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The role of open innovation in fostering SMEs' business model innovation during the COVID-19 pandemic

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Abstract

Purpose - The economic crisis triggered by the COVID-19 pandemic has had significant consequences on the activities of companies worldwide. This study aims to unveil how open innovation fostered business model innovation in small and medium enterprises (*SMEs*) during the pandemic.

Design/methodology/approach - The research adopts a qualitative approach, involving a multiple case study methodology, and focusses on six *SMEs* operating in various traditional sectors.

Findings - The findings highlight the impact of the external stimulus, COVID-19, on business model innovation and the key role of open innovation management in pursuing the business model innovation, which may also involve a digital transformation.

Originality/value - While some studies have examined how the pandemic has fostered business model transformation, to the best of the authors' knowledge, this is the first study analysing the pivotal role of open innovation in driving business model innovation during challenging times, such as the COVID-19 pandemic.

Keywords: COVID-19, business model innovation, open innovation, digital transformation

1. Introduction

And if we're running towards a place

Where we'll walk as one

Will the hardness of this life be overcome?

"Running towards a place" The Killers

The COVID-19 pandemic has altered markets, organisations, individuals, sectors, behaviours and technological developments worldwide (**Breier et al., 2021**). Companies of all types and sizes have been forced to adapt in a very rapid and agile manner to survive in a time of great change. Notably, this change was thought to be temporary. However, this was not the case. The pandemic has revolutionised many aspects and will impact many more in the coming years and decades. This is consistent with the literature suggesting that challenging times and grand challenges can be stimuli for new paths of growth (**Bertello et al., 2022a, 2022b**). Therefore, it is vital for companies to adapt to and create the conditions for survival during challenging times. It is not a question of developing new products or processes (**Sukumar et al., 2020**). Rather, this radical change necessitates rethinking business models (**Piccolo et al., 2022**). Business model innovations often involve processes of digital

transformation, whereas digital technologies are used to create or capture new forms of value (Bresciani et al, 2021).

Small and medium-sized enterprises (*SMEs*), which represent the backbone of many economies, are not exempt from such transformations. For *SMEs*, the transformation is even more complex as they suffer from the liability of smallness and, therefore, have fewer resources and capabilities to cope with it (Jabeen et al., 2019; Albats et al., 2021; Santoro et al., 2021). Thus, smaller companies may not have the ability to face sudden challenges with agility and promptness (Al-Esmael et al., 2020). To overcome this liability, *SMEs* can rely on open innovation strategies (Brunswicker and Vanhaverbeke, 2015). These strategies allow *SMEs* to increase their agility and flexibility to respond to sudden changes in the external environment by acquiring key resources, such as knowledge and technologies (Usman et al., 2018; Bivona and Cruz, 2021). Building on both resource- and knowledge-based views (KBV) (Vanhaverbeke and Cloudt, 2014; Del Giudice and Della Peruta, 2016; Khanra et al., 2022), the literature on open innovation indicates that open innovation processes help firms, including *SMEs* (Spithoven et al., 2013), innovate (Al Matroushi et al., 2018). Although recent studies also show the dark sides of open innovation (Chaudhary et al., 2022), the benefits of open innovation strategies are manifold. However, to the best of our knowledge, little is known about the role of open innovation in fostering business model innovation and digital transformation. Few studies do examine how open innovation can be linked to business models, but provide no insights on how to foster digital transformation processes through open innovation practices. Regarding open innovation and business models, Hienerth et al. (2011) note that co-creating products and services with users, which is a typical open innovation practice, requires a shift towards a user-centric business model; this requires an adaptation in the value configuration of the business model (resources and activities). Futterer et al. (2018) emphasise the two sub-dimensions of “value creation”: internal and external value creation. External value creation is related to the activities performed by and with external partners (Del Giudice et al., 2018). This is a critical business model dimension that reacts to market and regulatory uncertainties. External partners can provide access to complementary resources, which allows the organisation to overcome resource scarcity, pursue new opportunities and speed up innovation processes in challenging times when timing matters. This is particularly relevant for *SMEs*, who suffer from the liability of smallness (Eggers, 2020). In this regard, we know very little about how business model innovation can be fostered by open innovation strategies in challenging times, such as during and after COVID-19, an exogenous shock that changed the rules of the game. More broadly, research should examine how small companies can adapt their existing business models and launch new ones during external market shocks through open innovation strategies, namely, strategies to overcome a lack of tangible and intangible resources, which typically affect *SMEs* (Messeni Petruzzelli et al., 2022).

Therefore, this study aims to unveil how and to what extent open innovation fostered business model innovation in *SMEs* during the COVID-19 pandemic. Here, business model innovation includes digital transformation (Frank et al., 2019).

We used a multiple case analysis of six traditional *SMEs* that innovated their business models during the pandemic. The interview findings were triangulated using secondary data. Gioia's methodology (Corley and Gioia, 2004) was applied to analyse the data, present the findings and build theory.

The findings are proposed through the data structure framework (Gioia et al., 2013) which underlines the impact of the external stimulus (here, COVID-19) on business model innovation and the key role of open innovation management in pursuing business model innovation.

This study makes several contributions to the literature. Firstly, it contributes to the field of business model innovation, highlighting how the COVID-19 pandemic has driven traditional *SMEs* to change and adapt their value creation, configuration/architecture and capture mechanisms. Secondly, the study sheds light on the role of open innovation in fostering these complex and risky adaptations. Thirdly, this study contributes to the literature on innovation in *SMEs* by highlighting the key role of open innovation in overcoming the liability of smallness, especially during challenging times.

The remainder of this study is organised as follows. Section 2 reviews the literature on business model innovation and open innovation. Section 3 discusses the game changer, COVID-19 and presents the research question. Section 4 explains the research methodology. Section 5 presents case studies, and Section 6 presents the findings of the qualitative research. Finally, Section 7 discusses the findings in a critical manner while Section 8 elaborates on implications, limitations and future research directions.

2. Business model innovation and open innovation

Although commonly applied in management research as well as by managers and practitioners, the business model concept still suffers from a lack of clarity and a widely accepted definition. Generally, this concept is used to define how a company creates, delivers and captures value (**Zott and Amit, 2010; Hina et al., 2022**). Other authors have analysed the business model in terms of three components: value creation (value proposition and customer segments), value configuration (resources and activities) and value capture (costs and revenues) (**Whittington et al., 2020**). **Teece (2010, p. 172)** summarised these arguments, affirming that the “essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit”.

According to scholars, business models and innovations are logically linked. For example, business models are the key to successfully commercialising new products and services; specifically, without a proper business model, innovations fail to create and capture value (**Chesbrough, 2010; Teece, 2010**). This was the case for GoogleGlass, a promising technology which failed due to a weak and improperly defined business model.

From another perspective, business models can and should be innovated (**Schneider and Spieth, 2013; Paiola et al., 2022**). **Foss and Saebi (2017)** define business model innovation as “designed, nontrivial changes to the key elements of a firm's BM and/or the architecture linking these elements” (p. 207).

Consequently, business model innovation occurs when one or more dimensions of the business model change successfully (**Spieth and Schneider, 2016**). Research suggests that innovating “only” one core dimension of the business model usually leads to changes in the remaining dimensions (**Johnson et al., 2008**). Recent studies clearly advocate that business model innovation is pivotal in building competitive advantage in contexts with high uncertainty, such as those during COVID-19 (**Futterer et al., 2018; Harms et al., 2021**). This seems rather obvious if we consider that during the pandemic, many companies had to launch new products (value propositions), reorganise global value chains (value configuration/architecture), open new distribution and logistics channels (value delivery) and introduce new revenue models (value capture). When speed matters, this complex transformation cannot be pursued by relying solely on internal resources and activities.

Surprisingly, very few studies have examined how companies can realign their existing business models or innovate by developing new models via exploiting open innovation strategies and practices. **Hienerth et al. (2011)** indicate that co-creating products and services with users, a typical open

innovation practice, requires a shift towards a usercentric business model; this requires adapting the value configuration of the business model (resources and activities). Furthermore, **Futterer et al. (2018)** emphasise two subdimensions related to value creation: internal and external value creation. The first includes activities performed inside the organisation (**Santoro et al., 2019**), whereas the second includes activities performed by and with external partners (**Del Giudice et al., 2018**). External value creation is vital to face market and regulatory uncertainty (**Chesbrough, 2020**). External partners can provide access to complementary resources, which allows the organisation to overcome resource scarcity and pursue new opportunities. This is particularly relevant for *SMEs*, which typically suffer from the liability of smallness (**Eggers, 2020**). External value creation is consistent with the pillars of open innovation (**Bogers et al., 2020**). Further, open innovation is now considered a vital approach for firms aiming to adapt and renew themselves in an agile manner (**Bogers et al., 2018**). Specifically, open innovation involves the acquisition and transfer of knowledge and technology (**Kraus et al., 2020**). After almost 20 years of research, a growing body of literature suggests that opening up to external knowledge sources both widely and deeply helps improve firm performance and build competitive advantages (**Santoro et al., 2020; Venturelli et al., 2022**).

According to the KBV (**Mokhtarzadeh et al., 2021**), inbound open innovation allows firms to acquire unique and valuable forms of knowledge and other key resources from their external counterparts to increase performance (**Wang et al., 2014**) and innovate their business models (**Ferreras-Mendez et al., 2015; Scuotto et al., 2017a,2017b**). Getting access to extensive resources from external partners' facilities increases a firm's understanding of new information and potential changes. This helps enhance a firm's ability to detect technological opportunities and provides it the agility to adapt to unpredictable changes, thereby helping in innovating its business models. Thus, knowledge is recognised as an important intangible resource that nurtures competitive advantage through innovation. Notably, knowledge has been linked to product and process innovation (**Silvi and Cuganesan, 2006; Chen et al., 2011**), but less to business model innovation (**Hock-Doepgen et al., 2021**).

SMEs may specifically encounter barriers in acquiring and managing knowledge, such as a lack of formal knowledge management procedures, specialised human resources and clear knowledge-oriented leadership (**Nunes et al., 2006; Donate and de Pablo, 2015; Albloushi et al., 2022**). *SMEs* can overcome these barriers by exploiting knowledge acquisition mechanisms, such as inbound open innovation, to innovate their business model in turbulent times (**Hock-Doepgen et al., 2021**). **Kuckertz et al. (2020)** examined how start-ups coped with the COVID-19 crisis. The authors found that relational (e.g. goodwill of business partners and consultation of the business network) and financial (e.g. capital accumulation) resources helped them to identify and pursue market opportunities and, consequently, develop new products and services. However, what about business models? The open innovation paradigm recognises the key role of the business model in creating and capturing value from innovations (**Chesbrough, 2007**). However, very few empirical studies examine the relationship between open innovation and business models. One exception is **Huang et al. (2013)**, who found that companies can overcome organisational inertia by pursuing open innovation strategies, which in turn fosters business model innovation.

An emerging research stream suggests that companies adopting open innovation practices must carefully design the internal organisational aspects of their business models to positively influence the sourcing of knowledge from external parties and their subsequent exploitation for innovation (**Hienert et al., 2011; Keinz et al., 2012; Salge et al., 2012**). **Saebi and Foss (2015)** propose a model which underscores the importance of aligning the internal organisational aspects of companies with their business models to accommodate open innovation. However, the literature on open innovation

and business models (innovation) is still at an early stage. In addition, the pandemic stressed the need for empirical evidence in this respect for at least two reasons. Firstly, the pandemic has made it necessary to innovate business models to adapt to the new global context (**Breier et al., 2021**), which is marked economically, socially, politically, behaviourally and logistically. Secondly, the pandemic has imposed pressures on companies, which have been forced to change processes, products, and business models at an unprecedented speed. We argue that open innovation and knowledge acquisition strategies can accelerate this change.

3. Game changer: COVID-19

The economic crisis triggered by the COVID-19 pandemic has had significant and heterogeneous consequences on companies' activities worldwide (**Kraus et al., 2020; Belghitar et al., 2022**). Administrative closures, a drastic reduction in demand, the interruption of international value chains and a lack of liquidity have strongly influenced the operations of firms (**Breier et al., 2021; Kazancoglu et al., 2022**).

For example, border closures disrupted the globalisation process and negatively affected tourism and the internationalisation of businesses. However, COVID-19 also accelerated the digital transformation of public and private organisations (**Gabryelczyk, 2020; Tonnessen et al., 2021**). Thus, the pandemic has created opportunities and threats for business model innovations, such as new value propositions (new products and services), value configurations (activities and resources) and value capture (new revenue models).

During the pandemic, some companies have exploited their flexibility and ability to react quickly to change by modifying their priorities as needed and developed special solutions to cope with the emergency. For example, CURA converted its containers into intensive care units for hospitals. Isinnova 3 D printed a hundred pieces of respiratory valves. Waisair developed a website for monitoring queues at supermarket entrances. Many companies digitalised their sales channels by launching an e-commerce store (Kim, 2020). However, this transformation has had a significant impact on the value configuration component, as companies had to adapt their logistics processes and build new skills and competencies.

Nevertheless, not all companies have the required agility, resources, competencies and skills to cope with this sudden and challenging shock. For example, *SMEs* are the hardest hit by this crisis because they do not have the resources to innovate quickly (**Eggers, 2020; Belitski et al., 2022**). In addition, they often lack digital technology skills and competencies (**Bresciani et al., 2021**). In this paper, we argue that these firms need open innovation strategies for innovating their business models to face the opportunities and threats posed by COVID-19, and during challenging times, generally. Thus, we seek to answer the following research question: What was the role of open innovation in fostering *SMEs'* business model innovation during the COVID-19 pandemic?

4. Methodology

This study adopts a multiple case study approach and uses six case studies (**Yin, 2003**). We chose this approach as it allows us to analyse the items identified in our literature review, in a real-life context (**Saunders and Lewis, 2012; Jabeen, 2022**). Furthermore, there is limited understanding of the business model innovation-open innovation relationship, especially in the context of COVID-19 and *SMEs*. This approach is considered functional for explorative purposes following inductive logic (**Eisenhardt and**

Graebner, 2007). In our cases, the qualitative case study method helps in examining the specific open innovation strategies and practices that have allowed firms to innovate their business models. Furthermore, multiple cases, unlike single case studies, allow us to draw a more solid picture because the propositions or insights drawn from the qualitative analyses are more deeply grounded in different pieces of empirical evidence (**Eisenhardt and Graebner, 2007**). Moreover, constructs and relationships are more precisely delineated because they come from different sources and data.

Data were collected from *SMEs* founded and based in Italy. In Italy, *SMEs* represent the core of the national productive system. They employ 78.7% of the workforce and account for 68.1% of the value-added (**Bertello et al., 2022a, 2022b**). Open innovation scholars have mostly focussed on large multinationals, while *SMEs* have only recently attracted attention (**Mei et al., 2019**). *SMEs* represent a relevant research context, as they are characterised by a high level of flexibility and entrepreneurial orientation. Nevertheless, their innovation potential is often hampered by the lack of resources (**Tian et al., 2021**). This means that *SMEs* may need to open up their innovation process (**Brunswicker and Vanhaverbeke, 2015; Radziwon and Bogers, 2019**). Hence, studies on open innovation in *SMEs* have increased significantly in recent years, underlining interest in this topic (**Hossain and Kauranen, 2016**).

We focussed only on firms with fewer than 250 employees and an annual turnover lower than €50m, following the European Commission (**Scotto et al., 2017a, 2017b**).

The six companies were selected through purposeful sampling to ensure that they had innovated the business model and established open innovation practices (**Eisenhardt and Graebner, 2007**). This is also due to the sudden and extraordinary event, the COVID-19 pandemic, which led us to select companies based on their experience in business model innovation and their responses to the crisis. The selected companies operate in various sectors, including the most important ones in Italy such as food and beverage and fashion (**Table 1**). Italy is an appropriate context for the analysis because it is one of the most hit countries in terms of number of infections and deaths affecting a large percentage of the population. In addition, the Italian Government has been adept at undertaking several effective policies to revive the economy in the aftermath of the pandemic.

The authors conducted interviews between 2020 and 2021 during the pandemic period and at various times to evaluate the evolution of business models. The participants, namely, managers and employees, were selected based on their availability and knowledge of the key research themes (**Kumar et al., 1993**). We considered interviewing only those organisational members actively involved in decision-making and collaborative projects. We interviewed chief executive officers (*CEOs*), marketing managers, production managers, R&D managers, innovation managers and employees from different units (**Table 2**). One author spent significant time in the field to collect data through participant observations. Nineteen interviews were sufficient to achieve both code and meaning saturation (**Hennink et al., 2017**). The interviews lasted between 50min and 3 h. Due to the pandemic, some were conducted face to face, while others were conducted online.

The interview protocol evolved over time based on emerging findings and the nature of the interviewees (**Gillham, 2005**). First, the protocol was structured in defined sections. In the first section, we asked key informants to indicate their professional backgrounds and roles in the firm. Moreover, we asked them to provide a brief description of the company's sector and previous business model. We analysed the business models through a three-component framework: value creation (products and services and targets), value configuration/architecture (channels, resources and activities) and value capture (costs and revenue models). This interpretation was explained and shared with the participants for a clear understanding of the phenomenon.

Table 1 Descriptive information of our unit of analysis

<i>Firm</i>	<i>Sector</i>	<i>Size</i>	<i>Business model innovation</i>	<i>Open innovation practices</i>	<i>Component(s)</i>
A	Food	Medium	Development of new bakery products for new customer segments and IoT production equipment	Consulting; knowledge acquisition; product testing with users	Value creation and value configuration
B	Food	Medium	Development of an ecommerce platform	Consulting; knowledge and technology acquisition	Value configuration (delivery)
C	Beverage	Small	Development and commercialisation of a new product (beer) made with bread waste	Strategic partnerships to acquire key raw materials and commercialise the product	Value creation and value configuration
D	Energy	Medium	A complete solution consisting of independent modules for real-time analysis of environmental data, remote energy management and control of buildings	Strategic partnerships to distribute the product	Value delivery and configuration
E	Media	Medium	Transition from traditional media system (paper journals) to online journals	Consulting; knowledge and technology acquisition	Value creation, value configuration, value capture
F	Fashion	Small	Development of an ecommerce platform	Consulting; knowledge and technology acquisition	Value configuration and capture

Table 2 Data sources

<i>Firm</i>	<i>Interviews</i> 19 interviews with organisation members	<i>Observations</i>	<i>Archival data</i>
A	Chief executive officer (CEO), marketing manager, finance officer	Partnership, firm visits	Internal documents, publicly available project documentation, website
B	CEO, marketing manager	Partnership, firm visits	Internal documents, publicly available project documentation, website
C	CEO, marketing manager	Partnership, firm visits	Internal documents, publicly available project documentation, website
D	CEO, chief financial officer	Online	Internal documents, website
E	CEO	Partnership	Internal documents, publicly available project documentation
F	CEO, marketing manager	Partnership, workshop	Publicly available project documentation, website

In the data structure framework, we have a written “value architecture” as second order, but “value configuration” [1] can be considered a synonym as the literature used both interchangeably (**Zott and Amit, 2010**). In the second section, we asked for a more detailed description of the innovations they were pursuing and innovation projects involving partners, collaborations, knowledge and technology acquisition. We specifically asked interviewees to describe the pandemic's impacts on the firm's business model. All questions were based on the literature.

The interviews were conducted in Italian, as all firms are located in Italy. All interviews were recorded and transcribed verbatim to increase the reliability of the findings. The coding process was conducted in Italian to ensure consistency in the findings. The transcriptions were then translated into English for individuating the interview excerpts.

Interviews were triangulated with participant observations and archival data to increase the validity of the study (**Gibbert et al., 2008**). Moreover, one author of the study has been involved in some of the companies' projects as a consultant, and therefore, research in action has also been included in the methodology (**Eden and Huxham, 1996**).

The overall process of data collection comprised triangulation through multiple respondents and multiple sources of data to enable various perspectives to be brought to bear on the phenomenon of interest and increase trustworthiness (**Lincoln and Guba, 1985**).

The transcripts were analysed (**Eisenhardt, 1989**) to code the data and categorise the main concepts. Data analysis followed **Gioia et al.'s (2013)** methodology, which is useful for arriving at the development of "concepts". This systematic approach to the development of new concepts and the articulation of grounded theory led to the definition of first-order, second-order and aggregate concepts (**Corley and Gioia, 2004**). Specifically, after generating first-order concepts, second-order concepts were codified, followed by the definition of the aggregate dimensions.

5. Case studies

Company A operates in the food and beverage sector and offers sweet and savoury bakery products. COVID-19 put the company in crisis because it worked mostly with the hotels, restaurants and catering (HoReCa) channel and its sales were concentrated on one large customer who purchased a single product (breadsticks). The lack of diversification in product offerings, channels and customers meant that the company had to redesign its business model very quickly. This transformation concerns the value-creation (new products to new customers and channels) and value configuration components (the company created new Internet of things [IoT] machines internally to optimise production).

Company B operates in the food and beverage sector and offers various products, such as jams, marron glaces, creams and sweets. This company has always had a strong presence abroad. However, the pandemic has slowed the distribution chains. Therefore, the company needed an e-commerce channel to increase visibility and turnover in the business to consumer channel. Here, the (digital) transformation concerns value configuration (value delivery, sales channel).

Company C is a young company that has developed an open business model. The product (beer) is made from bread waste provided by strategic partners. The same partners then distribute the product to the end-customer. The business model innovations are related to value creation (innovative and sustainable products made from beer waste) and value configuration (relationships with key partners to produce and distribute the product). Their business model was not a direct consequence of COVID-19. However, in an increasingly complex world with a growing waste problem, this business model has proven to be resilient to closures, restrictions and related raw-material supply chain issues. A geographically close supply chain allowed this start-up to continue producing as usual during the first lockdown. As a consequence, we can infer that this innovative business model, thanks to its peculiarities, has proven to be resilient during the pandemic.

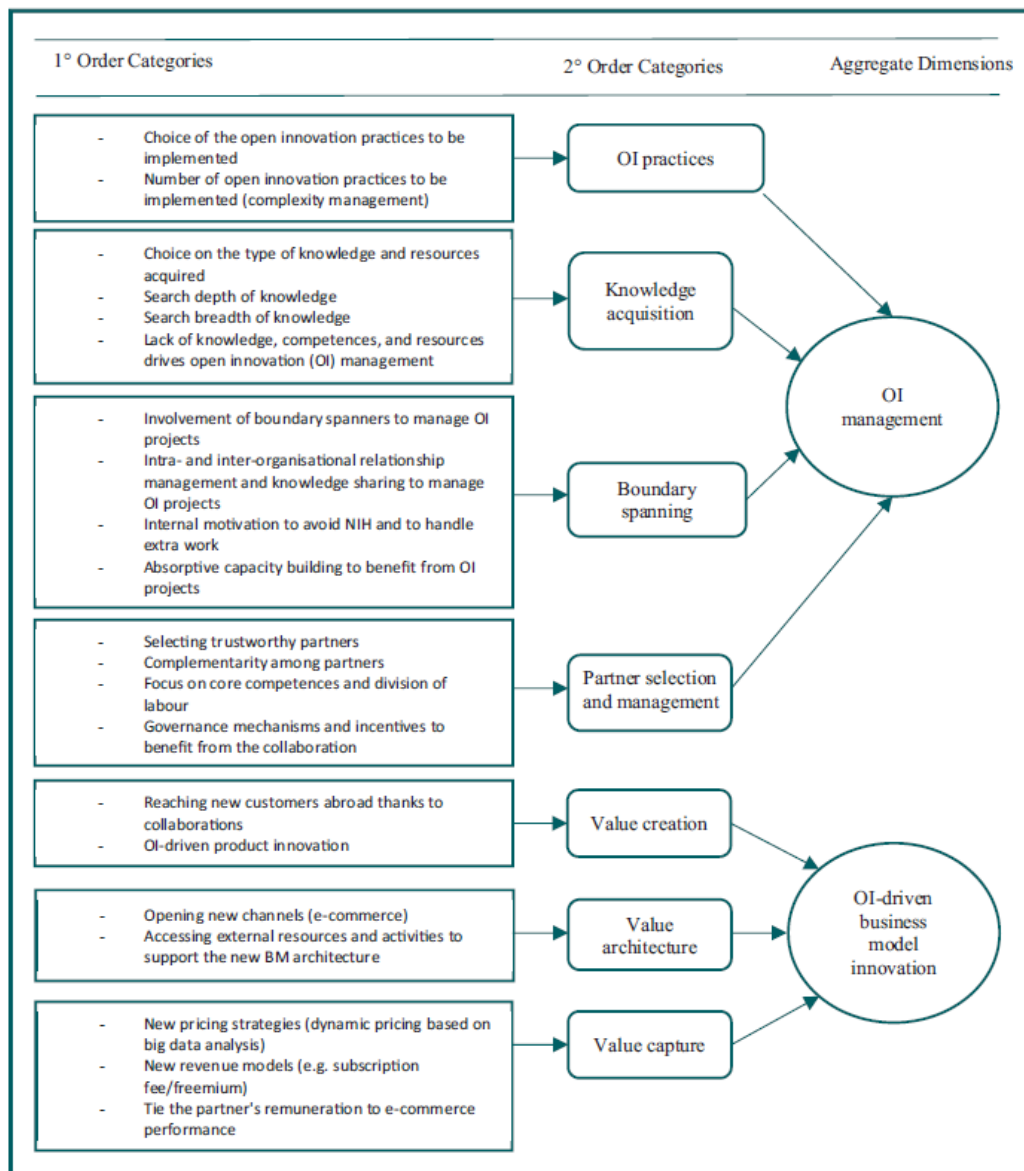
Company D operates in the energy sector. It has developed an IoT system that uses artificial intelligence to optimise energy consumption in large facilities (factories, shopping centres and large offices). Before the pandemic, the company was responsible for setting up devices at the customer's location. However, with the lockdown and associated travel restrictions, new ways to deliver and install/configure devices were needed. This is where strategic partners located close to the customer came into play.

Company E operates in the media sector, specifically in the production of daily, weekly and monthly newspapers. For years, the sector has been undergoing digital transformation, with an increasing number of people reading content online instead of on paper. The pandemic further accelerated this process. Therefore, the company had to create online content and develop new business and revenue models.

Company F operates in the fashion industry and produces clothing for both men and women. For this company, the pandemic also boosted online shopping. Therefore, the company implemented a digital transformation process by opening an e-commerce channel. However, it did not have the necessary skills and capabilities to implement or even manage such a strategy. Therefore, collaboration with strategic partners was necessary.

6. Findings

This section outlines the main findings as well as the data structure (**Figure 1**) which summarises the categories and dimensions (**Corley and Gioia, 2004**). The analysis of our interview data using this data structure reveals two dimensions: open innovation management and open innovation-driven business



model innovation. These aggregate dimensions are supported respectively by four (open innovation practices, knowledge acquisition, boundary spanning and partner selection) and three (value creation, value architecture and value capture) second-order categories. Each second-order category is divided into two, three or four first-order categories.

Figure 1 Data structure

6.1 Open innovation management

First, there were interesting choices of appropriate open innovation practices consistent with the goal and nature of the business model innovation that the company aims to pursue. Practices identified in the literature include crowdsourcing, user engagement, corporate venture capital, co-R&D and licensing (Ebersberger et al., 2012; Spithoven et al., 2013). Studies reveal that *SMEs* mainly rely on customer-focussed practices, such as customer involvement (van de Vrande et al., 2009). Meanwhile, others indicate that *SMEs* are more effective in using different open innovation practices simultaneously when they introduce new products in the market (Spithoven et al., 2013). Our interviews revealed the importance of understanding which resources were needed to innovate the business model and consequently, which open innovation practices were implemented to access that resource.

Notably, several companies relied on an open innovation practice that has been neglected in the literature: business consulting. Company A's CEO stated:

The lockdown has put the Ho.Re.Ca. in crisis, and therefore, our performance has dropped dramatically. We needed new products, new customers, and new brands, a transformation. Our business model was too risky being very focused on one large customer, one channel, one main product line. That's why we involved a consulting firm to carry out a market research on industry trends and competitive dynamics. This allowed us to understand where to invest and which products/markets to focus on.

In this case, collaboration started at an early stage of the innovation funnel through the acquisition of knowledge about market trends, and continued in several stages (Chesbrough, 2006). The marketing manager of the same company added:

The transformation is very intense. We are talking about new products, new brands, new tastes, new customers, new markets. For this reason, it was not enough to entrust market research to a partner. The partner was also involved in deciding on the prototypes to be developed, the flavours to be pursued, the tests with consumers, the choice of packaging, and the new brands to be created.

The complexity of the project required a high search depth, that is, a very intensive collaboration with the partner (Laursen and Salter, 2006). We identified several open innovation practices implemented by this company, including market research commissioned and product testing conducted by a partner. Finally, this collaboration helped speed up the development process by focussing on core competencies and division of labour. At the time of writing, the company has been able to find new business customers (food retailers) which bought all newly developed products; therefore, we can infer that these products have been successfully launched into the market.

As anticipated, Company C has developed an open business model. The product (beer) is made from bread waste provided by strategic partners. The same partners then distribute the product to the final customer. This is a typical case of an open, sustainable business model that focusses on circularity. The business model is supported by an intense relationship (search depth) with key partners, both

backward (raw material supply) and forward (product distribution). The two company founders stated, “without a close, trusting, and intense relationship with our partners, our business model would not be sustainable”. Currently, the company is still a start-up, but the number of business customers (retailers) is constantly increasing, suggesting the sustainability of the business model. In summary, this open innovation strategy involves close collaboration and acquisition of tangible resources (raw materials).

The first case (Company A) emphasises that a radical transformation of the business model required very intensive collaboration (search depth) with a strategic partner over several stages of the innovation funnel. Similarly, the second case (company C) indicated that deep collaboration with partners allows a firm to build a radical innovation in the value proposition and value architecture/configuration. The third case (Company D) highlights that an incremental transformation (an alternative distribution channel) requires a contract without real intensive collaboration with a partner. In any case, when faced with an external shock (here, COVID-19), the first important aspect in business model innovation is searching for an appropriate partner according to the knowledge or resources to be acquired and transformation (radical or incremental) to be pursued. Finally, a lack of tangible or intangible resources drives the open innovation approach.

Our literature review shows that boundary spanners play major roles in the transfer and recombination of external knowledge and that more research is needed on the performance outcomes of their knowledge-sharing behaviours (Haas, 2015). Indeed, our results confirm the importance of boundary spanners in pursuing open innovation strategies for business model innovations.

This emerged from the interviews conducted with the six companies. For example, for company A, the role of the boundary spanner was key in managing the relationship with the partner and company employees. The boundary spanner acted as an intermediary in the relationship between the partner and the company’s internal actors and performed “multiple boundary work” (Bertello et al., 2022a, 2022b). The boundary spanner plays a key role in the development of absorptive capacity in the firm because they must be able to share knowledge and insights from the partner with all company employees. The company A’s CEO noted:

When we started the collaboration with the partner, our previous marketing manager was in charge of managing the relationship with that partner. Several of us attended important meetings. However, he was the one who often heard from the partner and had to report key information to the production manager, the CFO, and me. However, as time went by we noticed that he didn’t report all the information and that he discarded ideas because it would mean extra work for him. Some product and project ideas (e.g. ecommerce) were rejected because he would have to manage them. This is not good. In the end, this manager was fired. Now, I am in charge of managing the relationship with the partner myself. This is important because in the end, every final decision for the company goes through me. After this decision, the decisionmaking process has been accelerated a lot. Before, there was too much time, too much hidden information, too much bureaucracy. As a result of this organisational change, we quickly decided, together with the partner, which products to take forward, got them tested by consumers, and put them into production, in an agile way.

The importance of the boundary spanner in business model innovation is also emphasised by Company C’s CEO, who stated:

Ours is a new, open business model. Without collaboration with retailers, we would not exist. Without their bread waste we wouldn’t make beer. To support this model, we need a human resource who manages relationships, who knows the partners well, who has a relationship

with them based on trust, who knows how to transfer the company philosophy precisely. Thus, this role is filled by my partner, a founder of the company. Only a founder, at least in the beginning, can do that.

This finding highlights the key role of motivation. In line with this, the interviews also revealed that a boundary spanner must be able to motivate employees to cooperate with external partners. As pointed out by the Company's CEO, company managers (marketing, finance and production) often feel threatened when collaborating with an external partner (a consulting company). Specifically, ideas for new products provided by the consultancy company were initially rejected by managers because they felt almost replaced by the external party. This can be considered a form of the "not-invented-here" syndrome (**Hussinger and Wastyn, 2016**). From this perspective, the CEO (who is also the company owner) had to create a dialogue between the various parties and help managers realise how vital it was to interact without being afraid of being replaced. In her words:

COVID-19 put us in great difficulty. We needed a radical change quickly. This put pressure on my staff to work with an unknown external partner. It was not easy. I tried to manage intra- and inter-organisational relationships, and motivate employees to work with the partner to try to survive the pandemic through a new business model.

6.2 Open innovation-driven business model innovation

The case studies in this research are cases of business model innovation in its different components (value creation, architecture and capture). The interviewees emphasised the key role of open innovation in pursuing business model innovation. Without collaborations, the sampled companies would not have had the necessary resources to carry out the business transformations.

Company D's CEO said the following:

During the first lockdown we were unable to assemble and install our products (a device) at geographically distant locations. Therefore, we came up with the following idea. To find a partner who could install the devices at the partner's location. A simple collaboration with a monetary transaction. The partner is paid for the assembly and installation service.

At first, this business model transformation (specifically, in the value-delivery component) was thought to be temporary. Instead, the savings from not having to travel to install the device caused the company to continue with this business model. Furthermore, this new channel allowed it to find new customers worldwide.

As already discussed, in-depth collaboration with a consulting company enabled Company A to develop new value propositions (products) through the acquisition of market knowledge and prototype tests conducted by the partner. These new products have been sold to new business customers (retailers).

Three sampled companies embraced a digital transformation path. In particular, they opened e-commerce channels. This was possible thanks to an open innovation approach that helped companies acquire knowledge and resources.

Company B's CEO said:

For us, ecommerce was a whole new world. We didn't (and still don't) have the technological and logistical skills to manage an ecommerce strategy. Therefore, we decided to rely on a partner who could take care of all this. However, it took us a long time to find the right partner

- trust is very important to us. We also stipulated a contract that tied the partner's remuneration to the ecommerce performance achieved.

This underlines the importance of selecting a trusted partner, but above all, creating governance mechanisms and incentives that align the interests of the parties involved. Open innovation, in this sense, does not only mean the transaction of resources and knowledge but also the creation of a path of joint growth that can satisfy the parties. Moreover, this case emphasises that a lack of knowledge about a particular field is a key driver in the development of open innovation practices.

Similar arguments were highlighted by company F's CEO:

We had expertise in ecommerce because we have been experimenting with this sales channel for some time now. However, the lack of key competencies led to rather poor results. This convinced us to hire a partner to manage the strategy together.

These results clearly show that a lack of skills makes it necessary to use open innovation strategies to implement changes in business models.

The media company (company E) brought content online, creating a brand-new business model. The app or online site allows the user to read some content for free, while reading the entire catalogue is subject to a subscription fee. The choice of the business model, revenue model, platform and marketing strategies were the results of analysis conducted by three external partners. One partner took care of the market and cost analysis to define the revenue model (the Freemium model). A technology partner was responsible for the implementation and management of the platform. A third partner took care of marketing strategies to scale the platform, focussing on search engine optimization and search engine marketing strategies and social media campaigns. Company E did not have any expertise in this area; therefore, it was necessary to establish inbound open innovation processes to acquire knowledge and key resources to innovate its business model. This innovation concerns value architecture (channels, resources and activities). However, the new platform can be considered as a new value proposition driven by open innovation activities. Moreover, as the CEO emphasised:

The new app has enabled us to reach a new, younger target segment, interested in reading the news in a smarter and faster way.

In all three cases, open innovation was necessary to select the proper platform, and implementing the proper marketing strategies (e.g. search engine indexing and social media marketing campaigns) and online and offline prices. Therefore, the division of labour and exploitation of core competencies is increasingly important in a period of change, such as the current one brought by the COVID-19 pandemic. Overall, the complexity of new technologies, sudden changes and dynamism of the market require an increasing use of open innovation to accelerate the transformation.

7. Discussion

This study attempts to answer the following question: What was the role of open innovation in fostering *SMEs'* business model innovation during the pandemic? Our findings reveal that open innovation strategies helped traditional SMEs innovate their business models during the pandemic. Moreover, we find that open innovation is a process that should be strategically managed through decisions and activities related to open innovation practices that should be implemented, knowledge that should be acquired, boundary spanning and partner selection.

Broadly, we find that the pandemic drove transformations that would not have occurred otherwise or would have occurred much more slowly. Therefore, one may infer that an external stimulus, such as the pandemic, positively affects the business model transformation of traditional SMEs. Research shows that external stimuli can create opportunities for innovation (**Sharma et al, 2021**). However, to the best of our knowledge, few studies have investigated the effects of external stimuli on business model innovation and its specific components, namely value creation, configuration/architecture and capture (**Breier et al , 2021**). All of our sampled SMEs embraced business model innovation but with a focus on different building blocks within value creation, value architecture and value capture. This type of innovation may be linked to the changing competitive conditions, consumer needs and restrictions imposed by the pandemic.

Our analysis of the case studies drove us to developing the concept of “open innovation management”, which is the first aggregate dimension. In this sense, open innovation is a process that needs to be managed through decisions regarding open innovation practices, knowledge acquisition, boundary-spanning activities and partner selection. Firstly, open innovation practices are specific strategies (e.g. user engagement, consulting and co-R&D) implemented for innovation (**Spithoven et al., 2013; Chesbrough and Brunswicker, 2014**).

Secondly, knowledge acquisition is vital for innovating the business models of our sampled firms. It is then vital to choose which resources to acquire and from which and how many partners (**Laursen and Salter, 2006**). Some of our sampled firms emphasised the importance of search depth, that is, intensive collaboration with one or more partners (**Ebersberger et al., 2021**). This is even more significant in the context of radical business model innovation - that is, radical transformation - where value creation, configuration and capture are involved. This is because of a lack of expertise, skills and resources to successfully embrace such a big change. Thus, search depth (**Laursen and Salter, 2006**) can guarantee full support for business transformation.

Thirdly, the interviews highlighted the key role of boundary spanners in the partnership management process (**Johanson et al., 2020**). However, external knowledge gathered by boundary spanners means little to firm-level success unless it is disseminated within the firm (**Arnett and Wittmann, 2014**). Thus, knowledge kept by a boundary-spanning individual does not have the potential to contribute to firm-level performance. Rather, boundary-spanning individuals' knowledge must be leveraged into firm-level assets before it can influence innovation outcomes (**Keszey, 2018**). The interviews indicated that boundary spanners are vital for managing relationships with partners for business model innovation. Our insights also reveal that boundary spanners should be able to disseminate knowledge among internal organisational members to increase the firm's absorptive capacity (**Sadeghi et al., 2020**).

Fourthly, partner selection is vital in managing the open innovation process for business model innovation (**Sandulli et al., 2017**). Our results posit that finding trusting partners, and implementing governance mechanisms and incentives is important for capturing high value from collaborations. In addition, complementarity among partners is vital in the sense that the focal firm searches for knowledge and technologies which it does not possess.

The second aggregate dimension underlines the open innovation-driven business model innovation. Interviewees stressed the key role of open innovation strategies in pursuing business model transformation. Specifically, opening up the innovation process has been vital in all sampled cases. Therefore, following a market shock caused by the pandemic, one may propose that the success of business model innovation is contingent on the development of open innovation strategies and practices, such as collaborating with consulting firms, knowledge acquisition and user engagement

(Chesbrough and Brunswicker, 2014). Open innovation can provide unique and valuable tangible and intangible resources to accelerate the innovation process (Della Peruta et al., 2018).

Another important aspect is that COVID-19 evidently boosted digital transformation (Soto-Acosta, 2020). However, traditional SMEs do not possess the resources, competencies and knowledge to pursue this strategy alone (Del Giudice et al., 2021). Consequently, they need to open their boundaries to acquire resources and knowledge (Bertello et al., 2021) that can accelerate the transformation. This was the case for sampled SMEs that opened their e-commerce channels.

In summary, the interviews highlighted that open innovation helped *SMEs* innovate different components of their business model. Firstly, some firms innovated the value-creation component, reaching new customers nationally and internationally. Others developed and offered new value propositions (products and services). Secondly, in some cases, open innovation fostered the opening of new channels, such as e-commerce, by providing access to external resources and activities. Thirdly, some firms changed their value-capture mechanisms, for example, through new pricing strategies and revenue models (e.g. subscription fee).

8. Implications and conclusions

Our research findings have the following theoretical implications. Firstly, this research highlights how the COVID-19 pandemic has driven traditional SMEs to revise their value creation, configuration and capture mechanisms, thereby contributing to the literature on business model innovation (Chesbrough, 2010; Strakova et al., 2021). Most studies since COVID-19 spread focussed on product or service innovation (Sharma et al., 2021) or on the opportunities and threats created by the pandemic for business processes. We add to this literature by showing how traditional *SMEs* can innovate their business models when the environment is dynamic and challenging.

Secondly, building on the KBV (Rezaei et al., 2020), this study sheds light on the key role of open innovation in fostering business model innovations. While there are studies on how the pandemic has fostered business model transformation, to the best of our knowledge, this is the first study to analyse the pivotal role of open innovation in driving business model innovation during challenging times, when speed matters above all. Thus, we contribute to the literature on open innovation (Bogers et al., 2018), showing that acquiring valuable resources and collaborating with a few partners (search depth) allow firms to speed up the business model innovation process and cope with the threats posed by COVID-19.

Thirdly, this study contributes to the literature on innovation in SMEs by shedding light on the key role of open innovation in overcoming the liability of smallness (Eggers, 2020), particularly during challenging times. *SMEs* usually lack resources (Jafari-Sadeghi et al., 2021). Consequently, during challenging times, such as the COVID-19 pandemic, smaller firms have higher bankruptcy risk than their larger counterparts. Therefore, it is vital that these companies collaborate with external partners to innovate and survive. The role of the boundary spanner thus becomes even more vital for benefiting from open innovation strategies.

Fourthly, this study proposes the concept of open innovation management, thereby making a theoretical contribution to the literature on open innovation (Palumbo et al., 2021). This concept emphasises viewing open innovation as a process that needs to be managed through decisions regarding open innovation practices, knowledge acquisition, boundary-spanning activities and partner selection.

This study also offers practical implications. Firstly, it emphasises the importance of open innovation in driving business model innovation. We suggest that managers and entrepreneurs, especially in these dynamic and uncertain times, explore new forms of value creation, configuration and capture driven by open innovation strategies and collaboration with trusted partners. Secondly, our research notes the relevance of the role of boundary spanners in the collaboration process with partners. Specifically, when the boundary spanner is a company founder, they can more effectively achieve the objective of collaboration. Furthermore, the boundary spanner plays a key role in sharing the knowledge acquired by the external partner. Thirdly, open innovation is very effective in digital transformation processes. Traditional *SMEs* may not have great digital skills. Therefore, relying on one or more partners is the best choice for digitising some business model activities. Fourthly, business consulting can be an effective open innovation practice for traditional *SMEs*. In addition, linking the partner's remuneration to performance indicators motivates the partner to achieve the objectives. Finally, we suggest that managers see open innovation as a process that should be managed through decisions regarding open innovation practices, knowledge acquisition, boundary-spanning activities and partner selection.

This study has several limitations that shed light on interesting future research directions. Firstly, this study uses a case study methodology that focusses on traditional *SMEs* operating in certain sectors. Consequently, our findings may not be generalisable to other types of firms or sectors. Future studies can focus on specific sectors and on particular contexts, such as platforms. Secondly, the time period covered was relatively short. Future research can use a longitudinal design to study the evolution of business model innovation and assess its effectiveness. Thirdly, as our work was qualitative in nature, future studies should quantitatively test the relationships between open innovation, business model innovation and performance, while testing also the role of several potential mediators and moderators.

Note

1. Sometimes, the literature refers also to "design". E.g. Amit and Zott (2015). *Crafting business architecture: The antecedents of business model design*. *Strategic Entrepreneurship Journal*, 9(4), 331-350.

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