared to successfully transform digitally (Trenerry *et al.*, 2021);
- types of digital challenges that should be managed through digital transformation (Favoretto *et al.*, 2022); and
- how digital transformation mechanisms should be selected to fit the specifics of the target market and groups of customers (Klimanov *et al.*, 2021).

At the same time, digitalization is not only viewed as an enabler for businesses, but in some cases it is critically assessed and shown as a barrier for successful BM transformation, e.g. in the context of commercial online learning BM, which "might not always be driven by best pedagogical practices but their business model that leverages user data for profit-making" (Teräs *et al.*, 2020).

### Redefining sustainability and sustainable business model in context of COVID-19 business model research

To discuss BM sustainability in a proper way, it is critical to define what sustainability actually is. Despite a huge number of publications dedicated to sustainability concept, there is no single definition of it, and, as mentioned in (Purvis *et al.*, 2019), sustainability "remains an open concept with myriad interpretations and context-specific understanding." Moreover, there are also neighboring notions accompanying it, such as sustainable development and sustainable BM, which also require conceptual clarity. We also noticed that many papers operate the sustainability term without even defining it, which obviously creates difficulties in understanding their research

goals and outcomes. To illustrate the broadness of sustainability and sustainable BM definitions, we provide a number of citations from some key sources studying this topic (Table 2).

Even in this small selection of definitions, we can observe multiple representations of views on sustainability and sustainable BM. However, many definitions demonstrate that *the pivotal characteristic of sustainable BM is that they are centered around creating, distributing and capturing sustainable value, which means actors engaged in these BM are not only focused on their own financial well-being, but are also concerned with broader environment and society impact that these BM generate.*

Analyzing the scope of sustainability definitions as well as how they appeared in chronological order, we can notice that for a long-time sustainability has been linked mainly to the environment topics (i.e. not being harmful to the environment, causing no damage to the environment etc.), which were brought by the United Nations (UN) agenda. However, the concept appears to be much broader, and in general is defined as “the quality of being able to continue over a period of time” (dictionary.cambridge.org).

At the same time any definition is hard to discuss without the connection to a particular context, in which the definition is applied. Sustainability will have its specific understanding considering the purpose of the concrete study, the theoretical background applied to study this phenomenon as well as expected outcomes. If we link sustainability discourse to the COVID-19 context it is mostly concerned about the ability of companies to withstand the crisis and is shifted from the environmental topics typical for the “traditional” sustainability agenda (Di Vaio et al., 2020). Therefore, sustainable BMs are primarily focused on rethinking of value delivered to their customers and forming new partnerships (and new networks) to strengthen the networks, rather than on considering environmental damage.

In this sense, sustainability serves as a foundation of the key mechanisms describing networked BM. It is widely acknowledged in BM literature that key activities forming BM performance include value creation and offer to the consumer, as well as value delivery and value capture (Teece, 2010). Hence, we can argue that this set of activities allows to use constant reproduction of the chain “demand-supply-distribution-exchange-consumption-demand[. . .]” for the specific product as a theoretical basis for the BM. This acts as a circuit of a value chain enabled by various market players for value creation aimed at specific group of customers.

The equilibrium, which BM players are striving for, and which is not necessarily achieved on each stage of the circuit, the balance between production and consumption of value, which creates the conditions for the capture mechanism related to the value jointly created by BM players. The mechanism of value distribution depends on the position of the company in the BM and its role that is played in the network of BM actors jointly creating value. This mechanism may be defined by the market share of the company, sales volume, access to specific technologies, negotiations position etc.

This list of sustainability subtopics demonstrates why the sustainability aspect of BM is so multidimensional and cannot be simply limited to the generally accepted triad of environment, social and economic dimensions.

While analyzing semantic structure of the articles dedicated to sustainable BM, we can observe that when authors refer to sustainability, depending on the context of a specific research they may use other terminology, such as e.g. resilience or robustness. Specifically, *resilience is referred to as the ability of an organization or a system to plan, absorb, sustain and adapt to shocks and disruptions, while robustness implies the ability of firms to maintain their function during disruptions and shocks* (Gereffi et al., 2022). From the literature dedicated to BM adaptation we learn that resilience is very much connected to the understanding of a

Table 2 Definitions of sustainability, sustainable development and sustainable BM

Source	Definition
Brundtland commission (Purvis et al., 2019)	Sustainability is commonly described along the lines of three dimensions (also called pillars): environmental, economic and social Sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their own needs
UNESCO	Sustainability is often thought of as a long-term goal (i.e. a more sustainable world), while sustainable development refers to the many processes and pathways to achieve it
United Nations	Sustainable development goals: no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace and strong institutions and partnerships for the goals
Bisoffi et al., 2021	Sustainability means ensuring availability, accessibility, affordability . . . at the same time, ensuring that production, processing, distribution and use do not impact climate and the environment negatively
Di Vaio et al., 2020	Sustainable BM – BM that create a competitive advantage for enterprises without damage to the environment and society
Gregurec et al., 2021	Sustainable BM – 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
Mattera et al., 2021	Sustainable BM – BM that can be overseen with adequate corporate governance, managing and mitigating conflicts of interest between stakeholders

Source: Authors’ own work

BM as a network of actors, which jointly create value by using their capabilities according to the roles they play in the value chain (Diedrich *et al.*, 2021). Both resilience and sustainability shed the light on how firms adapt to the disruptions in their value chains. For example, it is argued that resilience can be strengthened by enhancing the capabilities of lead firms, suppliers and other partners through strategies that improve risk management, flexibility and agility to respond to and recover from disruptions and vulnerabilities (Gereffi *et al.*, 2022). In particular, while resilience demonstrates capacity of the system over time in face of disturbances, sustainability defines the capacity to preserve the system in the long run. It is also considered that resilience and sustainability are complementary concepts [i.e. sustainability is the measure of system performance, whereas resilience is the means to achieve sustainability during or after a disturbance (Tendall *et al.*, 2015)]. Another interpretation defines sustainability as the ability to continue important functions indefinitely without a decline in quality, while resilience is the ability to thrive in the face of change (drake.edu).

If we intersect the link between sustainability, resilience and with what is generally called a “sustainable BM,” we would argue that *sustainability of a BM primarily demonstrates its ability to adapt key elements, such as structure of the network and the interactions between BM participants, value propositions and value creation process in a way that allows not only to survive in face of unexpected crises and challenges in short and mid term (i.e. to be resilient), but also to keep desirable performance in the long run.* We argue that this definition provides better understanding of what sustainable BM actually is versus frequently found environmental, social, and corporate governance (ESG) agenda-focused definition.

If we further link this understanding with the commonly accepted network nature of a BM, we should notice that sustainability discourse has gradually enriched its essence and frequently appears in context of value chains and stakeholder management as well as appearance of new market structures (Pettit *et al.*, 2010; Miroudot, 2020; Kochan and Nowicki, 2018).

The network nature of a BM primarily implies that the complex system, which creates and delivers value to the end consumer as well as captures a part of this value as profit, acts as an organic whole. It is also acknowledged that industrial marketing scholars, who are interested in studying value co-creation, called for an extension of thinking beyond buyer-supplier relationships to a network of stakeholder relationships (Coombes, 2023). This is supported by the existing consensus of multiple researchers mentioning that value is created as a result of collective interaction of BM actors (Nenonen and Storbacka, 2010; Dubosson-Torbay *et al.*, 2002; Zott and Amit, 2010). Therefore, the network of actors is treated as the unified object of research.

Based on what was mentioned earlier, we argue that network BM conceptual basis rests on the following fundamentals:

- Network BM is a standalone unit of analysis demonstrating a stable structure of interacting actors, which jointly create, deliver and capture value.
- Because of that BM should be analyzed considering broad context including all key network actors, their interactions and results of these interactions.
- The network context is used as a basis for creation and delivery of value, its acknowledgement by BM actors and

transformation into profits captured by network as a whole and each of its actors.

Therefore, we argue that network BM can be analyzed based on three distinct levels of analysis that conceptualize the process of value creation, distribution and capture. It is aligned with earlier presented in (Klimanov and Tretyak, 2019) network-based approach to BM analysis:

- First level is referred to as BM structure and describes key BM actors, their roles and connections. It implies that actors can differ not only by the position in the network, but also by their status, power, domination in value creation process.
- Second level analyzes mechanism of interaction (i.e. concrete forms of interaction – e.g. contract relationships) between BM actors. It also includes analysis of BM actors’ motivations and forms of their alignment that allow to increase total value created by the BM.
- Third level analyzes results of BM actors’ interaction, namely, financial, material, information flows, flows of control and power relationships.

We argue that this approach further elaborates on Zott and Amit BM Activity system perspective, which represents a “set of interdependent organizational activities centered on a focal firm, including those conducted by the focal firm, its vendors, partners or customers – it is the essence of a BM design” (Zott and Amit, 2010). According to Zott and Amit, the activities include structure, content and governance of transactions. In particular, content refers to the selection of activities to deliver value proposition, structure of the activity system refers to how these activities are delivered and governance refers to who performs which activities.

Linking back this network/activity system-based BM understanding to sustainability discourse, we should remember that the system perspective in general is an interdisciplinary phenomenon (rooted in biology, sociology, physics etc.), which studies systems, groups of interacting, interdependent elements that form a complex whole (Von Bertalanffy, 1972). From a systems perspective, sustainability is the ability of systems to persist, adapt, transform or transition in the face of constantly changing conditions (Williams *et al.*, 2017). Sustainability implies that organizations are agents in interconnected social, economic and ecological systems. It also implies that interaction with and reaction to feedbacks causes nonlinear dynamics and the emergence of complex behaviors overtime. Understanding feedbacks as underlying governance mechanisms can inform decision-making (Sterman, 2001). Therefore, we argue that sustainability can be defined and described by organizational resilience that ensures the survival of the system. It is critical for the organizations to prepare and adapt to the changing conditions.

Based on the analysis presented above, we can summarize our theoretical outputs in three key statements:

- 1 We demonstrated that BM sustainability can be defined as the ability to withstand the crisis and keep performance in long term. The understanding of sustainability is not limited to the environmental damage focused UN agenda. It is rooted into the resilience concept, which in turn is treated as the means to achieve sustainability during or after the disturbance.

- 2 BM has a company network nature and consists of a number of actors jointly creating value via implementing a system of interdependent activities. BM can be decomposed into three layers, namely, structure, interaction mechanism between the participants and results of their interaction.
- 3 From a system perspective, BM sustainability implies that organizations are agents in interconnected systems, generating complex behaviors and guided by underlying governance mechanisms. Adaptive resilience of a BM describes the process of achieving sustainability and ensures survival of the system through actors' learning activities and situational adaptation.

After defining and linking together the key theoretical concepts shaping the current paper, we will further review and structure key insights from the COVID-19 BM body of literature. This is critical to define the key aspects of sustainable BM, which we will then link back to the network-based BM understanding. This, in turn, will help to conceptualize the process of creating sustainable BM.

### Sustainable business model and the COVID-19 crisis: key insights

It is hard to imagine an industry that was not significantly affected by COVID-19 crisis and its consequences. We all know that the most severely hit set of industries belongs to so called BEACH sector [booking, entertainment, airlines, cruises and hotels (Neufeld, 2020)]. Many of the companies are still very much below their pre-pandemic stock price levels, according to Nasdaq. This fact also influences the focus of the studies covered in the current paper. We summarize the key industries and examples of papers in Table 3. Companies in these industries have been in search of sustainable and resilient BM, looking into solutions that can help them to withstand the crisis as well as to keep high levels of performance in long term. We apply Global Industry Classification Standard (GICS) [1] for consistency purposes:

One of the most frequently studied areas are related to food production and consumption (industry groups: food, beverage and tobacco, retail and consumer services). This is obvious as sustainable food production and consumption has been one of the key priorities for the countries during the crisis. As one of

**Table 3** Focus industries for the papers studying pandemic-driven BM innovation

Industry groups	Papers
Food, beverage and tobacco	Di Vaio <i>et al.</i> (2020), Bisoffi <i>et al.</i> (2021); Gurbuz and Ozkan (2020)
Retail	Leone <i>et al.</i> (2020), Harms <i>et al.</i> (2021)
Consumer services	Breier <i>et al.</i> (2021), Gerwe (2021); Sánchez-Teba <i>et al.</i> (2020); Li <i>et al.</i> (2021); Gavilan <i>et al.</i> (2021); Dirsehan and Cankat (2021); Dsouza and Sharma (2021)
Energy	Aydin and Ari (2020); Mattera <i>et al.</i> (2021)
Transportation	Bauer <i>et al.</i> (2020); Turoń and Kubik (2021)
Automobiles and components	Schaltegger (2021)

Source: Authors' own work

the studies mentioned, “food emerged again as a central element of life, along with health, after decades in which food security was taken for granted” (Bisoffi *et al.*, 2021). The basic needs of the people had to be fulfilled considering multiple restrictions imposed by the pandemic. This is confirmed by the fact that most of the papers in this category studied various approaches to online food delivery, the vital element of value chains that appeared during the COVID-19 crisis. For example, the papers studied the willingness of people to order food online and the ways to enhance experiential value of the customers (Gavilan *et al.*, 2021), the role of mobile food ordering applications in developing customer satisfaction and loyalty (Dirsehan and Cankat, 2021). In particular, authors decomposed the factors of online food delivery to better understand how they impact consumer behavior considering altered mindset of the consumers (Dsouza and Sharma, 2021). The other topics touched by the authors studying food industry include the implementation of artificial intelligence (AI) to effectively manage food systems, developing the approaches to make small food business more sustainable (Leone *et al.*, 2020) as well as developing sustainable food systems in general (Bisoffi *et al.*, 2021). Also the authors are concerned with the issues food systems are going to tackle in the post-pandemic world, thinking of the roadmaps addressing these questions (Gurbuz and Ozkan, 2020). Finally, the discussion of cognitive mechanisms and decision-making logics that help to innovate BM and navigate through uncertainty also is highlighted as a standalone research topic (Harms *et al.*, 2021).

One more industry that is extensively discussed in various papers is related to hospitality sector, namely, hotels and resorts (industry group: consumer services). Companies in this sector experienced huge decline in revenues and number of customers driven by pandemic lockdowns imposed around the world. This decline strongly affected the stock price of multiple well-known companies: Hilton down by 40% in Feb 2020, Booking.com by 30% and Expedia by 50% according to Nasdaq market activity data (Nasdaq). To improve the situation when the restrictions started to ease companies invested in strengthening customer safety protocols (maintaining social distancing, improved sanitizing of guest rooms and public areas, distributing face masks and hand sanitizers etc.). By noticing that, authors started to study the specific directions for BM innovation in hospitality industry that help to secure revenue streams and cope with the consequences of the pandemic (Breier *et al.*, 2021) as well as to identify avenues for the post-pandemic recovery (Gerwe, 2021). Some authors argue that recovery measures should include restoring travelers' confidence, which can be addressed by marketing activities focused on developing specialized content (Sánchez-Teba *et al.*, 2020). The attention is also directed toward developing specific crisis management approaches, decomposing the elements that are critical to consider for the recovery process (Li *et al.*, 2021).

There are multiple industries that have been hit hard during the pandemic, and energy and transportation are among them (industry groups: energy and transportation). One of the iconic examples of the pandemic impact is recorded in the oil and gas industry, where the April 20th, 2020 was the first day in history when oil recorded negative prices. US oil benchmark West Texas Intermediate fell from \$17.85 at the start of the trading day to

negative \$37.63 by the close. The authors researching these industries argue that commitment to sustainable development helps companies to overcome crisis periods (Mattera *et al.*, 2021). However, they also confirm the reluctance of some companies to change the status quo and to innovate their BM, which is also supported by the local authorities and acts as a barrier for future development (Turon and Kubik, 2021).

To summarize the BM alterations that we can observe using the examples of industries above, they happen across multiple BM levels mentioned earlier (structure of a BM, mechanism of BM actors' interaction, results of interaction).

For example, we can notice multiple adjustments of interaction mechanism, in many ways linked to digitalization of activities (online delivery, implementation of AI etc.). We can argue that digital transformation represents one of the means (among many others, such as reconfiguring company network structure, reprioritizing customers, creating new added value mechanisms etc.) to achieve sustainability. It allows to balance the system of BM elements with changing customer needs and environment conditions. This ultimately helps BM to continue generating value in a way that keeps customers satisfied and BM actors commercially successful. Digital transformation is not only altering interaction mechanisms between BM actors, its impact appears to be much broader, including redefining the value delivered to the consumers.

Change in interaction mechanisms due to digitalization also triggers the change of BM structure by bringing new actors that help to digitalize BM. This makes BM more cost effective (a huge range of actors can be brought here as an example, starting from world-known IT giants like Microsoft covering the range of technological needs, ending with niche players like Docusign specializing on a specific activity, i.e. electronic documentation flow).

As we mentioned earlier, BM transformation during COVID-19 pandemic is studied through the lens of multiple disciplines and research domains. This is first of all can be explained by the fact that this topic [as well as BM studies in general, as mentioned earlier in (Klimanov and Tretyak, 2014)] has a complex real-world nature, which is not possible to understand by using the lens of a single discipline. We briefly review the major research domains mentioned as theoretical foundations for the studies covered in this paper. This will help to better understand how to deal with this complex phenomenon in the future to uncover its potential and find effective ways to create sustainable BM (Table 4).

**Table 4** Major theoretical foundations used to study pandemic-driven BM

Research domain	No. of papers
Innovation management	27
Strategic management	11
Crisis management	10
Consumer behavior	8
Resource-based view	7
Sustainability theory	7
Entrepreneurship	5
Dynamic capabilities theory	4
Corporate social responsibility	3
Stakeholder theory	2

Source: Authors' own work

The list above well explains the essence of the papers studying BM transformation during the pandemic. We will discuss why some of these key theories are applied to study BM and what contribution do they make to the BM literature. When we think about BM in general and BM innovation in particular, several management domains come into play, namely, innovation management and strategic management.

Innovation management and entrepreneurship fundamentals are rooted in the beginning of 20<sup>th</sup> century and connected to the works of Joseph Schumpeter, who mentioned in one of his works that “carrying out innovation is the only function which is fundamental in history.” Schumpeter described development as a historic process of structural changes substantially driven by innovation, including launch of new products, application of new methods of production, opening new markets, acquiring new resources and creating new industry structures (Schumpeter, 1934; Ś ledzik, 2013). As Kotler also mentioned, innovation can be defined as the product, service or idea that are perceived by individuals or the society as new (Kotler *et al.*, 2019). When we think about BM innovation, it can be defined as changes happening along the key elements of the value chain, mentioned earlier, including BM participants (such as suppliers, manufacturers, distribution channels and end consumers) that impact the value created by these participants via mechanisms and results of their interaction (Klimanov *et al.*, 2021). Each if these elements can be innovated driven by specific transformation goals that business pursues. For example, BM structure can be innovated by changing the set and configuration of BM participants, adjusting their roles in the value creation process and by adjusting the connections between the participants (creating new and eliminating outdated and inefficient connections). Interaction mechanisms can be altered by changing specific interaction forms used by the BM participants and by considering their changed goals and motivations within the value creation process. Innovation of BM results includes change of value creation, capture and transformation processes to allow BM participants to get more value preferably at a lower cost.

Strategic management appears to be another key theoretical pillar, which defines the essence of BM research in general and pandemic-driven BM adaptation research in particular. This is not a surprise as for a long-time strategy has been a term that linked internal resources of the company with its external environment. At the same time, the appearance of BM phenomenon in the research agenda created the need to somehow relate and compare these notions. We can learn from (Klimanov and Tretyak, 2014) that the specific relationship between company strategy and its BM can be defined when we look at the context of the concrete market and company and, therefore, are able to define the specific unit of analysis. If we consider BM as a standalone unit of analysis, it is important to define on which level this analysis is conducted: either it is a single firm or sustainable interaction of group of firms. If analysis uses the strategy of a single firm as a starting point, then to realize this strategy it may be needed to enter a new set of interactions in the market, adjust the partnerships network and, therefore, change a company BM. At the same time, we should understand that companies may significantly differ by their position in the market and the opportunities to execute proactive or adaptive strategies. Also, the position of some companies allows them to proactively invest in developing the markets



infrastructure, create the conditions for strategic development of a group of companies. For example, a dominating company may start creating new value chain and invest in development of a new BM. At the same time, other companies must adapt to the existing market infrastructure and conditions. Obviously, for these companies the relationship between BM and strategy will be different. This means that defining the specific analysis level and market context helps eliminating the contradictions in understanding the difference between BM and strategy.

While summarizing the major themes raised by the authors studying BM adaptation to the pandemic crisis, we have crystallized five distinct directions. These directions in total generate good understanding of the context for BM adaptation, specific components of BM that are adapted by the companies, some frameworks describing BM adaptation, BM adaptation horizon and span of implications as well as industry-specific adaptation mechanisms.

The authors highlight among the key goals for BM adaptation the development of sustainable BM, achieving sustainable competitive advantage and improving BM efficiencies (Mahdi and Nassar, 2021; Fox et al., 2020; Amankwah-Amoah et al., 2021; Mattera et al., 2021). While analyzing which BM elements in particular are being adapted, there is a wide range of options having different nature, including internal company

processes, interactions with stakeholders, external environment. We can also observe that digitalization of business processes and value creation mechanisms becomes a separate topic studied by multiple papers (Amankwah-Amoah et al., 2021; Rapaccini et al., 2020; Kutnjak, 2021; Priyono et al., 2020). Frameworks for BM adaptation describe antecedents and consequences of this process, namely, which adaptation processes help to improve BM performance and achieve sustainable competitive advantage (Mahdi and Nassar, 2021; Fox et al., 2020). Finally, short- and long-term actions and consequences of BM adaptations are discussed and summarized by several studies (Björklund et al., 2020; Rapaccini et al., 2020).

Summary of these topics together with examples of papers is provided in Table 5.

We demonstrate how the results generated within the reviewed papers correspond to three levels of a networked BM highlighted earlier.

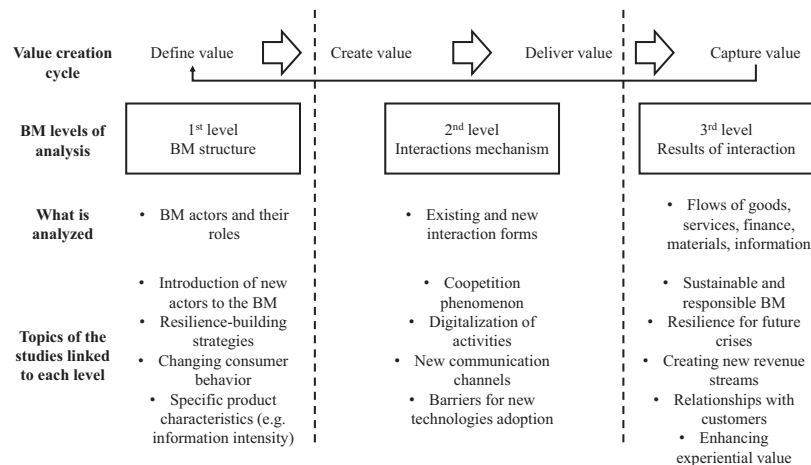
The illustration (Figure 2) shows how the structure of a BM, interaction mechanism between BM actors and results of their interactions are aligned with the elements of the value creation cycle. In particular, the process of value definition corresponds to the first level of a BM–BM structure. This level defines BM participants and their roles within the value creation process. In the papers, which we reviewed, there are multiple connections

Table 5 Pandemic-driven BM adaptation themes summary

BM adaptation theme	Examples
What for BM adaptation is needed	Sustainable competitive advantage (Mahdi and Nassar, 2021) Stakeholder commitment, corporate social responsibility (CSR) centric and sustainable BM (Fox et al., 2020) Streamlining processes and improving BM efficiencies, cost reduction (Amankwah-Amoah et al., 2021) Sustainable BM development through CSR long-term policies, solid management and control models (Mattera et al., 2021)
What is being adapted	Business objectives, customer relationships, value proposition, value demonstration and internal capabilities (Ritter and Pedersen, 2020) Knowledge management processes: knowledge integration, knowledge sharing and creation of new knowledge (Mahdi and Nassar, 2021) BM adaptation through digitalization: develop digital agenda, examine value chain activities, innovate to create digitally enabled BM (Amankwah-Amoah et al., 2021) Crisis management cycle adapting the following elements of a BM: political environment, social environment, economic environment and technology environment (Li et al., 2022) Digitalization and digital servitization, logistics pipeline, reorganization of the workspace, ensuring competitiveness of product-service solutions and developing outcome-based solutions (Rapaccini et al., 2020)
Frameworks for BM adaptation	Strategic leadership capabilities together with knowledge management processes generate sustainable competitive advantage (Mahdi and Nassar, 2021) BM flexibility and authentic leadership impact stakeholder commitment during the crisis, which in turn impacts BM performance (Fox et al., 2020) Crisis management cycle consisting of four elements: crisis prevention, crisis response, crisis adaptation and crisis recovery (Li et al., 2022)
BM adaptation horizon and span of implications	BM adaptation solution space: immediate actions (value offering, value creation architecture, revenue model, venture-specific action, collective action), long-term benefits (internal capabilities, relational and ecosystem capabilities) (Björklund et al., 2020) Short-term BM adaptation actions: secure people through working from home options, find options to deliver services that customers can accept; long-term implications: cultural and structural reorganization of work habits, accelerate digital programs (Rapaccini et al., 2020)
Industry-specific adaptation mechanisms	Business innovations in the new mobility market (Turon and Kubik, 2021) The Covid-19 pandemic and the accommodation sharing sector (Gerwe, 2021) Covid-19 and sustainable food systems (Bisoffi et al., 2021)

Source: Authors' own work

**Figure 2** Areas of interest for COVID-19 BM research connected to network-based approach to BM



Source: Authors' own work

to this level. For example, when redefining the value of the product, the authors suggest to analyze its characteristics, such as information intensity and essential nature (Seetharaman, 2020). Resilience-building strategies are also treated as a starting point for the value creation process (Huang and Farboudi Jahromi, 2021). Changing consumer behavior is studied as the antecedent of rethinking the value (Dsouza and Sharma, 2021). The topic of BM structure in particular is addressed by introducing new actors to the BM to achieve increased sustainability, e.g. partners with digital capabilities (Priyono et al., 2020).

The processes of value creation and delivery correspond to the second level of a BM, namely, interactions mechanism between BM actors. It describes existing and emerging interaction forms. The authors study coopetition as one of the novelties in value creation process, which involves simultaneous cooperation and competition (Crick and Crick, 2020; Coombes, 2023), digitalization of activities (Amankwah-Amoah et al., 2021) and new communication channels (Akpan et al., 2021), as well as barriers for new technologies adoption (Amankwah-Amoah et al., 2021).

Finally, the process of value capture corresponds to the third level of BM analysis, which analyzes the results of BM participants' interaction. Here we observe multiple representations of authors' opinions on what can be treated as a result of a BM. In general, many papers focus on achieving sustainable and responsible BM (Di Vaio et al., 2020), which help to navigate through the crisis and cope with implications of the pandemic (Harms et al., 2021; Mont et al., 2021), and also to create resilience for future crises (Rapaccini et al., 2020). From the financial standpoint, the authors are concerned with creating new revenue streams and securing high levels of liquidity (Breier et al., 2021). One of the core topic relates to maintaining and improving relationships with customers (Bretas and Alon, 2020) through various means including enhancement of experiential value (Gavilan et al., 2021).

## Conclusion

The current paper focused on reviewing COVID-19-related BM research and revisiting the understanding of sustainability

and sustainable BM in this new context. To focus our discourse, we looked at sustainable BM through the prism of network approach to BM. This approach allows to draw attention to the complex network-based value creation process that happens through interactions between multiple BM stakeholders, including suppliers, manufacturers, distribution channels and end consumers. This approach allows to holistically analyze means to achieve sustainable BM through various stages of value creation process, which correspond to three distinct levels of BM analysis: BM structure, interactions mechanism between BM participants and results of their interaction.

In particular, we demonstrated that:

- Sustainable BM and sustainability in general receive new understanding when applied to the situations related to global crises like COVID-19. In particular, sustainability of a BM demonstrates its ability to adapt key elements in a way that allows not only to survive in face of unexpected crises in short and mid term, but also to keep desirable performance in long run.
- We described why network-based approach to BM helps to better address sustainability aspects. It was shown that the network context is used as a basis for creation and delivery of value, its acknowledgement by BM actors and transformation into profits captured by each of the network actors.
- We demonstrated how representation of a networked BM be three levels of analysis (namely, structure of a BM, interaction mechanism between BM actors and results of their interaction) is organically connected to the key milestones of the value creation process (value definition, value creation, value distribution and value capture). We also showed how these three levels can be used to analyze and structure the practical changes proposed in COVID-19 oriented BM.
- Finally, we reviewed and summarized the key findings of the papers studying BM during the pandemic, structured key insights in relation to building sustainable BM.

The results of the paper contribute to further development of BM theory as well as provide practical insights for the businesses

that are concerned with crisis management and are looking for new ideas.

Speaking about future research, we see that BM adaptation approaches are regularly very specific to the context of the concrete industry, which limits their generalization and further applicability. Therefore, to better understand BM transformation mechanisms and increase their practical applicability we argue that future research should be focused on developing generalizable measurement frameworks to evaluate the antecedents, process and results of BM adaptation.

## Note

- 1 GLOBAL INDUSTRY CLASSIFICATION STANDARD (GICS®) METHODOLOGY (msci.com)

## References

- Akpan, I.J., Soopramanien, D. and Kwak, D.H. (2021), "Cutting-edge technologies for small business and innovation in the era of covid-19 global health pandemic", *Journal of Small Business & Entrepreneurship*, Vol. 33 No. 6, pp. 607-617.
- Akpan, I.J., Udoh, E.A.P. and Adebisi, B. (2022), "Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the covid-19 pandemic", *Journal of Small Business & Entrepreneurship*, Vol. 34 No. 2, pp. 123-140.
- Amankwah-Amoah, J., Khan, Z., Wood, G. and Knight, G. (2021), "Covid-19 and digitalization: the great acceleration", *Journal of Business Research*, Vol. 136, pp. 602-611.
- Aydın, L. and Ari, I. (2020), "The impact of covid-19 on turkey's non-recoverable economic sectors compensating with falling crude oil prices: a computable general equilibrium analysis", *Energy Exploration & Exploitation*, Vol. 38 No. 5, pp. 1810-1830.
- Bauer, L.B., Bloch, D. and Merkert, R. (2020), "Ultra Long-Haul: an emerging business model accelerated by COVID-19", *Journal of Air Transport Management*, Vol. 89, p. 101901.
- Bhattacharyya, S.S. and Thakre, S. (2021), "Coronavirus pandemic and economic lockdown; study of strategic initiatives and tactical responses of firms", *International Journal of Organizational Analysis*, Vol. 29 No. 5, pp. 1240-1268.
- Bisoffi, S., Ahrné, L., Aschemann-Witzel, J., Baldi, A., Cuhls, K., DeClerck, F., ... Brunori, G. (2021), "COVID-19 and sustainable food systems: what should we learn before the next emergency", *Frontiers in Sustainable Food Systems*, Vol. 5, p. 650987.
- Björklund, T.A., Mikkonen, M., Mattila, P. and van der Marel, F. (2020), "Expanding entrepreneurial solution spaces in times of crisis: business model experimentation amongst packaged food and beverage ventures", *Journal of Business Venturing Insights*, Vol. 14, p. e00197.
- Breier, M., Kallmuenzer, A., Clauss, T., Gast, J., Kraus, S. and Tiberius, V. (2021), "The role of business model innovation in the hospitality industry during the covid-19 crisis", *International Journal of Hospitality Management*, Vol. 92, p. 102723.
- Bretas, V.P.G. and Alon, I. (2020), "The impact of covid-19 on franchising in emerging markets: an example from Brazil", *Global Business and Organizational Excellence*, Vol. 39 No. 6, pp. 6-16.
- Carlborg, P.J., Hasche, N. and Kask, J. (2021), "Overcoming the business model transformation dilemma: exploring market shaping and stabilizing strategies in incumbent firms", *Journal of Business & Industrial Marketing*, Vol. 36 No. 13, pp. 66-77.
- Chakravorti, B., Bhalla, A. and Chaturvedi, R. (2017), "60 Countries' digital competitiveness, indexed", available at: <https://hbr.org/2017/07/60-countries-digital-competitiveness-indexed>
- Choi, T.M. (2020), "Innovative 'bring-service-near-your-home' operations under coronavirus (covid-19/SARS-CoV-2) outbreak: can logistics become the messiah?", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 140, p. 101961.
- Coombes, P. (2023), "A review of business model research: what next for industrial marketing scholarship?", *Journal of Business & Industrial Marketing*, Vol. 38 No. 3, pp. 520-532.
- Crick, J.M. and Crick, D. (2020), "Coopetition and covid-19: collaborative business-to-business marketing strategies in a pandemic crisis", *Industrial Marketing Management*, Vol. 88, pp. 206-213.
- Di Vaio, A., Boccia, F., Landriani, L. and Palladino, R. (2020), "Artificial intelligence in the agri-food system: rethinking sustainable business models in the covid-19 scenario", *Sustainability*, Vol. 12 No. 12, p. 4851.
- Diedrich, D., Northcote, N., Roder, T. and Sauer-Sidor, K. (2021), "Strategic resilience during the covid-19 crisis", McKinsey & Company, available at: [www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/strategic-resilience-during-the-covid-19-crisis](http://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/strategic-resilience-during-the-covid-19-crisis)
- Dirsehan, T. and Cankat, E. (2021), "Role of mobile food-ordering applications in developing restaurants' brand satisfaction and loyalty in the pandemic period", *Journal of Retailing and Consumer Services*, Vol. 62, p. 102608.
- Donthu, N. and Gustafsson, A. (2020), "Effects of covid-19 on business and research. Journal of business research", *Journal of Business Research*, Vol. 117, pp. 284-289.
- Dsouza, D. and Sharma, D. (2021), "Online food delivery portals during covid-19 times: an analysis of changing consumer behavior and expectations", *International Journal of Innovation Science*, Vol. 13 No. 2, pp. 218-232.
- Dubosson-Torbay, M., Osterwalder, A. and Pigneur, Y. (2002), "E-business model design, classification, and measurements", *Thunderbird International Business Review*, Vol. 44 No. 1, pp. 5-23.
- Easton, G. and Araujo, L. (1992), "Non-economic exchange in industrial networks", in Axelsson, B. and Easton, G. (Eds), *Industrial Networks: A New View of Reality*, Routledge, London, pp. 62-87.
- Eikhof, D.R. (2020), "Covid-19, inclusion and workforce diversity in the cultural economy: what now, what next?", *Cultural Trends*, Vol. 29 No. 3, pp. 234-250.
- Favoretto, C., Mendes, G.H.D.S., Filho, M.G., Gouvea de Oliveira, M. and Ganga, G.M.D. (2022), "Digital transformation of business model in manufacturing

- companies: challenges and research agenda”, *Journal of Business & Industrial Marketing*, Vol. 37 No. 4, pp. 748-767.
- Fox, C., Davis, P. and Baucus, M. (2020), “Corporate social responsibility during unprecedented crises: the role of authentic leadership and business model flexibility”, *Management Decision*, Vol. 58 No. 10, pp. 2213-2233.
- García-Sánchez, I.M., Raimo, N., Marrone, A. and Vitolla, F. (2020), “How does integrated reporting change in light of covid-19? A revisiting of the content of the integrated reports”, *Sustainability*, Vol. 12 No. 18, p. 7605.
- Gavilan, D., Balderas-Cejudo, A., Fernández-Lores, S. and Martínez-Navarro, G. (2021), “Innovation in online food delivery: learnings from covid-19”, *International Journal of Gastronomy and Food Science*, Vol. 24, p. 100330.
- Gereffi, G., Pananond, P. and Pedersen, T. (2022), “Resilience decoded: the role of firms, global value chains, and the state in covid-19 medical supplies”, *California Management Review*, Vol. 64 No. 2, pp. 46-70.
- Gerwe, O. (2021), “The covid-19 pandemic and the accommodation sharing sector: effects and prospects for recovery”, *Technological Forecasting and Social Change*, Vol. 167, p. 120733.
- Gregurec, I., Tomičić Furjan, M. and Tomičić-Pupek, K. (2021), “The impact of covid-19 on sustainable business models in SMEs”, *Sustainability*, Vol. 13 No. 3, p. 1098.
- Gurbuz, I.B. and Ozkan, G. (2020), “Transform or perish: preparing the business for a postpandemic future”, *IEEE Engineering Management Review*, Vol. 48 No. 3, pp. 139-145.
- Hani, M. and Dagnino, G.B. (2021), “Global network co-competition, firm innovation and value creation”, *Journal of Business & Industrial Marketing*, Vol. 36 No. 11, pp. 1962-1974.
- Harms, R., Alfert, C., Cheng, C.F. and Kraus, S. (2021), “Effectuation and causation configurations for business model innovation: addressing covid-19 in the gastronomy industry”, *International Journal of Hospitality Management*, Vol. 95, p. 102896.
- Huang, A. and Farboudi Jahromi, M. (2021), “Resilience building in service firms during and post COVID-19”, *The Service Industries Journal*, Vol. 41 Nos 1/2, pp. 138-167.
- Kang, J., Diao, Z. and Zanini, M.T. (2021), “Business-to-business marketing responses to covid-19 crisis: a business process perspective”, *Marketing Intelligence & Planning*, Vol. 39 No. 3, pp. 454-468.
- Katara, B., Marshall, M.I. and Valdivia, C.B. (2021), “Bend or break? Small business survival and strategies during the covid-19 shock”, *International Journal of Disaster Risk Reduction*, Vol. 61, p. 102332.
- Klimanov, D. and Tretyak, O. (2014), “Business models: major research directions and search of conceptual foundations”, *Russian Management Journal*, Vol. 12 No. 3, pp. 107-130.
- Klimanov, D. and Tretyak, O. (2019), “Linking business model research and marketing: new network-based approach to business model analysis”, *Journal of Business & Industrial Marketing*, Vol. 34 No. 1, pp. 117-136.
- Klimanov, D., Tretyak, O., Goren, U. and White, T. (2021), “Transformation of value in innovative business models: the case of pharmaceutical market”, *Foresight and STI Governance*, Vol. 15 No. 3, pp. 52-65.
- Kochan, C. and Nowicki, D. (2018), “Supply chain resilience: a systematic literature review and typological framework”, *International Journal of Physical Distribution & Logistics Management*, Vol. 48 No. 8, pp. 842-865.
- Kotler, P., Kartajaya, H. and Setiawan, I. (2019), “Marketing 3.0: from products to customers to the human spirit”, *Marketing Wisdom*, Springer, Singapore, pp. 139-156.
- Kraus, S., Clauss, T., Breier, M., Gast, J., Zardini, A. and Tiberius, V. (2020), “The economics of covid-19: initial empirical evidence on how family firms in five European countries cope with the corona crisis”, *International Journal of Entrepreneurial Behavior & Research*, Vol. 26 No. 5, pp. 1067-1092.
- Kutnjak, A. (2021), “Covid-19 accelerates digital transformation in industries: challenges, issues, barriers and problems in transformation”, *IEEE Access*, Vol. 9, pp. 79373-79388.
- Leone, L.A., Fleischhacker, S., Anderson-Steeves, B., Harper, K., Winkler, M., Racine, E., Baquero, B. and Gittelsohn, J. (2020), “Healthy food retail during the covid-19 pandemic: challenges and future directions”, *International Journal of Environmental Research and Public Health*, Vol. 17 No. 20, p. 7397.
- Li, B., Zhang, T., Hua, N. and Wang, Y. (2021), “A dynamic model of crisis management from a stakeholder perspective: the case of covid-19 in China”, *Tourism Review*, Vol. 76 No. 4, pp. 764-787.
- Li, H., Hu, Q., Zhao, G. and Li, B. (2022), “The co-evolution of knowledge management and business model transformation in the post-covid-19 era: insights based on Chinese e-commerce companies”, *Journal of Knowledge Management*, Vol. 26 No. 5, pp. 1113-1123.
- Mahdi, O.R. and Nassar, I.A. (2021), “The business model of sustainable competitive advantage through strategic leadership capabilities and knowledge management processes to overcome covid-19 pandemic”, *Sustainability*, Vol. 13 No. 17, p. 9891.
- Manolova, T.S., Brush, C.G., Edelman, L.F. and Elam, A. (2020), “Pivoting to stay the course: how women entrepreneurs take advantage of opportunities created by the covid-19 pandemic”, *International Small Business Journal: Researching Entrepreneurship*, Vol. 38 No. 6, pp. 481-491.
- Mattera, M., Soto Gonzalez, F., Alba Ruiz-Morales, C. and Gava, L. (2021), “Facing a global crisis – how sustainable business models helped firms overcome covid”, *Corporate Governance: The International Journal of Business in Society*, Vol. 21 No. 6, pp. 1100-1116.
- Mehta, S., Saxena, T. and Purohit, N. (2020), “The new consumer behaviour paradigm amid covid-19: permanent or transient?”, *Journal of Health Management*, Vol. 22 No. 2, pp. 291-301.
- Miroudot, S. (2020), “Reshaping the policy debate on the implications of covid-19 for global supply chains”, *Journal of International Business Policy*, Vol. 3 No. 4, pp. 430-442.
- Mohsin, A.K.M., Hongzhen, L. and Hossain, S.F.A. (2021), “Impact of covid-19 pandemic on consumer economy: countermeasures analysis”, *Sage Open*, Vol. 11 No. 2, p. 21582440211008875.
- Mont, O., Curtis, S.K. and Palgan, Y.V. (2021), “Organisational response strategies to covid-19 in the sharing economy”, *Sustainable Production and Consumption*, Vol. 28, pp. 52-70.
- Nenonen, S. and Storbacka, K. (2010), “Business model design: conceptualizing networked value co-creation”, *International Journal of Quality and Service Sciences*, Vol. 2 No. 1.

- Neufeld, D. (2020), "The hardest hit companies of the covid-19 downturn: the 'beach' stocks", available at: [www.visualcapitalist.com/covid-19-downturn-beach-stocks/](http://www.visualcapitalist.com/covid-19-downturn-beach-stocks/)
- Nichols, C. (2021), "Fact-check: have one-third of US small businesses closed during pandemic?", available at: [www.statesman.com/story/news/politics/politifact/2021/06/08/kamala-harris-small-business-closures-covid-fact-check/7602531002/](http://www.statesman.com/story/news/politics/politifact/2021/06/08/kamala-harris-small-business-closures-covid-fact-check/7602531002/)
- Peñarroya-Farell, M. and Miralles, F. (2021), "Business model dynamics from interaction with open innovation", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 7 No. 1, p. 81.
- Pettit, T., Fiksel, J. and Croxton, K. (2010), "Ensuring supply chain resilience: development of a conceptual framework", *Journal of Business Logistics*, Vol. 31 No. 1, pp. 1-20.
- Priyono, A., Moin, A. and Putri, V.N.A.O. (2020), "Identifying digital transformation paths in the business model of SMEs during the covid-19 pandemic", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 6 No. 4, p. 104.
- Purvis, B., Mao, Y. and Robinson, D. (2019), "Three pillars of sustainability: in search of conceptual origins", *Sustainability Science*, Vol. 14 No. 3, pp. 681-695.
- Rapaccini, M., Saccani, N., Kowalkowski, C., Paiola, M. and Adrodegari, F. (2020), "Navigating disruptive crises through service-led growth: the impact of covid-19 on Italian manufacturing firms", *Industrial Marketing Management*, Vol. 88, pp. 225-237.
- Rashid, S. and Ratten, V. (2021), "Entrepreneurial ecosystems during covid-19: the survival of small businesses using dynamic capabilities", *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 17 No. 3, pp. 457-476.
- Ratten, V. (2020), "Coronavirus disease (covid-19) and sport entrepreneurship", *International Journal of Entrepreneurial Behavior & Research*, Vol. 26 No. 6, pp. 1379-1388.
- Ratten, V. (2021), "Coronavirus (covid-19) and entrepreneurship: cultural, lifestyle and societal changes", *Journal of Entrepreneurship in Emerging Economies*, Vol. 13 No. 4, pp. 747-761.
- Ritter, T. and Pedersen, C.L. (2020), "Analyzing the impact of the coronavirus crisis on business models", *Industrial Marketing Management*, Vol. 88, pp. 214-224.
- Sánchez-Teba, E.M., García-Mestanza, J. and Rodríguez-Fernández, M. (2020), "The application of the inbound marketing strategy on costa del sol planning & tourism board. Lessons for post-COVID-19 revival", *Sustainability*, Vol. 12 No. 23, p. 9926.
- Schaltegger, S. (2021), "Sustainability learnings from the covid-19 crisis. Opportunities for resilient industry and business development", *Sustainability Accounting, Management and Policy Journal*, Vol. 12 No. 5, pp. 889-897.
- Schumpeter, J.A. (1934), "The theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle", *Harvard Economic Studies*, Vol. 46, Harvard College, Cambridge, MA.
- Seetharaman, P. (2020), "Business models shifts: impact of covid-19", *International Journal of Information Management*, Vol. 54, p. 102173.
- Shafer, S., Smith, H. and Linder, J. (2005), "The power of business models", *Business Horizons*, Vol. 48 No. 3, pp. 199-207.

- Śledzik, K. (2013), "Schumpeter's view on innovation and entrepreneurship", *Management Trends in Theory and Practice*, (Ed.), Stefan Hittmar, Faculty of Management Science and Informatics, University of Zilina & Institute of Management by University of Zilina.
- Standish, J. and Bossi, M. (2020), "How will covid-19 change the retail consumer?", Accenture, available at: [www.accenture.com/\\_acnmedia/PDF-126/Accenture-COVID-19-Retail-Consumer-Research-Wave-Four-POV.pdf](http://www.accenture.com/_acnmedia/PDF-126/Accenture-COVID-19-Retail-Consumer-Research-Wave-Four-POV.pdf)
- Sterman, J.D. (2001), "System dynamics modeling: tools for learning in a complex world", *California Management Review*, Vol. 43 No. 4, pp. 8-25.
- Teece, D.J. (2010), "Business models, business strategy and innovation", *Long Range Planning*, Vol. 43 Nos 2/3, pp. 172-194.
- Tendall, D.M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q.B., ... Six, J. (2015), "Food system resilience: defining the concept resilience sustainability", *Global Food Security*, Vol. 6, pp. 17-23.
- Teräs, M., Suoranta, J., Teräs, H. and Curcher, M. (2020), "Post-covid-19 education and education technology 'solutionism': a seller's market", *Postdigital Science and Education*, Vol. 2 No. 3, pp. 863-878.
- Trenerry, B., Chng, S., Wang, Y., Suhaila, Z.S., Lim, S.S., Lu, H.Y. and Oh, P.H. (2021), "Preparing workplaces for digital transformation: an integrative review and framework of multi-level factors", *Frontiers in Psychology*, Vol. 12, p. 620766.
- Turoń, K. and Kubik, A. (2021), "Business innovations in the new mobility market during the covid-19 with the possibility of open business model innovation", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 7 No. 3, p. 195.
- Von Bertalanffy, L. (1972), "The history and status of general systems theory", *Academy of Management Journal*, Vol. 15 No. 4, pp. 407-426.
- Voorhees, C.M., Fombelle, P.W. and Bone, S.A. (2020), "Don't forget about the frontline employee during the covid-19 pandemic: preliminary insights and a research agenda on market shocks", *Journal of Service Research*, Vol. 23 No. 4, pp. 396-400.
- Williams, A., Kennedy, S., Philipp, F. and Whiteman, G. (2017), "Systems thinking: a review of sustainability management research", *Journal of Cleaner Production*, Vol. 148, pp. 866-881.
- Zott, C. and Amit, R. (2010), "Business model design: an activity system perspective", *Long Range Planning*, Vol. 43 Nos 2/3, pp. 216-226.

## Further reading

- Al Ramich (2022), "What is customer centricity?", Forbes, available at: [www.forbes.com/sites/forbesagencycouncil/2022/01/20/what-is-customer-centricity](http://www.forbes.com/sites/forbesagencycouncil/2022/01/20/what-is-customer-centricity)
- Amit, R. and Zott, C. (2001), "Value creation in e-business", *Strategic Management Journal*, Vol. 22, Nos 6/7, pp. 493-520.
- Cambridge Dictionary (2024), "Sustainability. In dictionary. cambridge.org dictionary", available at: <https://dictionary.cambridge.org/dictionary/english/sustainability>
- Chesbrough, H. (2010), "Business model innovation: opportunities and barriers", *Long Range Planning*, Vol. 43 Nos 2/3, pp. 354-363.

- Chesbrough, H. and Rosenbloom, R.S. (2002), "The role of the business model in capturing value from innovation: evidence from xerox corporation's technology spin-off companies", *Industrial and Corporate Change*, Vol. 11 No. 3, pp. 529-555.
- Demirkan, H., Spohrer, J.C. and Welsler, J.J. (2016), "Digital innovation and strategic transformation", *IT Professional*, Vol. 18 No. 6, pp. 14-18.
- Drake University (2024), "What is sustainability and resilience?", available at: [www.drake.edu/enss/majorsminors/sandr/](http://www.drake.edu/enss/majorsminors/sandr/)
- Ebert, C. and Duarte, C.H.C. (2018), "Digital transformation", *IEEE Software*, Vol. 35 No. 4, pp. 16-21.
- Eckhardt G.M. and Bardhi, F. (2015), "The sharing economy isn't about sharing at all", *Harvard Business Review*, Vol. 28 No. 1, pp. 881-898.
- Farcomeni, A. and Greco, L. (2013), *Robust Methods for Data Reduction*, Chapman & Hall/CRC Press, Boca Raton, FL.
- Gatignon, H., Lecocq, X., Pauwels, K. and Sorescu, A. (Eds) (2017), "A marketing perspective on business models", *AMS Review*, Vol. 7 Nos 3/4, pp. 85-89.
- Gordon, I.H. (1998), *Relationship Marketing*, John Wiley & Sons, Ontario.
- Gummesson, E. (1999), *Total Relationship Marketing: Rethinking Marketing Management from 4Ps to 30 Rs*, Oxford, Butterworth Heinemann.
- Hancock, B. and Schaninger, B. (2022), "Back and forth: covid-19's impact on business in 2021—and today", McKinsey, available at: [www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/back-and-forth-covid-19s-impact-on-business-in-2021-and-today](http://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/back-and-forth-covid-19s-impact-on-business-in-2021-and-today)
- Horlacher, A., Klarner, P. and Hess, T. (2016), "Crossing boundaries: organization design parameters surrounding CDOs and their digital transformation activities", *In AMCIS 2016: Surfing the IT Innovation Wave – 22nd Americas Conference on Information Systems*.
- Johnson, M., Christensen, C. and Kagermann, H. (2008), "Reinventing your business model", *Harvard Business Review*, Vol. 86 No. 12, pp. 57-68.
- Leischnig, A., Ivens, B.S. and Kammerlander, N. (2017), "A new conceptual lens for marketing: a configurational perspective based on the business model concept", *AMS Review*, Vol. 7 Nos 3/4, pp. 138-153.

- Magretta, J. (2002), "Why business models matter", *Harvard Business Review*, Vol. 80, pp. 3-8.
- Melander, L. and Arvidsson, A. (2021), "Introducing sharing-focused business models in the B2B context: comparing interaction and environmental sustainability for selling, renting and sharing on industrial markets", *Journal of Business & Industrial Marketing*, Vol. 36 No. 10, pp. 1864-1875.
- Morris, M., Schindehutte, M. and Allen, J. (2005), "The entrepreneur's business model: toward a unified perspective", *Journal of Business Research*, Vol. 58 No. 6, pp. 726-735.
- Szopinski, D., Massa, L., John, T., Kundisch, D. and Tucci, C.L. (2022), "Modeling business models: a cross-disciplinary analysis of business model modeling languages and directions for future research", *Communications of the Association for Information Systems*, Vol. 51 No. 1, p. 39.
- Tretyak, O.A. and Klimanov, D.E. (2016), "New approach to business model analysis", *Russian Management Journal*, Vol. 14 No. 1, pp. 115-130.
- Tretyak, O.A., Bilinkis, J.A. and Klimanov, D.E. (2021), "Business model of the sharing economy: specifics, features, and management challenges", *Russian Management Journal*, Vol. 19 No. 4, pp. 403-428.
- Turon K. and Kubik, A. (2021), "Business innovations in the new mobility market during the covid-19 with the possibility of open business model innovation", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 7 No. 3, p. 195.
- Venkatraman, N. (1994), "IT-enabled business transformation: from automation to business scope redefinition", *Sloan Management Review*, Vol. 35, pp. 73-73.
- Westerman, G., Bonnet, D. and McAfee, A. (2014), "The nine elements of digital transformation", *MIT Sloan Management Review*, Vol. 55 No. 3, pp. 1-6.
- Wright, O. and Blackburn, E. (2020), "Covid-19: knowing how consumer trends impact CPGs", Accenture, available at: [www.accenture.com/in-en/insights/consumer-goods-services/coronavirus-cpg-consumer-needs](http://www.accenture.com/in-en/insights/consumer-goods-services/coronavirus-cpg-consumer-needs)

### Corresponding author

Denis Klimanov can be contacted at: [klimanov\\_denis@inbox.ru](mailto:klimanov_denis@inbox.ru)

Appendix

Table A1 Summary on articles dedicated to COVID-19 business model research

Title	Cited by	Key insights	Theoretical foundation	Category of paper/industry
<p><b>Kraus et al. (2020)</b>. The economics of COVID-19: initial empirical evidence on how family firms in five European countries cope with the corona crisis. <i>International Journal of Entrepreneurial Behavior &amp; Research</i>. Vol. 26 No. 5, pp. 1067-1092</p>	226	<p>The COVID-19 crisis represents a new type and quality of challenge for companies. These companies are applying measures that can be assigned to three different strategies to adapt to the crisis in the short term and emerge from it stronger in the long run. Our findings show how companies in all industries and of all sizes adapt their business models to changing environmental conditions within a short period of time. Finally, the findings also show that the crisis is bringing about a significant yet unintended cultural change</p>	<p>Strategic management, crisis management (pre-crisis prevention, crisis management and post-crisis outcomes)</p>	<p>Case study, BM adaptation, cultural change, digitalization, family firms</p>
<p><b>Seetharaman (2020)</b>. Business models shifts: impact of Covid-19. <i>International Journal of Information Management</i>, 54, 102173</p>	166	<p>Three dimensions are introduced to help understand the immediate implications of C-19 – information intensity of product/service, information intensity of process/value chain; along with a third dimension – essential nature of the product/service</p>	<p>Innovation management</p>	<p>Case study, Implications of Covid 19, framework for BM adaptation</p>
<p><b>Choi (2020)</b>. Innovative “bring-service-near-your-home” operations under coronavirus (COVID-19/SARS-CoV-2) outbreak: can logistics become the messiah? <i>Transportation Research Part E: Logistics and Transportation Review</i>, 140, 101961</p>	155	<p>Analytical models are built to explore how logistics and technologies together can transform the “static service operations” to become the “bring-service-near-your-home” mobile service operations. It is also highlighted how the government may provide the subsidy to support the above-mentioned mobile service operation to make it financially viable</p>	<p>Innovation management</p>	<p>Case study, delivery services</p>
<p><b>Teräs et al. (2020)</b>. Post-Covid-19 education and education technology ‘solutionism’: a seller’s market. <i>Postdigital Science and Education</i>, 2(3), 863-878</p>	135	<p>This paper uses a critical lens to reflect on the possible problems arising from hasty adoption of commercial digital learning solutions whose design might not always be driven by best pedagogical practices but their business model that leverages user data for profit-making. Therefore, this is a critical moment to reflect how the current choices educational institutions are making might affect with Covid-19 education and online learning</p>	<p>Education management</p>	<p>Case study, digitization, education</p>
<p><b>Crick and Crick (2020)</b>. Coopetition and COVID-19: collaborative business-to-business marketing strategies in a pandemic crisis. <i>Industrial Marketing Management</i>, 88, 206-213</p>	132	<p>Although coopetition (simultaneous cooperation and competition) should positively affect company performance, it is unclear how implementation of these business-to-business marketing strategies can take place during large-scale emergencies. Therefore, guided by resource-based theory and the relational view, this investigation examines how organisations have used coopetition to cope with the novel Coronavirus (COVID-19) pandemic</p>	<p>Resource-based theory, relational theory</p>	<p>Case study, multiple industries (Retail, pharmaceutical, IT)</p>
<p><b>Rapaccini et al. (2020)</b>. Navigating disruptive crises through service-led growth: the impact of COVID-19 on Italian manufacturing firms. <i>Industrial Marketing Management</i>, 88, 225-237</p>	127	<p>This study highlights the increased importance of servitization business models and the acceleration of digital transformation and advanced services. To help firms navigate through the crisis and be better positioned after the pandemic, the authors present a four-stage crisis management model (calamity, quick &amp; dirty, restart and adapt), which provides insights and critical actions that should be taken to cope with the expected short and long-term</p>	<p>Crisis management</p>	<p>Case study, crisis management framework, servitization, Italian manufacturing firms</p>

(continued)

Table A1

Title	Cited by	Key insights	Theoretical foundation	Category of paper/industry
<p><b>Priyono et al. (2020).</b> Identifying digital transformation paths in the business model of SMEs during the COVID-19 pandemic. <i>Journal of Open Innovation: Technology, Market, and Complexity</i>, 6(4), 104</p>	<p>100</p>	<p>implications of the crisis. Finally, this study discusses how servitization can enhance resilience for future crises – providing a set of indicators on the presumed role of, and impact on, service operations in relation to what executives expect to be the “next normal”</p> <p>The paper demonstrates that SMEs adopt a different degree of digital transformations, which can be summarized into three paths, depending on the firms’ contextual factors. First, SMEs with a high level of digital maturity who respond to the challenges by accelerating the transition toward digitalized firms; second, SMEs experiencing liquidity issues but a low level of digital maturity who decide to digitalize the sales function only; and, third, the SMEs that have very limited digital literacy but are supported by a high level of social capital. This last group of firms solves the challenges by finding partners who possess excellent digital capabilities</p> <p>The hospitality industry worldwide is among the hardest-hit industries from the COVID-19 lockdowns. Initial theoretical and practical observations in the hospitality industry indicate that business model innovation might be a solution to recover from and successfully cope with the COVID-19 crisis. Interestingly, some firms in the hospitality industry already started to successfully adapt their business models. Findings show that business model innovation is applied during and after the crisis to create new revenue streams and secure a higher level of liquidity, with an important role of stammgasts</p> <p>The aim of the paper is to investigate the artificial intelligence (AI) function in agri-food industry, as well as the role of stakeholders in its supply chain. The findings highlight interesting issues about AI toward a “space economy” to achieve sustainable and responsible business models, also in the perspective of the COVID-19 pandemic scenario</p> <p>This article looks at the consumer behaviour during COVID-19 crisis and in the subsequent lockdown period when the world stood still for more than a quarter of a year. The proposition offers further testable hypotheses for future research to understand consumer sentiments or requirement in buying “what is enough” within the marketing context and how it can be reinforced post-COVID crisis for ensuring sustainability of business models</p> <p>To provide structured analysis and to guide strategic decision-making, we present a novel, five-step approach for analyzing the impact of a crisis on a firm’s business model. We applied the approach with eight business-to-business firms and find support for its usefulness. The evidence suggests very different impacts of the coronavirus crisis on business-to-business firms, and that understanding these differences is important for strategizing during the crisis but also to navigating successfully into the future. We also describe six different types of crisis impacts on business models</p>	<p>Dynamic capabilities theory, organizational agility theory, open innovation</p>	<p>Case study, digital transformation, SME</p>
<p><b>Breier et al. (2021).</b> The role of business model innovation in the hospitality industry during the COVID-19 crisis. <i>International Journal of Hospitality Management</i>, 92, 102723</p>	<p>99</p>	<p>The aim of the paper is to investigate the artificial intelligence (AI) function in agri-food industry, as well as the role of stakeholders in its supply chain. The findings highlight interesting issues about AI toward a “space economy” to achieve sustainable and responsible business models, also in the perspective of the COVID-19 pandemic scenario</p> <p>This article looks at the consumer behaviour during COVID-19 crisis and in the subsequent lockdown period when the world stood still for more than a quarter of a year. The proposition offers further testable hypotheses for future research to understand consumer sentiments or requirement in buying “what is enough” within the marketing context and how it can be reinforced post-COVID crisis for ensuring sustainability of business models</p> <p>To provide structured analysis and to guide strategic decision-making, we present a novel, five-step approach for analyzing the impact of a crisis on a firm’s business model. We applied the approach with eight business-to-business firms and find support for its usefulness. The evidence suggests very different impacts of the coronavirus crisis on business-to-business firms, and that understanding these differences is important for strategizing during the crisis but also to navigating successfully into the future. We also describe six different types of crisis impacts on business models</p>	<p>Innovation management</p>	<p>Case study, hospitality business</p>
<p><b>Di Vaio et al. (2020).</b> Artificial intelligence in the agri-food system: rethinking sustainable business models in the COVID-19 scenario. <i>Sustainability</i>, 12(12), 4851</p> <p><b>Mehta et al. (2020).</b> The new consumer behaviour paradigm amid COVID-19: permanent or transient? <i>Journal of health management</i>, 22(2), 291-301</p>	<p>85</p> <p>72</p>	<p>implications of the crisis. Finally, this study discusses how servitization can enhance resilience for future crises – providing a set of indicators on the presumed role of, and impact on, service operations in relation to what executives expect to be the “next normal”</p> <p>The paper demonstrates that SMEs adopt a different degree of digital transformations, which can be summarized into three paths, depending on the firms’ contextual factors. First, SMEs with a high level of digital maturity who respond to the challenges by accelerating the transition toward digitalized firms; second, SMEs experiencing liquidity issues but a low level of digital maturity who decide to digitalize the sales function only; and, third, the SMEs that have very limited digital literacy but are supported by a high level of social capital. This last group of firms solves the challenges by finding partners who possess excellent digital capabilities</p> <p>The hospitality industry worldwide is among the hardest-hit industries from the COVID-19 lockdowns. Initial theoretical and practical observations in the hospitality industry indicate that business model innovation might be a solution to recover from and successfully cope with the COVID-19 crisis. Interestingly, some firms in the hospitality industry already started to successfully adapt their business models. Findings show that business model innovation is applied during and after the crisis to create new revenue streams and secure a higher level of liquidity, with an important role of stammgasts</p> <p>The aim of the paper is to investigate the artificial intelligence (AI) function in agri-food industry, as well as the role of stakeholders in its supply chain. The findings highlight interesting issues about AI toward a “space economy” to achieve sustainable and responsible business models, also in the perspective of the COVID-19 pandemic scenario</p> <p>This article looks at the consumer behaviour during COVID-19 crisis and in the subsequent lockdown period when the world stood still for more than a quarter of a year. The proposition offers further testable hypotheses for future research to understand consumer sentiments or requirement in buying “what is enough” within the marketing context and how it can be reinforced post-COVID crisis for ensuring sustainability of business models</p> <p>To provide structured analysis and to guide strategic decision-making, we present a novel, five-step approach for analyzing the impact of a crisis on a firm’s business model. We applied the approach with eight business-to-business firms and find support for its usefulness. The evidence suggests very different impacts of the coronavirus crisis on business-to-business firms, and that understanding these differences is important for strategizing during the crisis but also to navigating successfully into the future. We also describe six different types of crisis impacts on business models</p>	<p>Sustainability theory, social responsibility, digitalization</p> <p>Consumer behavior</p>	<p>Literature review, agri-food system</p> <p>Literature review, BM sustainability, consumer behavior</p>
<p><b>Ritter and Pedersen (2020).</b> Analyzing the impact of the coronavirus crisis on business models. <i>Industrial Marketing Management</i>, 88, 214-224</p>	<p>68</p>	<p>implications of the crisis. Finally, this study discusses how servitization can enhance resilience for future crises – providing a set of indicators on the presumed role of, and impact on, service operations in relation to what executives expect to be the “next normal”</p> <p>The paper demonstrates that SMEs adopt a different degree of digital transformations, which can be summarized into three paths, depending on the firms’ contextual factors. First, SMEs with a high level of digital maturity who respond to the challenges by accelerating the transition toward digitalized firms; second, SMEs experiencing liquidity issues but a low level of digital maturity who decide to digitalize the sales function only; and, third, the SMEs that have very limited digital literacy but are supported by a high level of social capital. This last group of firms solves the challenges by finding partners who possess excellent digital capabilities</p> <p>The hospitality industry worldwide is among the hardest-hit industries from the COVID-19 lockdowns. Initial theoretical and practical observations in the hospitality industry indicate that business model innovation might be a solution to recover from and successfully cope with the COVID-19 crisis. Interestingly, some firms in the hospitality industry already started to successfully adapt their business models. Findings show that business model innovation is applied during and after the crisis to create new revenue streams and secure a higher level of liquidity, with an important role of stammgasts</p> <p>The aim of the paper is to investigate the artificial intelligence (AI) function in agri-food industry, as well as the role of stakeholders in its supply chain. The findings highlight interesting issues about AI toward a “space economy” to achieve sustainable and responsible business models, also in the perspective of the COVID-19 pandemic scenario</p> <p>This article looks at the consumer behaviour during COVID-19 crisis and in the subsequent lockdown period when the world stood still for more than a quarter of a year. The proposition offers further testable hypotheses for future research to understand consumer sentiments or requirement in buying “what is enough” within the marketing context and how it can be reinforced post-COVID crisis for ensuring sustainability of business models</p> <p>To provide structured analysis and to guide strategic decision-making, we present a novel, five-step approach for analyzing the impact of a crisis on a firm’s business model. We applied the approach with eight business-to-business firms and find support for its usefulness. The evidence suggests very different impacts of the coronavirus crisis on business-to-business firms, and that understanding these differences is important for strategizing during the crisis but also to navigating successfully into the future. We also describe six different types of crisis impacts on business models</p>	<p>Crisis management, B2B marketing, BM, capability-based view</p>	<p>Conceptual study, BM crisis impact management approach, B2B</p>

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Title	Cited by	Key insights	Theoretical foundation	Category of paper/industry
<p><b>Ratten (2020)</b>, "Coronavirus disease (COVID-19) and sport entrepreneurship", <i>International Journal of Entrepreneurial Behavior &amp; Research</i>, Vol. 26 No. 6, pp. 1379-1388</p>	55	<p>The purpose of this article is to discuss in more detail how the sport sector can use entrepreneurship as a way of combatting uncertainty whilst promoting the recognition of new opportunities. All sport businesses, athletes, managers, fans and consumers need to use entrepreneurial thinking to act creatively. This will help combat the unease and uncertainty, associated with the COVID-19 crisis and create more entrepreneurial ecosystems to develop</p>	<p>Innovation management, entrepreneurship</p>	<p>Case study, sport entrepreneurship</p>
<p><b>Amankwah-Amoah et al. (2021)</b>. COVID-19 and digitalization: the great acceleration. <i>Journal of Business Research</i>, 136, 602-611</p>	52	<p>In this article, we develop and advance a conceptual model by linking the different forces for and against digitalization in response to the pandemic. Our analysis indicates that adoption of emerging technologies may be hindered by vested external interests, nostalgia and employer opportunism, as well as negative effects on employee well-being that undermine productivity, work-life balance and future of work. Whilst digitalization may bring new opportunities, the process imparts risks that may be hard to mitigate or prepare for</p> <p>We contend that while all businesses must pivot their business models in times of tumultuous change, simultaneously reducing risk and seizing new opportunities, this is particularly difficult for women entrepreneurs, whose businesses are concentrated in the industry sectors most severely affected by the economic shutdown. We draw on recent survey data from the Diana International Research Institute (DIRI) to identify business model pivots in women-owned businesses, and conclude by offering a set of gendered future research questions</p>	<p>Innovation management</p>	<p>Conceptual study, conceptual model digitalization response to the pandemic</p>
<p><b>Manolova et al. (2020)</b>. Pivoting to stay the course: how women entrepreneurs take advantage of opportunities created by the COVID-19 pandemic. <i>International Small Business Journal</i>, 38(6), 481-491</p>	52	<p>The purpose of this paper is to detail in more depth how entrepreneurs have been affected by the crisis by focusing on specific types of entrepreneurship in terms of cultural, lifestyle and social change. While entrepreneurs by nature are resilient, the Covid-19 crisis in terms of its magnitude and length has led to specific challenges faced by entrepreneurs in adapting to the new environment. These challenges can be related to the way entrepreneurs respond to uncertainty by being flexible but also through the support of an entrepreneurial ecosystem environment</p>	<p>Innovation management, entrepreneurship</p>	<p>Case study (cross-industry external survey), women entrepreneurs</p>
<p><b>Ratten (2021)</b>, Coronavirus (Covid-19) and entrepreneurship: cultural, lifestyle and societal changes, <i>Journal of Entrepreneurship in Emerging Economies</i>, Vol. 13 No. 4, pp. 747-761</p>	45	<p>Most state-of-the-art technologies, including cloud computing, "big data," and predictive analytics that can improve operations and strategic decisions, are yet to make inroads in most emerging markets and developing economies. The absence and non-adoption of digital technologies in EMDEs explain why business activities in most EMDEs remain shut during the outbreak of SARS-CoV-2 and the community lockdown to contain the COVID-19 pandemic. The strategies to survive the 'new normal' imposed by COVID-19 and fierce global competition includes a successful adoption of advanced technologies</p>	<p>Innovation management, entrepreneurship</p>	<p>Case study, entrepreneurship</p>
<p><b>Akpan et al. (2022)</b>. Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic. <i>Journal of Small Business &amp; Entrepreneurship</i>, 34(2), 123-140</p>	42	<p>Most state-of-the-art technologies, including cloud computing, "big data," and predictive analytics that can improve operations and strategic decisions, are yet to make inroads in most emerging markets and developing economies. The absence and non-adoption of digital technologies in EMDEs explain why business activities in most EMDEs remain shut during the outbreak of SARS-CoV-2 and the community lockdown to contain the COVID-19 pandemic. The strategies to survive the 'new normal' imposed by COVID-19 and fierce global competition includes a successful adoption of advanced technologies</p>	<p>Innovation management, entrepreneurship</p>	<p>Literature review, SME, digitalization</p>

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Table A1

Title	Cited by	Key insights	Theoretical foundation	Category of paper/industry
<p><b>Leone et al. (2020).</b> Healthy food retail during the COVID-19 pandemic: challenges and future directions. <i>International journal of environmental research and public health</i>, 17(20), 7397</p>	40	<p>Using the Retail Food Environment and Customer Interaction Model, we describe the impact of COVID-19 in four key areas: (1) community, state, tribal and federal policy; (2) retail actors, business models and sources; (3) customer experiences; and (4) dietary intake. We discuss how previously existing vulnerabilities and inequalities based on race, ethnicity, class and geographic location were worsened by the pandemic. We recommend approaches for building a more just and equitable RFE, including understanding the impacts of changing shopping behaviors and adaptations to federal nutrition assistance as well as how small food business can be made more sustainable</p>	Consumer behavior	Literature review, framework to describe Covid impact, food retail
<p><b>Gregurec et al. (2021).</b> The impact of COVID-19 on sustainable business models in SMEs. <i>Sustainability</i>, 13(3), 1098</p>	37	<p>This research aims to gain insights into which transformation drivers SMEs 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</p>	Innovation management, sustainability theory	Literature review, SME, digitalization
<p><b>Akpan et al. (2021).</b> Cutting-edge technologies for small business and innovation in the era of COVID-19 global health pandemic. <i>Journal of Small Business &amp; Entrepreneurship</i>, 33(6), 607-617</p>	34	<p>This paper identifies the technologies, evaluates disruptive software platforms, and strategies needed for creating and managing small business innovation and highlighting the complexity of that process and the context within which this process takes place. The current realities show that technologies that enable social business creation, customer relationship management systems, new communications channels, virtual reality technologies for remote operations and the Internet of Things (IoT) are crucial to lowering the costs of doing business. Big data and predictive and visual analytics are critical enablers to aiding complex business decisions in the current challenging business climate</p>	Innovation management, digitalization, customer relationship management	Literature review, SME
<p><b>Bauer et al. (2020).</b> Ultra long-haul: an emerging business model accelerated by COVID-19. <i>Journal of Air Transport Management</i>, 89, 101901</p>	32	<p>Our modelling and scenario analysis results suggest that point-to-point ULH services, with access to a strong domestic feeder system, will not only require minimal adjustments to cope with COVID-19, but will simultaneously produce higher seat-load factors and yields, heightened network flexibility and unique health benefits tied to its ability to bypass densely populated hub airports</p>	Innovation management	Literature review, aviation
<p><b>Bretas and Alon (2020).</b> The impact of COVID-19 on franchising in emerging markets: an example from Brazil. <i>Global Business and Organizational Excellence</i>, 39(6), 6-16</p>	30	<p>This investigation, based on primary data from webinars with food service, education, retail and business-to-business service companies in Brazil, coupled with reports from commercial and franchising entities, reveals how the COVID-19 outbreak has affected the franchising sector. It illustrates the measures that were taken, the negotiations that take place between suppliers and landlords, the adaptation of business models, the effects on franchisor–franchisee relationships and the impact the pandemic has had on relationships with customers</p>	Customer relationship management, innovation management	Case study, franchising

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<b>Voorhees et al. (2020)</b> . Don't forget about the frontline employee during the COVID-19 pandemic: preliminary insights and a research agenda on market shocks. <i>Journal of Service Research</i> , 23(4), 396-400	29	We shine a light on how frontline service employees are coping with the changing work environment. Leveraging insights from a critical incident technique data collection, we identify challenges related to employee morale, interfacing with service consumers and transformational negative events. Moreover, we discuss how the business model transformations caused by COVID-19 could impact the role of technology in future service interactions as well as new challenges related to demand planning	Human resource management, customer relationship management, demand planning	Literature review
<b>García-Sánchez et al. (2020)</b> . How does integrated reporting change in light of COVID-19? A Revisiting of the content of the integrated reports. <i>Sustainability</i> , 12(18), 7605	28	The impact of the pandemic on business activities and business models entails rethinking reporting practices. The pandemic has, in fact, created an enormous need for investors and stakeholders in general for future-oriented information relating to the impacts of this event on organizations. Integrated reporting is an ideal tool to provide information related to the effects of the pandemic and provide a holistic view of the future prospects of organizations. This study, using legitimacy theory and based on a two-step methodology, highlighted a series of information that companies will need to have to include in integrated reports to maintain and defend legitimacy	Legitimacy theory	Literature review
<b>Gavilan et al. (2021)</b> . Innovation in online food delivery: learnings from COVID-19. <i>International journal of gastronomy and food science</i> , 24, 100330	24	The COVID-19 pandemic has forced some restaurants to shift their business models to innovative approaches in Online Food Delivery (OFD) services. This paper seeks to study the impact of innovations on OFD –new product/services– that aim to enhance the experiential value when ordering food online. Moreover, this paper analyses the willingness to order food delivery online during the COVID-19 pandemic. The article demonstrates how considering the cultural economy's typical business models and resultant work and employment practices allows understanding that the inclusion and diversity impacts of the COVID-19 pandemic will be driven by more than workers' differing abilities to buffer short-term income insecurity. The article highlights four areas relevant to inclusion and workforce diversity that research and policy responses to COVID-19 should attend to in revising existing and designing new responses to the COVID-19 pandemic	Innovation management, consumer behavior	Case study, food delivery services
<b>Eikhof (2020)</b> . COVID-19, inclusion and workforce diversity in the cultural economy: what now, what next? <i>Cultural Trends</i> , 29(3), 234-250	21	This exploratory study is built upon a meta-synthesis approach to identify, analyze and clarify how academics have dealt with the three terms used in the business model dynamics research strand: business model innovation, business model adaptation and business model evolution. The results of the meta-synthesis show that a disambiguation of concepts is necessary as, from an organizational learning point of view, it is required to provide a better connection between strategic value appropriation and changes on business models	Cultural economy	Literature review, workforce diversity
<b>Peñarroya-Farell and Miralles (2021)</b> . Business model dynamics from interaction with open innovation. <i>Journal of Open Innovation: Technology, Market, and Complexity</i> , 7(1), 81	20		Innovation management, strategic management, organizational learning, change management, dynamic capabilities, resource-based view	Literature review, open innovation

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Title	Cited by	Key insights	Theoretical foundation	Category of paper/industry
<b>Trenerly et al. (2021)</b> . Preparing workplaces for digital transformation: an integrative review and framework of multi-level factors. <i>Frontiers in psychology</i> , 12, 620766	19	Although digital transformation is a new and urgent imperative, there is a long trajectory of rigorous research that can readily be applied to grasp these emerging trends. Recent studies and reviews of digital transformation have primarily focused on the business and strategic levels, with only modest integration of employee-related factors. Our review article seeks to fill these critical gaps by identifying and consolidating key factors important for an organization's overarching digital transformation. We reviewed studies across multiple disciplines and integrated the findings into a multi-level framework	Human resource management, digital transformation	Literature review, digitalization, multi-level for digital transformation
<b>Huang and Farboudi Jahromi (2021)</b> . Resilience building in service firms during and post COVID-19. <i>The Service Industries Journal</i> , 41(1-2), 138-167	19	This paper develops a new conceptual framework of resilience-building strategies for the service industry. This framework encompasses five major practical strategies and several sub-strategies that can help service firms to survive and thrive amid and post COVID-19 pandemic. The proposed strategies include market orientation, supply chain optimization, strategic corporate reorganization, innovation and business model transformation	Strategic management, innovation management	Literature review, service industry, framework of resilience-building strategies
<b>Rashid and Ratten (2021)</b> , Entrepreneurial ecosystems during COVID-19: the survival of small businesses using dynamic capabilities, <i>World Journal of Entrepreneurship, Management and Sustainable Development</i> , Vol. 17 No. 3, pp. 457-476	19	This paper adopts the lens of dynamic capabilities to study how small business entrepreneurs are trying to survive and grow in an entrepreneurial ecosystem affected by coronavirus. From the data analysis, the three main dimensions of dynamic capabilities for small business entrepreneurs emerge, which involve a sensing, seizing and transforming capability	Dynamic capabilities theory	Case study, SME
<b>Dirsehan and Cankat (2021)</b> . Role of mobile food-ordering applications in developing restaurants' brand satisfaction and loyalty in the pandemic period. <i>Journal of Retailing and Consumer Services</i> , 62, 102608	18	This study first positions the MFOAs among other mobile food applications regarding their business models. Then, a structural model was developed and tested by focusing on the outcomes of MFOA usage. The main contribution of the results is the finding that MFOA satisfaction plays a critical role in developing restaurants' brand satisfaction and loyalty. Thus, brands should cooperate with MFOA providers	Consumer behavior, innovation management, technology acceptance model	Case study, mobile food ordering applications
<b>Gerwe (2021)</b> . The Covid-19 pandemic and the accommodation sharing sector: effects and prospects for recovery. <i>Technological Forecasting and Social Change</i> , 167, 120733	18	This paper analyses the effects of the Covid-19 crisis on the accommodation sharing sector and conceptually uncovers the underlying reasons for its disruption. The paper outlines potential avenues for the post-pandemic recovery of accommodation sharing and presents future directions for research	Innovation management, strategic management	Literature review, hospitality industry, sharing economy, digitalization
<b>Dsouza and Sharma (2021)</b> , Online food delivery portals during COVID-19 times: an analysis of changing consumer behavior and expectations. <i>International Journal</i>	17	This study aims to understand the consumer behavior in the context of online food delivery services that has become crucial for all the players in the market to meet their bottom line, especially given the fact that COVID-19 has altered the mindset of consumers. The current perception was addressed and analyzed to understand the trends. So,	Consumer behavior	Case study, Online food delivery

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<p><i>of Innovation Science</i>, Vol. 13 No. 2, pp. 218-232</p>	17	<p>this study examined various parameters such as e-services quality, food quality (FQ), safety measures (SM), customer satisfaction (CS) and customer loyalty (CL) in correlation to each other We found ventures to experiment with new business model variations, which not only expanded their set of solutions directly, but resulted in action-based learning leading to longer-term changes and increased capabilities for subsequent value creation. Furthermore, collaborative experiments and prosocial support increased the solution space through developing the capabilities of the ecosystem</p>	<p>Crisis management, entrepreneurship, innovation management, organizational networks</p>	<p>Case study, network collaboration and collective action</p>
<p><b>Björklund et al. (2020)</b>. Expanding entrepreneurial solution spaces in times of crisis: business model experimentation amongst packaged food and beverage ventures. <i>Journal of Business Venturing Insights</i>, 14, e00197</p> <p><b>Bisoffi et al. (2021)</b>. COVID-19 and sustainable food systems: what should we learn before the next emergency. <i>Frontiers in Sustainable Food Systems</i>, 5, 650987</p>	16	<p>Three key transitions leading to a "safe and just" operating space, with a focus on food systems, emerged during the development of a Foresight study promoted by SCAR (Standing Committee on Agricultural Research): (a) sustainable and healthy diets for all; (b) full circularity in the use of resources; (c) diversity as a key component of stable systems. As consequence of COVID-19, food emerged again as a central element of life, along with health, after decades in which food security was taken for granted, at least in most developed countries Conclusions of this study include measures to restore travelers' confidence which will play an important role in attracting tourists after crisis. An inbound marketing strategy will provide a response as it is based on contact with the future tourist through highly specialized content</p>	<p>Innovation management, consumer behavior, sustainability theory</p>	<p>Literature review, Food systems</p>
<p><b>Sánchez-Teba et al. (2020)</b>. The application of the inbound marketing strategy on costa del sol planning &amp; tourism board. Lessons for post-covid-19 revival. <i>Sustainability</i>, 12(23), 9926</p> <p><b>Mont et al. (2021)</b>. Organisational response strategies to COVID-19 in the sharing economy. <i>Sustainable Production and Consumption</i>, 28, 52-70</p>	16	<p>Conclusions of this study include measures to restore travelers' confidence which will play an important role in attracting tourists after crisis. An inbound marketing strategy will provide a response as it is based on contact with the future tourist through highly specialized content</p>	<p>Strategic management, consumer behavior, customer relationship management, marketing management</p>	<p>Case study, Hospitality industry</p>
<p><b>Mont et al. (2021)</b>. Organisational response strategies to COVID-19 in the sharing economy. <i>Sustainable Production and Consumption</i>, 28, 52-70</p>	15	<p>An empirically-driven framework of organisational responses to COVID-19 was developed that comprises eight overarching response strategies targeting the organisation, users and society. It is a novel framework that structures organisational responses to a high-impact, low-probability crisis. This study also discusses the long-term implications of the COVID-19 pandemic on the sharing economy, and explores how this may impact future responses among sharing platforms in the society that seeks sustainability</p>	<p>Crisis management, strategic management</p>	<p>Sharing economy</p>
<p><b>Turoń and Kubik (2021)</b>. Business innovations in the new mobility market during the COVID-19 with the possibility of open business model innovation. <i>Journal of Open Innovation: Technology, Market, and Complexity</i>, 7(3), 195</p>	15	<p>The obtained results indicate that business practices do not coincide with the authorities' plans for transport after the pandemic. Moreover, the results show a lack of complementarity between the developed practices and a reluctance to create open innovations in the new mobility industry. The article supports the management of new mobility systems in times of pandemic and in post-COVID reality</p>	<p>Innovation management</p>	<p>Case study, transportation and mobility</p>

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Title	Cited by	Key insights	Theoretical foundation	Category of paper/industry
<p><b>Aydin and Ari (2020).</b> The impact of Covid-19 on Turkey's non-recoverable economic sectors compensating with falling crude oil prices: a computable general equilibrium analysis. <i>Energy Exploration &amp; Exploitation</i>, 38(5), 1810-1830</p>	15	<p>Results show that Covid-19 decreases gross domestic product by 1.16 but falling oil prices as 25 and 50% compensate for this decrease by 0.72 and 1.56% gross domestic product increases, respectively. It is concluded that through the falling oil prices, Turkey's dependence on crude oil imports might provide a new reparation to overcome non-recoverable impacts</p>	<p>Case study, oil and gas</p>	
<p><b>Gurbuz and Ozkan (2020).</b> Transform or perish: preparing the business for a postpandemic future. <i>IEEE Engineering Management Review</i>, 48(3), 139-145</p>	15	<p>This article aims to inform managers, decision-makers and team leaders about the changes they will face in the post-Covid-19 world, based on the example of the agriculture and food sector, and to provide them with a road map</p>	<p>Innovation management</p>	<p>Case study, food and agriculture sector</p>
<p><b>Schaltegger (2021).</b> Sustainability learnings from the COVID-19 crisis. Opportunities for resilient industry and business development, <i>Sustainability Accounting, Management and Policy Journal</i>, Vol. 12 No. 5, pp. 889-897</p>	14	<p>The purpose of this paper is to identify sustainability learnings from origins of epidemics such as COVID-19 and deduct conclusions for businesses to create sustainable futures in three industries, which are strongly affected by Covid-19. To defeat future pandemics, three paths how epidemics develop need to be broken to create sustainable development structural transitions beyond degrowth are needed</p>	<p>Crisis management, innovation management, sustainability theory</p>	<p>Literature review (conceptual discussion), automotive industry, retail</p>
<p><b>Harms et al. (2021).</b> Effectuation and causation configurations for business model innovation: addressing COVID-19 in the gastronomy industry. <i>International Journal of Hospitality Management</i>, 95, 102896</p>	13	<p>When established ways of doing business become almost impossible, business model innovation (BMI) is a possible reaction to this high uncertainty level. Effectuation and causation are decision-making logics that may lead to BMI and help a firm navigate uncertainty. We investigate configurations of causation and effectuation components associated with a high BMI level during the first wave of COVID-19</p>	<p>Innovation management</p>	<p>Case study, food and gastronomy</p>
<p><b>Li et al. (2021).</b> A dynamic model of crisis management from a stakeholder perspective: the case of COVID-19 in China. <i>Tourism Review</i>, 76(4), 764-787</p>	12	<p>From a stakeholder perspective, the model comprises six elements: political environment, economic environment, technology, social environment, health and science and international relationships, which relate significantly to four procedural actions: prevention, response, recovery and adaptation. The overlapping stages and situational dynamic mechanisms of the process are another two new major findings of this study</p>	<p>Crisis management, stakeholder theory, lifecycle model, strategic management</p>	<p>Literature review, hospitality and tourism industry</p>
<p><b>Fox et al. (2020).</b> Corporate social responsibility during unprecedented crises: the role of authentic leadership and business model flexibility. <i>Management Decision</i>, Vol. 58 No. 10, pp. 2213-2233</p>	12	<p>This research explains how firms that are led by authentic leaders and that have flexible business models will be more engaged with their stakeholders than firms with less authentic leaders or more rigid business models during unprecedented crises</p>	<p>Innovation management, corporate social responsibility, stakeholder theory</p>	<p>Literature review (conceptual study)</p>

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<p><b>Bhattacharyya and Thakre (2021)</b>. Coronavirus pandemic and economic lockdown; study of strategic initiatives and tactical responses of firms. <i>International Journal of Organizational Analysis</i>, Vol. 29 No. 5, pp. 1240–1268</p>	12	<p>The authors identified that managers had adopted a dual approach responding to the disruption. Companies simultaneously focused on surviving the crisis in the short-term by reconfiguring existing resources and initiated long-term recovery by mobilizing efforts for a redesigned business model. The research findings indicated that companies had adapted to the dynamic chaotic crisis environment to fulfill the changed consumer expectations</p>	<p>Crisis management, strategic management, resource-based view, dynamic capabilities view</p>	<p>Case study, multiple industries</p>
<p><b>Mattera et al., 2021</b>. Facing a global crisis – how sustainable business models helped firms overcome COVID. <i>Corporate Governance</i>, Vol. 21 No. 6, pp. 1100–1116</p>	11	<p>Findings show long-term CSR strategies and a strong commitment to sustainable development contribute to firm's overcoming periods of economic crisis. In addition, considering the environmental impact of the firms' actions, transition to sustainable business and widening portfolio in the case of energy firms proved to have a positive impact in overcoming a hard context such as COVID-19. The virtuous cycle can be created by honouring the social contract, yet the tools and management models shall be further tailored to ensure an effective win-win situation</p>	<p>Strategic management, strategic management, corporate social responsibility, sustainability theory</p>	<p>Case study, energy sector</p>
<p><b>Mohsin et al. (2021)</b>. Impact of COVID-19 pandemic on consumer economy: countermeasures analysis. <i>Sage Open</i>, 11(2), 21582440211008875</p>	9	<p>The potential impact on the macroeconomy includes the slower growth of consumption and investment, fluctuation of prices and the contraction of export and import. The policy environment will also change in terms of monetary and fiscal policy, which will affect firms' financing and tax paying. The impact on the consumer economy will be large. First, three modes of the influence on different types of retail industries include moderate, positive and negative</p>	<p>Crisis management</p>	<p>Case study, multiple industries</p>
<p><b>Katere et al. (2021)</b>. Bend or break? Small business survival and strategies during the COVID-19 shock. <i>International Journal of Disaster Risk Reduction</i>, 61, 102332</p>	8	<p>First, drivers of income loss were not necessarily associated with time to recovery. Second, businesses that were undercapitalized were more likely to suffer higher income loss, longer time to recovery and less likely to be resilient. Third, business model changes were necessary due to the pandemic but not all adaptive strategies led to better business outcomes. The results from this research study will lead to a better understanding of key vulnerabilities and adjustments that small businesses make to fully recover from economic shocks</p>	<p>Crisis management, innovation management, resource-based view</p>	<p>Case study, small businesses in the service sector</p>
<p><b>Mahdi and Nassar (2021)</b>. The business model of sustainable competitive advantage through strategic leadership capabilities and knowledge management processes to overcome covid-19 pandemic. <i>Sustainability</i>, 13(17), 9891</p>	6	<p>This conceptual research is primarily comprised of a model and assertions concerning strategic leadership capabilities, knowledge management processes and sustainable competitive advantage. The outcomes of this study reflect that strategic leadership capabilities can accomplish sustainable competitive advantage. They also have the greatest potential to impact sustainable competitive advantage via engaging the knowledge management processes</p>	<p>Strategic management, knowledge management, sustainability theory, resource-based view</p>	<p>Literature review (conceptual study)</p>

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<p>Li et al. (2022), The co-evolution of knowledge management and business model transformation in the post-COVID-19 era: insights based on Chinese e-commerce companies, <i>Journal of Knowledge Management</i>, Vol. 26 No. 5, pp. 1113-1123</p>	5	<p>Three aspects of the co-evolution between knowledge management and business model transformation are introduced. These three aspects are as follows: knowledge integration helps with multi-system business integration and decision-making collaborations; knowledge sharing helps to enhance cognitive ability and network value based on businesses; and the creation of new knowledge helps enrich the knowledge base and promote the transformation of BMs</p>	<p>Knowledge management, sustainability theory, consumer behavior</p>	<p>Literature review, open data</p>
<p>Kutnjak (2021). Covid-19 accelerates digital transformation in industries: challenges, issues, barriers and problems in transformation. <i>IEEE Access</i>, 9, 79373-79388</p>	5	<p>Paper presents a review of the literature of relevant research bases, where a qualitative and quantitative analysis of the results was made. Results show the frequency of occurrence of certain difficulties in DT within four categories - challenges, issues, barriers and problems, but also the occurrence of difficulties in the inevitable transformation due to the Covid-19 pandemic</p>	<p>Innovation management, strategic management</p>	<p>Literature review, digital transformation</p>

Source: Authors' own work