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The Short- and Long-Term Impacts of COVID-19 Pandemic on the Sharing Economy: Distinguishing Between "Symptomatic" and "Asymptomatic" Platforms

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Abstract
Our study presents a systematic literature review on the repercussions of the COVID-19 pandemic on the different types of sharing economy platforms and the sharing economy phenomenon in its entirety. Our literature review helps understand how the characteristics of different services of the sharing economy combine with contingent factors, such as government-mandated lockdowns, changed consumer behaviors, and people's fear of contagion, to determine the magnitude of the impact of COVID-19 on the sharing economy both in the short run and in the long run. By examining these factors, we distinguish between sharing economy services/platforms that were (and possibly will be) negatively impacted by the COVID-19 pandemic (referred to as "symptomatic" platforms) and those that were not (and possibly will not be) impacted at all or even benefit (referred to as "asymptomatic" platforms). We then propose a new framework that combines traditional dimensions of sharing economy with a dimension resulting from the COVID-19 pandemic, i.e., the level of physical interaction required to deliver the sharing economy service. Building upon the extant literature, the framework helps better understand how the sharing economy will evolve after the pandemic. It also helps identify important research gaps that both academics and practitioners working on the field of sharing economy should address in the near future.

Keywords Sharing economy · Peer-to-peer platforms · COVID-19 · Pandemic · Sustainable future

Introduction

The term "sharing economy," also known as collaborative economy, access economy, and community-based economy, denotes the peer-to-peer collaborative consumption enabled by Internet-based platforms that consists of the activities of

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sharing and/or renting idle resources without owning them (Acquier et al., 2017; Jiang & Tian, 2018; Sutherland & Jarrahi, 2018; Zhu & Liu, 2021; Sanchez-Perez et al., 2021; Koul & Jasrotia, 2022; Reuschl et al., 2022; Roma, 2020). The sharing economy paradigm emphasizes replacing ownership of goods with access to goods (Lessig, 2008) and its logic lies mainly in the consumer-to-consumer (C2C) domain. The disruptive idea behind this economy model has led to the surge of successful companies, such as Airbnb in 2007 and Uber in 2009, able to become giant companies, in less than a decade, in the lodging and car transportation industries, respectively. For instance, in 2018, Morningstar valued Airbnb's market capitalization at $53–65 billion, more than that of Marriott ($46 billion), the world's largest hotel company (Hossain, 2021). More generally, the unprecedented growth of the sharing economy has been largely documented and nowadays sharing economy involves many industries and product categories (Bouncken & Reuschl, 2018; Geissinger et al., 2020) In particular, PWC's pre-pandemic estimates indicate that in Europe the sharing economy could potentially soar up to €570 billion by 2025 compared to €28 billion in 2016 (PWC, 2014). In the USA alone, the sharing economy sector has created more than six million jobs with almost eighty million service providers, and almost a billion people engaging with it (Hossain, 2021). Many agree that the rise of the sharing economy phenomenon was due, to a great extent, to the unemployment and wealth erosion generated by the 2008 global economic crisis, which, on the one hand, have jointly induced resource owners (e.g., landlords) to look for additional economic returns from their assets, and, on the other hand, consumers to look for less expensive solutions to satisfy their needs (e.g., traveling) (Belk, 2014; Puschmann & Alt, 2016; Roma et al., 2019, 2021).

The extraordinary pace at which sharing economy was growing was however abruptly overturned by the emergence of the COVID-19 pandemic (Gerwe, 2021). Since its declaration on March 2020 (Ghebreyesus, 2020), the COVID-19 pandemic has had massive repercussions on many businesses (Mishrif & Khan, 2022; Ullah, 2022), including those enabled by sharing economy platforms (e.g., lodging sharing or ride sharing), with governments across the world imposing full lockdowns which led to complete shutdowns of several businesses to limit the spread of COVID-19 infection.

As the COVID-19 pandemic has tremendously affected the growth of the sharing economy in the last 2 years (Batool et al., 2020), our study aims to present a systematic literature review on the current state of the art of what we know about the short-term and long-term effects of the pandemic on the different types of sharing economy services and the sharing economy phenomenon in its entirety. Our literature review helps us understand which aspects related to the effects of the COVID-19 pandemic on the sharing economy have been already investigated and which instead are yet to be explored. Moreover, it allows providing initial insights into how the characteristics of different services of the sharing economy combine with contingent factors, such as government-mandated lockdowns, changed consumer behaviors, and people's fear of contagion, to determine the magnitude of the short- and long-term impacts of COVID-19 on sharing economy.

By examining these factors, we elucidate why some of the sharing economy services or platforms (e.g., Airbnb) were negatively impacted by the COVID-19 pandemic. We refer to such platforms as being "symptomatic" platforms, abusing a

word that has become, sadly, popular in everyday language in the pandemic years. On the other hand, we also provide a rationale for why other sharing economy platforms such as Uber Eats were experiencing increasing growth, and we refer to those platforms thus as "asymptomatic" platforms. In this regard, we explain that new dimensions are needed to classify the sharing economy platforms, in addition to those already identified by pre-COVID-19 literature. In particular, we highlight that one new important dimension to consider is the *level of physical interaction* required to deliver the sharing economy service, which is naturally correlated to the level of contagion that a sharing economy provider may generate during its service delivery during pandemic times. We argue that this new dimension was (and will be) taken into account by both consumers for their daily purchasing decisions, and governments for issuing COVID-19-related restrictions. Therefore, we propose a new framework that, besides considering traditional dimensions for understanding the sharing economy (e.g., the actors involved and the service category), also takes into account the level of physical interaction required to deliver the sharing economy service. Building upon the extant literature, the framework helps better understand how the sharing economy will evolve after the pandemic. More importantly, it helps identify relevant research gaps that both academics and practitioners working on the field of sharing economy should address in the near future.

The remainder of the paper is organized as follows. In "Sharing Economy Background and Categorization," we discuss the theoretical background of the sharing economy and categorize the different sharing economy platforms. In "Methodology," we present the methodology used in this article. In "The Impacts of COVID-19 Pandemic on Sharing Economy by Platform Category," we review the literature focusing on the effects of the COVID-19 pandemic on the sharing economy. We do this by categorizing the literature by type of platform/service characterizing the sharing economy. In "A Sharing Economy Framework After the COVID-19 Pandemic," we propose our framework for analyzing the sharing economy in the post-COVID-19 era, building upon our literature review. Finally, in "Research Gaps, Future Research Directions, and Conclusion," we identify research gaps emerging from our study and delineate some important future research directions in the post-COVID-19 era.

Sharing Economy Background and Categorization

The pivotal idea behind the sharing economy is to take advantage of underutilized resources, therefore emphasizing access instead of ownership, contrarily to the traditional business model that is based on the ownership of resources (Jiang & Tian, 2018). Sharing economy platforms operate by matching the supply and demand of certain idle resources among peers. That is, they allow individuals to make their own resources, such as houses or cars, temporarily at the disposal of other individuals who use them upon payment. Originally, the practices of sharing economy emerged as not-for-profit initiatives, such as Couchsurfing and Freecycle, but they have gradually grown into a big business model by taking a fraction of the sharing fee as an intermediary fee.

Most sharing economy initiatives are platform-based in the sense that they work as an intermediary to facilitate supply and demand matching, rather than operating as resellers who buy from producers and resell to consumers. Sharing economy firms can scale up easily in many geographical locations by avoiding regulatory aspects and taking advantage of a multitude of geographically distributed resources (owned by many individuals). Indeed, they reduce their transaction costs by offloading risk onto their workers, which are treated as independent contractors (Hossain, 2020; Murillo et al., 2017). Most categories of sharing economy platforms tend to be dominated by some or even just one intermediary platform that earned this dominating status either through an early entry or even by creating the business model. The two prominent examples are Uber and Airbnb, operating in the car transportation service and lodging industries, respectively (Cheng, 2016). More generally, the sharing economy model has irreversibly disrupted long-established industries, generating incumbent reactions from traditional players (Adeyinka-Ojo & Abdullah, 2019; Öberg, 2020; Si et al., 2020). For instance, many automotive companies such as Daimler (car2go) and BMW (drive now) started their own car-sharing services to respond to the disruptive entry of car-sharing platforms (e.g., Turo and GetAround). Also, in the tourism industry, traditional companies are adapting their models to the collaborative culture. For instance, Marriott partnered with the international coworking company Liquid Space to offer coworking spaces in its underutilized lobbies and common spaces (Botsman, 2014). In general, while the entry of sharing economy players has certainly helped create value, it is less clear whether this value has been successfully shared among all actors involved, such as peer-to-peer users, competitors, governments, and society at large (Rong et al., 2021).

The rapid growth of the sharing economy can be attributed mainly to three factors. The first is increased urbanization, ranging from urbanization level to urban internet technology. In fact, the sharing economy can be considered an urbanization phenomenon since dense urban geographies create inefficiencies and challenges but also opportunities that enable sharing economy firms to flourish thanks to the high concentration and proximity of people (Davidson & Infranca, 2016; Huang et al., 2020). Households pay a price premium to live in urban areas that offer more availability of houses to rent and higher employment opportunities. Moreover, urban districts have a high density of population compared to rural districts, which favors more social ties and social diversification that could assist the growth of the sharing economy (Vale & de Mello-Sampayo, 2021). In fact, recent research has shown that several social antecedents are beneficial in stimulating the use of sharing economy platforms (Davlembayeva et al., 2020).

The second factor behind the rapid growth of the sharing economy is digitalization. In fact, the widespread use of the Internet, digital devices, secure online payments, high speed, and large-scale communications facilitates the sharing of resources through several platforms. Moreover, on the service provider side, digitalization has favored low entry costs, more flexibility, and low transaction costs, whereas on the consumer side, it has facilitated the search for goods and services (Albinsson & Perera, 2012; Rayna & Striukova, 2021; Zervas et al., 2017). For instance, in the case of peer-to-peer lodging, digitalization has facilitated the rental of a secondary residence for a short period of time, using for

instance Airbnb, thus making it more an object of trade rather than a second home (Bachimon et al., 2020). Online platforms help service providers to get in touch with others as Airbnb hosts and make money out of personal time by riding around the city as Uber drivers or Deliveroo riders (Köbis et al., 2021).

The third factor, as anticipated earlier, is the 2008 global economic crisis, which has generated a high level of unemployment and wealth erosion, leading people to be more price-sensitive and seek additional economic returns from their underutilized resources, as well as less expensive and more sustainable solutions to satisfy their needs (Belk, 2014; Puschmann & Alt, 2016; Roma et al., 2019).

While sharing economy platforms operate to match supply and demand among peers in relation to certain underutilized resources, every shared resource requires a certain *degree of physical interaction* between the service provider and the final consumer. To examine the impacts of the COVID-19 pandemic on the sharing economy, we first need to understand the different service categories where the sharing economy has emerged. A comprehensive overview of such service categories is provided by Geissinger et al. (2020).

Based on the physical interaction required by a sharing economy service and the similarities to other services, Fig. 1 summarizes the main categories of sharing economy services or platforms and the main industries that such categories create or compete with, also showing some examples of the most known platforms for each category. From Fig. 1, we can note that there are four main categories of resource (peer-to-peer) sharing platforms.

The first category relates to physical resource-sharing platforms through which the service provider and the final consumer exchange physical resources that vary from clothes to entire homes for a limited period of time. The second category refers to knowledge sharing: these platforms serve as a meeting point between people eager to learn and people transferring knowledge. The third category relates to time and service-sharing platforms that connect service providers in different fields (e.g., freelancing), who offer their time, labor skills, and expertise to service consumers. Lastly, hybrid resource sharing that combines two or all three sharing economy categories. For example, Uber drivers share their time (the third resource-sharing category), physical means of transportation (the first resource-sharing category), and knowledge of local streets (the second resource-sharing category) to transport customers of Uber.

The intuitive categorization presented in Fig. 1 is useful to analyze the extant literature that examines the effects of the COVID-19 pandemic on sharing economy. Indeed, as can be seen in the next sections, most of the extant works focus on a specific resource/service category to evaluate the issues and the consequences associated with the pandemic. Moreover, together with our systematic literature review, the categorization in Fig. 1 will be the starting point to develop our conceptual framework.

Fig. 1 Sharing economy categories

Methodology

To examine the extant literature on the COVID-19 pandemic and its impact on the sharing economy, we started from all published articles available in (Elsevier-owned) Scopus repository as of 31st December 2021 resulting from the simultaneous presence of at least one common term to indicate the sharing economy and the term COVID-19 (and the like). We have chosen the Scopus database because this is the largest repository of journals and articles worldwide, implements a review process for accepting journals to be listed, and has been commonly utilized for literature review purposes (e.g., Latino et al., 2022a, b; Nuttah et al., 2023). In particular, in our queries, we used the keywords reported in Table 1, which are the main terms used in the literature when referring to the sharing economy. These inclusion criteria yielded a total of 1519 articles. However, a closer examination of these articles showed that the great majority of these articles were not centered on the joint study of the sharing economy and the COVID-19 pandemic. Rather, as expected, they mentioned very

Table 1 Main keywords and their relative search outcomes

Keywords	Total results	Articles selected
"Access economy" + COVID-19	1	1
Airbnb + COVID-19	164	46
"Collaborative consumption" + COVID-19	38	9
"Collaborative economy" + COVID-19	68	13
"Peer-to-peer" + COVID-19	370	23
Uber + COVID-19	492	21
"Sharing Economy" + COVID-19	318	33
"Platform economy" + COVID-19	68	5
Total	1,519	151

quickly the role of the pandemic in the sharing economy, in the best scenario as a future research direction. For this reason, out of 1519 articles, we considered only those articles that clearly focused on the study of the role of COVID-19 in the sharing economy phenomenon in some sections or in the whole article. The number of these articles is 151. This is a surprisingly large number considering the recent occurrence of the pandemic, but it is not so surprising if thinking about the huge academic interest devoted to the sharing economy in the last 5 years as well as the industry implications of the pandemic on the sharing economy. The 151 articles selected for this review are published in 71 different journals. As expected, due to the prominence of Airbnb and Uber, the highest number of occurrences refers to journals focusing on tourism, transportation, sustainability, and digital business issues. Figure 2 reports the PRISMA flowchart, which illustrates our article selection procedure in greater detail. It is noteworthy that the content of the selected articles was analyzed according to two main elements, namely the types of sharing economy platform discussed in each paper and the effects of COVID-19 on the specific types of platform, which, as explained later, differ based on the level of required physical interaction to deliver the sharing economy service. In what follows, after a brief overview on the general contingency due to the COVID-19 pandemic, we discuss the effects of such pandemic on the sharing economy by service category.

The Impacts of COVID-19 Pandemic on Sharing Economy by Platform Category

Overview

Unlike earlier coronaviruses, such as SARS or MERS, whose impact was bounded to specific regions of the world (Brem et al., 2021), the SARS-CoV-2 virus has spread rapidly all over the world moving center from China to Europe, then the USA and most of the world. The COVID-19 pandemic has created economic

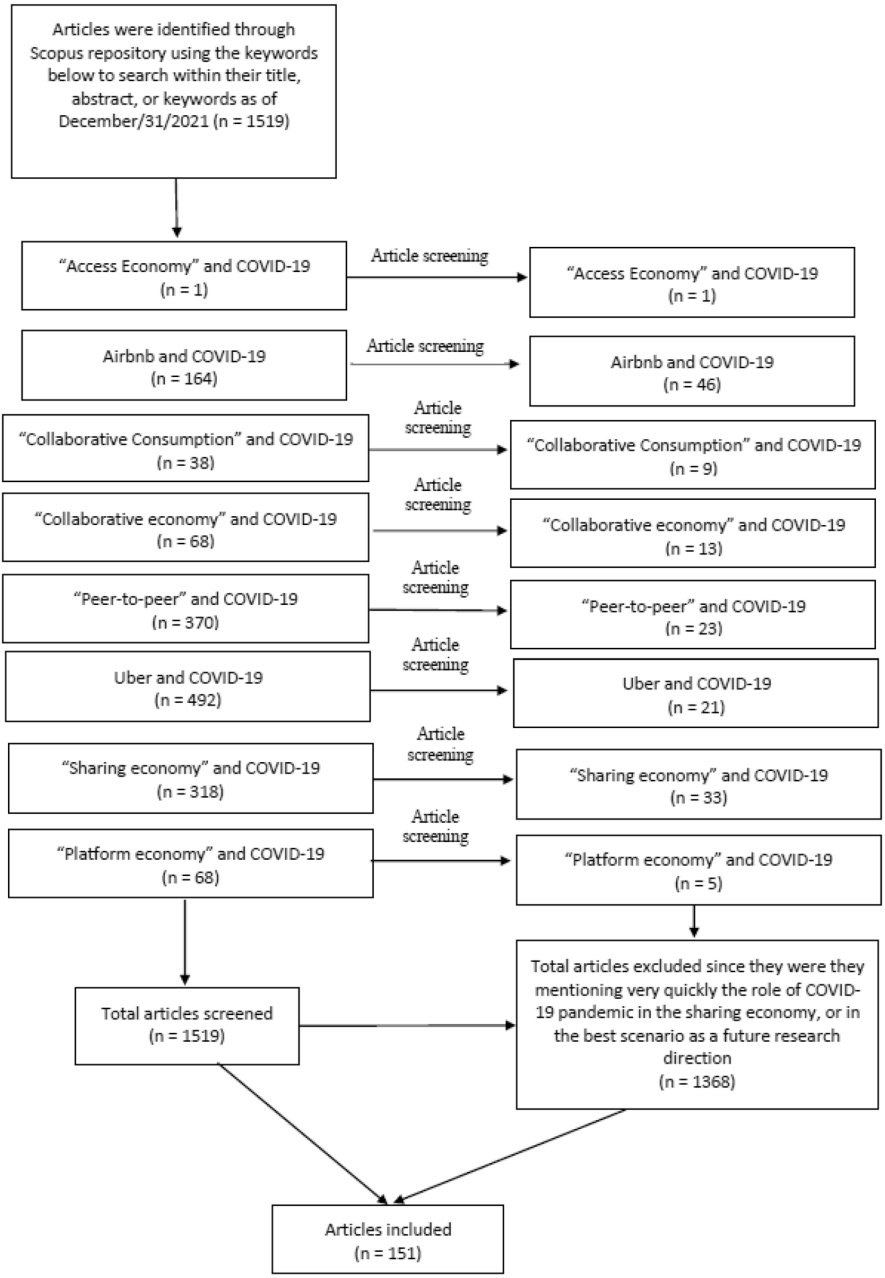

Fig. 2 PRISMA flowchart

shocks for all industries, due to national lockdowns and international travel ban. These shocks were not the same for all the categories of the sharing economy. Transportation/delivery and accommodation services, two of the biggest sectors of sharing economy, were the most affected due to lockdown restrictions. COVID-19 has worsened the working conditions of service providers in these industries. In fact, despite their financial loss and their contribution to the economy, in most countries, they may not be part of financial support packages provided by the government and they may not even have access to governmental aid provided to COVID-19 vulnerable employees (Chen et al., 2021). For instance, food delivery employees had no health insurance or coverage for lost salaries in case they got infected while working (Batool et al., 2020).

More generally, service providers enabled by the sharing economy enjoy flexible working schedule but at the cost of low wages, missing job security, lack of health insurance, and other benefits. The consequences of the COVID-19 pandemic on sharing economy workers are an amplification of existing known challenges experienced by this group rather than the manifestation of something new, in terms of their precarious existence in the workforce, their low levels of compensation, and poor working conditions (Baum et al., 2020). Customers have also missed opportunities to travel and canceled their plans, but their exposure is definitely more limited than that peer service providers have experienced (Hossain, 2021; Sigala, 2020).

COVID-19 has disclosed risks involved in sharing items with strangers (UNWTO, 2020a). Consumers have become afraid to continue sharing many services and spaces (Darnell & Kish, 2021; De Medeiros et al., 2021; Zhu & Liu, 2021). Service industries often need close contact to ensure service delivery, which results in new difficulties for service providers to offer their services in a contactless manner (Tao & Di, 2020). The COVID-19 pandemic has activated contamination concerns among many customers during service delivery, which has led to dramatic changes in consumer behavior for online and offline activities. These concerns place a special value on physical cleaning actions, which have been shown to be the most effective at removing cues that would otherwise trigger fear of contamination (Baek & Oh, 2021; De Vos, 2020; Hazée & Van Vaerenbergh, 2020). In the same vein, individuals might still fear social contact even when social distancing rules are no longer enforced. In this respect, in the post-COVID-19 era, people may prefer permanently to get home-delivery of goods purchased online, such as food and clothes instead of in-store shopping (De Vos, 2020). Jayasimha et al. (2021) suggest that contamination fear results in better individual preparedness and continued use intentions of sharing economy services.

The sharing economy has experienced three main contrasting effects caused by the COVID-19 pandemic. The first refers to new government regulations pushing firms towards digitalization by favoring remote services to avoid COVID-19 infections. As we will discuss in "A Sharing Economy Framework After the COVID-19 Pandemic," such regulations affect sharing economy platforms directly and indirectly. The second effect refers to the fact that, given the fear of contagion, consumers have been reluctant to use products touched by other people or shared with them. The third refers to the consequent economic recession, which, on the one hand, may

drive consumers towards increased participation in the sharing economy because renting houses, clothing, and bicycles is cheaper than purchasing them (Campbell et al., 2020), and, on the other hand, could induce people to rent out their idle assets for extra revenues.

The future of the sharing economy heavily depends on trust, which is generally recognized as the most important driver (Clauss et al., 2019; Huarng & Yu, 2019). Customers' future intent to use or to recommend a certain platform is based on trust and a positive consumption experience, especially in the COVID-19 pandemic context (Paștiu et al., 2020). For instance, nearly half of New Yorkers reported that they would avoid public transportation when the city restrictions will be over (Shokouhyar et al., 2021). Low social trust is positively associated with reduced citizen mobility (Mehari, 2020). People have changed their views and the pandemic has changed the products and services they considered important. Consumers have probably returned to their normal pre-COVID-19 lives after the pandemic-related restrictions, but some of the habits developed during the pandemic have remained even after it (Campbell et al., 2020).

In the next sections, we discuss in detail the consequences of the COVID-19 pandemic on sharing economy platforms across the categories proposed in Fig. 1. We argue that the impact that the COVID-19 pandemic has on a specific sharing economy service differs based on the *level of required physical interaction* to deliver the sharing economy service, which influences the infection rate that the sharing economy service exhibits during service delivery. A low level of *required physical interaction* means a low infection risk exhibited by the sharing economy service, which can be used to estimate the economic consequences on such service. Some services with relatively low risk of infection rate had high growth rates during the COVID-19 pandemic and were among the least hit by it as government restrictions have actually assisted their growth. Other services instead that require a high level of physical interaction were severely affected by the pandemic due to both government-imposed restrictions and changes in consumer behavior.

Travel, Tourism, and Hospitality Platforms

Travel and tourism industries were among the most affected industries by the COVID-19 pandemic, from the largest airline to the local hostel in a rural area. Geographical barriers between cities have resurged due to the drastic drop in demand from travelers' side but also due to heavy travel restrictions that often resulted in the suspension of national and international travel. Crises are not new to tourism and even though tourism has long been identified as one of the most vulnerable industries to crises or disasters, the impact of COVID-19 has been more devastating than any other crises in recent history. Indeed, while in other crises the freedom to travel was limited by the shortage of liquidity, in this case, such effect derives in primis from the imposed restrictions. On the one hand, travelers found themselves struggling with new traveling procedures that were changing rapidly, such as mandatory self-isolation and negative PCR tests. On the other hand, service providers had to promptly implement COVID-19 protection measures, which often resulted

in increased costs. In fact, the COVID-19 pandemic brought the travel industry to a stand-still worldwide (Gretzel et al., 2020; Niewiadomski, 2020; Yu et al., 2020). According to UNWTO, in 2019, the sector accounted for 30% of the world's exports of services (approximately equal to US$1.5 trillion). International tourism was expected to decline more than 70% in 2020, back to levels of 30 years ago, with hundreds of millions of direct tourism jobs at risk and an estimated economic loss of more than 2% of the world's GDP in 2019 (UNWTO, 2020b). Unlike sectors that manufacture physical products, tourism revenue is permanently lost as the unsold capacity cannot be marketed in subsequent years. In addition to being challenged with reduced revenue, the tourism industry has faced increased costs when implementing the protective measures put in place by authorities (Fotiadis et al., 2021).

Changes have been observed in consumer behavior to mitigate risks, such as proximity travel, bookings near the departure dates of the trip, or a preference to use cars to avoid transportation modes with a high density of people. Fear of COVID-19 contagion, travel anxiety, and risk attitude negatively impacted travelers' intention making them afraid to travel (Li et al., 2020c; Luo & Lam, 2020). Because COVID-19 is spread via human interaction, tourists have been viewed as COVID-19 infection vectors by the communities they visit during their trips (Joo et al., 2021). For instance, many Chinese tourists have faced discrimination problems, which have spread as rapidly as the disease (Tse, & Tung, 2020). The perceived discrimination against Chinese tourists unfavorably generates anxious sentiment, which in turn devastates their post-trip well-being, whereas support from social media platforms can be considered as an element that alleviates the well-being loss invoked by such anxious emotions (Yang & Wong, 2020). The perceived risk of contracting the virus from Chinese tourists was seen as a significant variable influencing intended hospitable behavior (Armutlu et al., 2020). Such discrimination actions have deteriorated the remaining customer trust in tourism during the COVID-19 pandemic. Of course, as observed, the roll-out of vaccines was expected to increase consumer confidence and contribute to ease travel restrictions (UNWTO, 2020c). This is precisely what happened after vaccination against COVID-19 was introduced.

For most countries, the tourism industry restart will occur domestically where travel bubbles[1] exist (Ioannides & Gyimóth, 2020). In fact, the COVID-19 pandemic has entailed new and somewhat unexpected attention to second homes as they provide an opportunity for close-to-home tourism. In this respect, it has been observed that, during the early stages of the pandemic, second-home owners moved from urban cities with a high risk of contagion to their second homes in rural areas, being vectors of transmission of the disease in such areas (Zoğal et al., 2020).

The pandemic has made manifest that online work from home can serve as a substitute for traditional work for an increasing number of people. Some authors have suggested that this insight opens up new opportunities to utilize second homes, which may impact sharing economy hospitality platforms and the housing market (Müller, 2020; Zhang & Yang, 2021). Nevertheless, COVID-19 can be seen

[1] Travel bubbles refer to destinations that allow people to travel from one city/region/country to another one without self-quarantine requirements (Harper, 2020).

as a transformational opportunity for technological innovation and change within an organization by accelerating structural long-term changes, such as digitalization and moving towards green energy consumption. The forced digitalization by the COVID-19 pandemic on small businesses in the tourism industry may indicate higher competition with the sharing economy platforms in the future.

As tourism recovers from COVID-19, tourists may shift preferences. A Chinese study confirms the existence of a sizable and stable segment of Chinese tourists that is likely to be in the market for a rebound in tourism post-COVID-19 (Jin et al., 2021). In terms of destinations, travelers may choose destinations that suit their needs and prefer wide-open natural settings after almost 2 years of home confinement. Therefore, niche markets should be underlined in marketing campaigns (Li et al., 2020c). A Polish study based on residents' survey believes that holidays on Polish agritourism farms, both during and after the COVID-19 pandemic, will be enjoying growing interest among tourists. Short getaways to country nature far away from crowds will certainly be very popular in Poland (Wojcieszak-Zbierska et al., 2020). Travelers regardless of the COVID-19 situation or accommodation type indeed prefer locations that provide social distance rather than being overcrowded (Craig, 2020). Therefore, facilities have worked (and will keep working) to reduce tourists' health and psychological risk perceptions by using a number of measures, including booking visits online, purchasing tickets through QR codes, checking the temperature of entrants, and demarcating the waiting area with 2-m lines when queueing (Li et al., 2020c).

Even though travel and tourism businesses have suffered during the COVID-19 period, they will recover by embracing new settings, different from the pre-COVID-19 period. We argue that virtual traveling and traveling to explore natural and open spaces, which were niche tourism markets in the pre-COVID-19 period, would become more mainstream. After almost 2 years of lockdowns, tourists would prefer traveling to open and natural spaces rather than closed ones; moreover, they would start traveling virtually using sharing economy services, such as Airbnb online experiences. In this respect, supporting evidence shows that meal-sharing platforms, such as Eatwith and Withlocals, have redesigned their events as online virtual events, due to unprecedented challenges since the COVID-19 outbreak.

Hospitality Platforms

Digging deeper into the literature on the effects of COVID-19 on the sharing economy in the tourism industry, we now focus on the effects on a prominent sharing economy sector, namely the hospitality industry. Restrictions on people gatherings and closure of public places have clearly affected tourist activities and limited the hosting of events and conferences. Moreover, social distancing requirements have reduced the capacity of hospitality operations (Hall et al., 2020; Gössling et al., 2020; Zhu & Liu, 2021). The COVID-19 pandemic has generated a 71% decline in hotel occupancy in China during February 2020. Also, numerous hotels of the Hilton chain stopped their operations worldwide. More in general, during the first peak of the pandemic in 2020 (February–April), nearly nine out of ten hotels had dismissed employees, resulting in 7.5 million job losses in the leisure and hospitality industries (Khan et al., 2020). More closely related to the sharing economy, in April 2020,

over 4100 hosts deregistered their properties from the Japanese sharing economy platform Minpaku. Almost two thousand Airbnb employees lost their jobs as Airbnb reduced its workforce by 25% (Hossain, 2021). Even though the supply and demand of peer-to-peer accommodations were growing in the pre-pandemic period, Benítez-Aurioles (2021a) found that both supply and demand of peer-to-peer accommodations declined after the pandemic. According to Ndaguba (2021), COVID-19 pandemic–related lockdowns have drastically reduced the revenue of Airbnb between March 2020 and April 2020 in 17 cities in South Africa. Using Google Trends data, it was also reported that the search intensity for accommodation services, such as Airbnb and Couchsurfing, had a drastic reduction in 2020 compared to 2019 (Batool et al., 2020). Moreover, AirDNA reported a 53% fall in Airbnb bookings in the USA between February and April 2020. Nevertheless, Gerwe (2021) suggested the presence of optimism regarding Airbnb's long-term future due to its successful initial public offering in the USA in December 2020.

Guests reacted to the pandemic quickly by canceling their reservations well before travel restrictions. The effect on price categories varied from one location to another (Boros et al., 2020). A negative aspect of Airbnb is the fact that the company essentially transferred its risk to Airbnb hosts given that they were not their formal employees, but simply independent contractors. Indeed, when there is an economic boom, there is a win–win situation. However, during the COVID-19 pandemic, Airbnb hosts in Sydney suffered about 6.5 times more than the Airbnb platform itself, mostly because Airbnb supported guests, rather than hosts, by modifying its cancellation policy to offer the former full refunds (Chen et al., 2021). In the same vein, Xu et al. (2021a, b) show that after the COVID-19 outbreak, hosts faced economic stress, operation-related stress, social stress, and uncertainty. As such, many hosts opted for leaving their business and their decision to exit the Airbnb platform was in large part due to hosts' disappointment over the minimal support received from Airbnb (Farmaki et al., 2020). A survey from Simonovits et al. (2021) showed that even guests recognized hosts' difficulties during the COVID-19 pandemic due to a lack of booking income and social benefits, with some of them stating that the Airbnb platform was treating Airbnb hosts unfairly. After significant pressure, Airbnb announced that they would contribute 250 million USD to support Airbnb hosts who had experienced COVID-19-related cancellations (Airbnb, 2020a). Airbnb has also established the Superhost Relief Fund for a total of 17 million USD for hosts who rely on Airbnb as a vital source of income, which according to Airbnb, are 8700 hosts with two-thirds being outside of the USA (Airbnb, 2020b). Even though Airbnb has modified its cancellation policy to meet guests' standards during the COVID-19 pandemic, Singh et al. (2021) documented that guests were still angry with the modified cancellation policy of Airbnb, where Europe and America have the most density of anger compared to other continents.

According to some authors, COVID-19 has disrupted Airbnb, i.e., the disruptor (Dolnicar & Zare, 2020). Even though hospitality platforms will recover again, an upper limit to supply from the hosts' side will be probably reached because some hosts abandon the short-term rental market for the long-term one in order to avoid super shock-related risks (Dolnicar & Zare, 2020). In this respect, Romano (2021) showed that during the COVID-19 pandemic, a large portion of Rome, Milan,

Naples, and Florence cities have reversed the exponential growth trend of Airbnb housing supply, while few areas of such Italian cities have increased their supply. Moreover, Gossen and Reck (2021) showed that during the COVID-19 pandemic, Berlin hosts switched from short-term rents to long-term rents, renting more entire apartments rather than shared facilities during the COVID-19 pandemic compared to the pre-pandemic period. In the same vein, by using panel data from 22 cities worldwide, Benítez-Aurioles (2021a) showed that the COVID-19 pandemic has resulted in a decline in accommodation supply from the hosts' side, causing a significant fall in price and demand from the guests' side. Nonetheless, Minoia and Jokela (2021) claim that there is no reason to assume that the decline in short-term holiday rentals caused by the pandemic would lead to a significant increase in the supply of accommodations in the long-term rental market.

Other authors have suggested that all major factors that made sharing economy platforms successful transformed into weaknesses during the pandemic (Gerwe, 2021). Of course, as the gradual recovery of Airbnb has suggested (Yohn, 2020), the COVID-19 pandemic is not the killer of the peer-to-peer accommodation industry. It is more a sort of accelerator that preserves the "real" peer-to-peer accommodation hosts that offer better experiences with unique value propositions to a targeted segment and eliminates hosts who only go after profit opportunities with no clear value proposition. The COVID-19 pandemic left hosts with lower demand and guests with a larger supply; as a result, hosts need to differentiate themselves. For example, Papagiannidis and Davlembayeva (2021) have suggested that hosts could upgrade their facilities to smart homes to gain functional and emotional values. In fact, from a functional perspective, guests perceive smart homes as good value for the price (Papagiannidis & Davlembayeva, 2021). Moreover, from an emotional perspective, guests see their stay at smart accommodations as a sustainable behavior, but guests also improve their entertainment experience during their stay at smart homes. The peer-to-peer accommodation sector will have an opportunity to reformulate its current value proposition and prepare for the rebound in the post-COVID-19 period (Zhang et al., 2021). For instance, Airbnb has refocused on its original core business, i.e., peer-to-peer budget home rental, significantly streamlining ancillary services that were gradually added before the pandemic, such as traditional hotel and luxury property listings (Yohn, 2020). In general, the effects of shrinkage in local Airbnb offers would easily spill over on real estate and rental markets. That is, apartments withdrawn from Airbnb can become available for long-term rent, or owners may sell them. Thus, the price and the quantity of available flats can be affected by such changes (Boros et al., 2020). Trojanek et al. (2021) have provided evidence that the Airbnb housing supply saw a shrinkage during the COVID-19 pandemic, therefore increasing the long-term rentals' supply in Warsaw. More in general, some authors advance issues that should become central for the sharing economy in the post-COVID era, namely moving from global to local, competing with higher service standards, cutting costs by focusing on core business, and moving towards increased sustainability (De las Heras et al., 2021; Gerwe, 2021).

Social interaction between the host and guest is a distinctive feature of peer-to-peer accommodation platforms compared to hotels and other competitors (Moon et al., 2019; Tussyadiah, 2016). With the COVID-19 restrictions and the consequent social distancing of guests and hosts, peer-to-peer accommodation has lost one of its distinctive features.

But from the competitors' side even though hotels are more reliable about cleaning, hotels' hygiene might still alarm guests because many more people use hotel facilities throughout the day compared to peer-to-peer accommodations (Hossain, 2021). Peer-to-peer accommodation platforms have developed cleaning protocols for hosts (e.g., 24-h vacancies between consecutive bookings in Airbnb), which have addressed the challenges and pressure created by the pandemic, as well as limiting possible transmissions (Farmaki et al., 2020; Rezapouraghdam & Karatepe, 2020). Recently, Gyódi (2021) showed that during the COVID-19 pandemic, Airbnb price rates decreased more moderately compared to hotel price rates. Moreover, Bresciani et al. (2021) found that during the COVID-19 pandemic, travelers preferred physically distanced accommodations, therefore being reluctant to book shared flats on Airbnb. However, travelers preferred to book Airbnb full flats over hotel rooms due to the need for better physical distancing. Also, Benítez-Aurioles (2021b) claims that entire homes and professional hosts still predominate the peer-to-peer accommodation market.

During the COVID-19 pandemic, health and safety have considerably affected accommodation bookings, and this does not apply only to older age groups (the segments most vulnerable to COVID-19), but also to the entire population. In fact, the process of accommodation decision-making is rationally bounded to the simplified core values of health and safety, which were considered significant factors for purchase decisions during COVID-19 times (Li et al., 2021). Business tourists with a low perceived risk of COVID-19 were more willing to book Airbnb accommodations than leisure tourists (Kuhzady et al., 2020; Pappas & Glyptou, 2021). While, Bode et al. (2021) showed that during the COVID-19 pandemic, guests used host reputation, seniority, and superhost status as major criteria for choosing an Airbnb listing. Furthermore, by analyzing the city of Madrid, Hidalgo et al. (2021) have shown that listings with kitchen amenities increased their price premium by 15.2% during the COVID-19 pandemic as compared to the pre-pandemic period. Since tourists' perceived risk of the virus infection was (and may still be) reduced in rural destinations, Airbnb listings could take advantage of the low density of tourism businesses and the ease of social distancing in rural areas (Jang et al., 2021). Indeed, Liang et al. (2021) claim that tourists preferred renting in suburbs rather than city centers during the COVID-19 pandemic. Karthik and Sinha (2021) suggest that peer-to-peer guests preferred spacious and healthy spaces, and will do it also in the future. In contrast, Hidalgo et al. (2021) show that Madrid guests' marginal willingness to pay for size-related characteristics declined during the COVID-19 pandemic as compared to the pre-pandemic state even though larger facilities provide social distancing for their guests. As a result, further research is needed in this field to determine whether size-related characteristics provide higher price premiums for hosts in the post-COVID-19 era.

Given the need for social distancing derived from the COVID-19 pandemic, hosts may emphasize, even in the near future, the role of artificial intelligence (AI) and robotics in their operations using cleaning robots and AI-enabled services (Melián-Alzola et al., 2020). Indeed, during the pandemic, quarantine accommodations under sharing economy needed to redefine their in-room services and amenities. This is because being isolated in a room not only induced anxiety and loneliness, but also created issues of health, wellness, and sociability (Wong & Yang, 2020). Finally, an

important point that needs to be highlighted is that, as tourism is fully restarting, local and national governments are more likely to support "traditional" hotel companies due to their stronger lobbying power, role in employment, and contribution to tax incomes. This support can be manifested in financial support or regulatory changes that would offer a significant advantage to hotels over peer-to-peer accommodations in future competition (Boros et al., 2020).

Sharing Mobility Platforms

This section analyzes vehicle sharing, ride sharing, ride hailing, and delivery platforms. These kinds of platforms can be found under both physical and hybrid resource-sharing categories in Fig. 1, and they can be referred to as sharing mobility platforms. The COVID-19 pandemic has changed people's traveling modes because of panic and strict restriction measures, such as city lockdowns and traffic control. According to Zhou et al. (2021), the COVID-19 pandemic has altered traveling behaviors resulting in a significant decline in overall trips, while Yoshida and Ye (2021) have suggested that changes in traveling behaviors were related to individual risk perceptions of COVID-19 infection. Furthermore, Esposti et al. (2021) have shown that daily commuters preferred avoiding contact with strangers on shared transportation means such as public transportation and ride sharing. During the COVID-19 pandemic, mobility demand decreased significantly as limited mobility was one of the key measures to reduce the spread of the pandemic (Martin et al., 2021). Many people have replaced their outdoor activities with indoor ones. Google and Apple mobility data reported that among all the transport modes, public transport experienced the largest reduction. Moreover, some authors have suggested that the negative and significant impact of the COVID-19 pandemic on public transport may result in long-lasting reduced demand (Wen et al., 2021). Others instead suggest that shared mobility operators will rebound quickly taking advantage of food delivery, logistics, and micro-mobility services, such as bike sharing and electric scooter sharing (Shokouhyar et al., 2021).

Ride-Hailing and Ride-Sharing Platforms

Uber and Lyft have been hit heavily by COVID-19, with bookings for ride-sharing services having fallen 40% or more in May 2020 (Zhu & Liu, 2021). Google trends data indicated a significant decline in the search volume for Uber and Lyft, with the drop being larger for Uber than Lyft (Batool et al., 2020). For instance, Borowski et al. (2021) have suggested that higher levels of income corresponded to a lower willingness to share rides during combined crisis periods such as flood evacuations during COVID-19 times. Furthermore, both Uber and Lyft reduced their workforce by 14% and 17%, respectively, with the remaining employees receiving only 70% of their salary during the crisis period (Hossain, 2021). The decrease in ride-hailing platforms demand essentially means that millions of drivers became unemployed, thus requiring financial support to survive the COVID-19 storm. About 53% (out of 871) surveyed Uber drivers have been

worried that their earnings have fallen by 67% during the pandemic (Hossain, 2021). Moreover, during the COVID-19 pandemic, Uber drivers had to adhere to restrictive governmental guidelines that were changing on a daily basis, for instance, limiting the number of people to transport, where a failure to accommodate such rule would result in a penalty for Uber drivers (Vinod & Sharma, 2021). In contrast, from the consumers' side, Rasheed Gaber and Elsamadicy (2021) suggested that the perceived infection risk and fear of COVID-19 did not influence Uber consumers' intentions to use ride-hailing apps.

By using a topic modeling approach over "Uber Drivers Forum" data, Mojumder et al. (2021) have documented that interactions related to tipping drivers became less frequent after the declaration of a national emergency, while topics related to economic disruption, staying at home, unemployment, and social benefits were among the emergent topics during the COVID-19 pandemic. The COVID-19 pandemic has further increased Uber drivers' vulnerability compared to the well-protected job status of traditional taxi drivers. As a result, when traditional taxi drivers became unemployed, they were able to apply for unemployment benefits, while Uber drivers did not have the chance to do so due to the nature of their job conditions and the lack of labor union privileges (Tashiro & Choi, 2021).

Uber has been long known for treating its drivers as independent contractors, thus not providing them with any health insurance or paid sick leave in case they faced health issues. However, after continuous pressure, on March 2020, Uber implemented a global financial assistance policy to aid drivers diagnosed with COVID-19 with up to 14 days of paid sick leave. After criticisms, Uber expanded the policy scope to include drivers forced to self-isolate by a medical authority. Such policies may be interpreted as new Uber plans towards considering its drivers as Uber employees (Katta et al., 2020). Nonetheless, governmental institutions should plan to restructure their tax contribution plans so that independent contractors are guaranteed increased social security (Mufamadi & Koen, 2021). Many initiatives have been launched concerning how to ride share safely during the COVID-19 pandemic, with a focus on ride sharing as a way to avoid crowded modes of transport (Molina et al., 2020). For instance, Xu et al. (2021a, b) have shown that during the COVID-19 pandemic, families with more than two members, who were traveling a distance less than seven miles, were more likely to prefer carpooling services.

Also, there has been evidence of ride-hailing platforms stimulating their drivers for delivery services as the interest in home delivery of grocery and food has peaked. For instance, Uber encouraged their drivers to become food couriers for Uber Eats (Buchwald, 2020). This suggests a high degree of flexibility and modularity of the sharing economy model that evolved towards the provision of new services in a matter of days, thus fostering the effective re-allocation of temporarily underutilized resources and/or competences. We argue that Uber, Lyft, and BlaBlaCar would exploit the benefit of diversification (e.g., Roma & Vasi, 2019) by adding delivery and logistics services to their business model in order to mitigate the negative consequences imposed by the COVID-19 pandemic and other future negative shocks.

Vehicle-Sharing Platforms

During the pandemic, both car-sharing services and automotive manufacturers' profits dropped drastically. For instance, in China, due to the pandemic, the use of shared cars went down from 554 million users to 368 million users (Liu et al., 2021). Similarly, in Italy, 60 to 70% of car-sharing services were drastically reduced (Roblek et al., 2021). A recent survey also suggests that one-third of interviewed people are less likely to use car sharing even in the post-COVID-19 period (Hossain, 2021). According to a British survey, over half (56%) of individuals not owning a car (but having a driving license) have stated that due to COVID-19 they would consider buying a car (Wang & Wells, 2020). This is not the case for bicycles and electric scooter–sharing systems. Users have indeed expressed a positive opinion on the use of micro-mobility during the pandemic (Campisi et al., 2020). A global and large interest in using bicycles and electric scooter–sharing systems has been noted during the COVID-19 pandemic (Alharthi et al., 2021; Butler, 2020; Chen, 2020; Goldbaum, 2020). According to a survey, almost half of the participants believe that the effects of the COVID-19 pandemic will not affect their willingness to use electric scooters (Almannaa et al., 2021).

Due to a number of factors encompassing better ventilation, convenient disinfection, and avoidance of close contact between travelers, consumers have been more prone to use bike sharing for traveling rather than using public transport during the pandemic (Teixeira & Lopes, 2020). As a response, many policy makers in cities, such as Berlin, Bogota, and Philadelphia, have started expanding their cycling infrastructure (Agatz et al., 2021). A study has compared subway and bike-sharing system users during the COVID-19 pandemic in New York City, providing compelling evidence of a possible modal transfer from some subway users to bike-sharing systems (Teixeira & Lopes, 2020). Results have also shown better resilience for bike-sharing systems over the subway system. In fact, although the demand has dropped significantly for both systems during the pandemic, the reduction was smaller for bike-sharing systems than for subway systems (71% versus 90%). Finally, the study demonstrated the existence of a statistically significant increase in the average duration of bike trips, which was positively correlated with the number of daily new COVID-19 cases (Teixeira & Lopes, 2020). This result has been also found in another study based on bike-sharing data from three main operators in Beijing (Shang et al., 2021). As a matter of fact, the latter study documented that the average bike trip time of bike-sharing systems was higher after the COVID-19 outbreak. A possible explanation is that people tend to use bike-sharing systems for longer trips, which used to be done by public transit because of the COVID-19 pandemic. Moreover, environmental benefits caused by bike sharing substantially reduced the usage of petroleum, CO^2, and NOx emissions in Beijing (Shang et al., 2021). An Italian study has found that, comparing the period before and after the COVID-19 lockdown, people are turning to healthier and more sustainable lifestyles, e.g., using bike sharing more frequently (Bergantino et al., 2021). In this regard, it is reasonable to expect that the impacts caused by COVID-19 will hardly disappear in the short term (Yoshida & Ye, 2021). Rather, it is more likely that in the future people will increase their involvement with bike-sharing systems instead of public transportation. As a result, governments need

to reformulate their public transportation plans and perhaps consider favoring (peer-to-peer) bike-sharing systems as an alternative mode of transportation.

Delivery Platforms

In pandemic times, the use of delivery services has increased significantly. Both shoppers' and retailers' adoption of grocery delivery has been continuously growing with many shoppers using it to purchase their entire shopping basket. Moreover, retailers who adopted grocery delivery services early before the COVID-19 pandemic have benefited from the largest returns due to their early adoption, while those who were late are still catching up with the trend (Shankar et al., 2020). As mentioned earlier, while the use of Uber's ride-sharing service went down by 80% in April of 2020, Uber Eats has experienced an 89% increase in demand (Williams et al., 2020). However, by analyzing Uber Eats user comments during the April-June 2020 lockdown in the USA, Chen McCain et al. (2021) documented that comments related to service quality, platform performance, and product quality were mostly negative. Therefore, it would be interesting to investigate whether the COVID-19 pandemic has caused a deterioration of overall delivery service quality and whether this will hold in the post-COVID-19 era. In the same vein, Belarmino et al. (2021b) have shown that, before quarantine, price-value and food quality had a significant impact on the continuous usage of delivery services, while during the quarantine, food quality and service speed were the most significant factors.

More generally, COVID-19 lockdowns had a positive and significant effect on the search intensity for the search term "Food Delivery" (Batool et al., 2020). In the USA, it is notable that Lyft signed an agreement with Amazon to run delivery services. Uber has sought to capitalize on its Uber Eats business in some markets, thus delivering meals from restaurants to home-confined consumers (Wang & Wells, 2020). Food delivery services were already rising as a key business model for US and Chinese restaurants and their global impact has been boosted during the COVID-19 pandemic (Belanche et al., 2021). However, the COVID-19 pandemic has made the supply and demand of the food industry less predictable (Alonzo et al., 2021). Hence, many businesses had to reduce their workforce to limit the consequences of low demand. Online platforms can raise firms' survival rate during a crisis by providing steady access to final consumers.

Delivery services, indeed, positively contributed to the sales of restaurants when dine-in services were restricted, thus contributing to restaurant employees' earnings (Atsiz & Cifci, 2021; Belarmino et al., 2021a, b; Kim et al., 2021). Moreover, during the pandemic, Belarmino et al. (2021a) indicate that guests were more likely to choose a restaurant adhering to COVID-19 restrictions. Due to fear of infection, consumers may continue to replace restaurant visits with at-home consumption even after the COVID-19 pandemic, which suggests that restaurant could permanently extend their delivery areas in the near future (Kim et al., 2021). Indeed, based on Uber Eats data, small restaurants have experienced significant increases in total activity following the closure of the dine-in channel (Raj et al., 2020). It has also been documented that the negative effect of COVID-19 was smaller for fast-food restaurants compared to full-service restaurants (Yang et al., 2020). Further findings

underscore the pivotal role that digitalization will play in creating business resilience in the post-COVID-19 economy (Raj et al., 2020).

Delivery services were increasingly crucial for individuals in quarantine allowing them to source food without leaving home, while also providing an important option to those particularly vulnerable to the COVID-19 disease. The public has been relying on gig workers to have access to food, groceries, goods, and even medical services, which suggests that the pandemic has raised the demand for gig workers (Schreyer, 2021). Unemployed gig workers in other fields could find employment opportunities in the delivery sector (Howley, 2020; Li et al., 2020a). Food delivery platforms such as Uber Eats and Glovo provided an alternative source of income to people, who have lost their jobs during the pandemic (Polkowska, 2020).

In most countries across the globe delivery workers were considered as part of the "emergency services" during COVID-19 lockdowns. Many of those workers have incurred a greater risk of infection given that they were often not provided with personal protective equipment, paid sick leave, and health insurance coverage. As such, it became difficult for them to afford self-quarantine and get tested even if COVID-19 symptoms were to appear (Rani & Dhir, 2020). For instance, in Ecuador delivery couriers suffered a very high incidence rate of COVID-19 compared to the national average, sometimes even higher than the incidence rate of medical staff. According to Ortiz-Padro et al. (2021), such a high incidence rate may be explained by the delivery speed that couriers needed to ensure to be on time, which made them let down their guard as the working day proceeded. Moreover, the COVID-19 pandemic has intensified some of the challenges faced by delivery couriers in India (Parwez & Ranjan, 2021; Puram et al., 2021). Further findings from Allegretti et al. (2021) have shown that the COVID-19 pandemic has amplified some inequalities related to platform capitalism in Portugal. According to Umer (2021), delivery couriers have an "illusory freedom" in the sense that their flexible work schedule comes at the cost of difficult working conditions and lower wages. This poses important challenges in terms of regulations and protection of this type of sharing economy service providers in case of future pandemics to protect delivery couriers and their communities.

Freelancing Platforms and Co-working Spaces

The COVID-19 pandemic has forced the digitalization of work by showing that most of the work does not need a fixed workplace but can be done remotely. Companies prepared for lockdowns and asked their employees to work from home. During lockdowns, an increasing number of companies and public institutions switched to remote working, relying on virtual collaborative spaces, such as Zoom (Rese et al., 2021; Hu, 2020; Hudek et al., 2021; Mont et al., 2021). Working without direct social interactions became part of everyday life for many people. The COVID-19 pandemic made telecommuting essential for several jobs (Mouratidis et al., 2021). With offices being closed, many firms resorted to freelancers for some activities and reformed their organizational structure into shared employees' paradigm (Batool et al., 2020). The COVID-19 pandemic had a positive impact on freelancing since many people lost

their occupations and started looking for work on freelance platforms, leading to an increase in the number of average daily tasks or jobs posted and filled on sharing economy platforms since the beginning of the pandemic. Reports show that the government lockdowns had a significant and positive effect on two freelancing platforms, namely Upwork and Fiverr (Umar et al., 2020). For many freelancers, the benefits of freelancing work outweighed the challenges encountered (Tudy, 2021). Moreover, working from home is part of freelancers' expertise, which conferred them a competitive advantage over traditional workers in terms of efficiency (Hudek et al., 2021).

The COVID-19 pandemic has significantly dropped the average occupancy of co-working spaces with many of them left empty. Nonetheless, the post-pandemic return to work offices faces an increased demand for flexibility from the employees' side, which may lead co-working spaces to be an attractive alternative to traditional work offices (Berbegal-Mirabent, 2021). The COVID-19 pandemic accelerated the adoption of remote work. Remote work offers temporal and spatial flexibility to individuals as well as heavily reduces CO_2 emissions and the use of fuel for transportation due to limited work-home trips (Kylili et al., 2020). The pre-COVID-19 workspace and management norms will probably switch to more flexible and remote working. In the post-COVID-19 era, companies will likely continue using remote working in a mixed approach with traditional work modes, and participate in co-working spaces instead of owning offices to innovate their business model and cut down costs.

Online Service Platforms

The pandemic has accelerated several changes that were on the way by encouraging companies towards using online services (Vale & de Mello-Sampayo, 2021). A suitable internet connection needs to be installed to allow online services to work effectively. In fact, during the pandemic, many governments incentivized the installation of high-speed internet connections. Many physical services were transformed into peer-to-peer online services. Education and virtual collaborative platforms replaced physical classrooms in universities and schools, and also physical meetings were done through several peer-to-peer platforms. Moreover, entertainment platforms were the only legal amusement source during lockdowns. Indeed, Internet and social media usage have seen a drastic surge during the pandemic. People turned to social media for news and information and for maintaining relationships with families and friends in quarantine. Along with increased Internet usage, statistically significant differences between the numbers of peer-to-peer online transactions before and after COVID-19 were documented, which marked a significant increase in the post-COVID-19 period (Trisnowati et al., 2020). Moreover, during the pandemic, online users have been spending as much as 40% more time on social media (Li et al., 2020b).

After the COVID-19 pandemic, traditional sales channels may no longer be the preferred mean of purchasing products for consumers. Consumers' fear of the COVID-19 contagion boosted their purchasing intention and trust of online platforms, due to online platforms' perceived health and safety benefits compared to

traditional businesses (Tran, 2021; Valdez-Juárez et al., 2021). We argue that traditional retailers will further move towards business digitalization, but sharing economy platforms will benefit from the first mover advantage since their business model is already built over a digital infrastructure.

Education Platforms

Despite the crisis, the COVID-19 pandemic entailed positive changes in the education industry over the long run. Due to the pandemic, the use of online platforms to connect educators and learners has been regarded as a possible substitute for educational processes during school closures (Mohammadian et al., 2020; European Commission, 2020). Education quickly adapted to the COVID-19 pandemic by switching to e-learning. There are many e-learning processes that are offered through virtual collaborative platforms, for example, (peer-to-peer) virtual classes instead of face-to-face lectures, offering online practice questions and quizzes using Kahoot! (Cheung, 2021), (peer-to-peer) meetings, videoconferencing, group assessments through breakout rooms, self-access resources for learning, and providing registered videos of practical and theoretical lectures (Chick et al., 2020; Favale et al., 2020; Kelly et al., 2020; Sandhu & de Wolf, 2020). It was during the pandemic that virtual collaborative platforms gained interest due to the closure of physical classrooms. From students' perspective, the main advantages of virtual collaborative platforms were saving time and costs because there is no need to travel to school as well as increased accessibility of study resources, and flexibility of space and time. From instructors' perspective, virtual collaborative platforms allowed for flexibility in the work schedule, ease of conducting online courses, a variety of tools available at hand, and ease in monitoring and documenting teaching activities (Ionescu et al., 2020). The main disadvantages for both students and instructors are less personal interaction, distraction, and technical obstacles (Förster et al., 2020; Hussein et al., 2020; Khan et al., 2021). The use of virtual collaborative platforms in the educational processes compared to traditional physical educational processes reduces operational costs (Mohammadian et al., 2020). The COVID-19 pandemic has shown the clear benefits of using virtual collaborative platforms in education. In the near future, universities may enter the sharing economy by playing the role of providing virtual collaborative platforms that connect students and educators, thus sharing educational content created by educators for students. Indeed, virtual collaborative platforms proved their irreplaceable role in some future solutions, such as the use of platforms to reach isolated towns and provide them with the necessary education. While traditional learning processes need a predefined time and place, the use of digital technology might help overcome such traditional barriers to learning (Börnert-Ringleb et al., 2021). Although Foo et al. (2021) have suggested that distance learning students have lower performance than students who attend classes in presence, the use of virtual collaborative platforms to transform traditional educational processes into e-learning ones will most likely stay as the students have been very positive about the extra-virtual support. A mixed-mode delivery of the educational process may be the preferred way in the future (Schweiker & Levonis, 2020). We argue that by using the mixed educational approach, schools and universities will invest less on real estate, while

exploiting the sharing economy core principles on their facilities, and thus profiting from underutilized resources. As a result, further research is needed to identify the viability of the distance learning approach in the post-pandemic era.

The educational technology (EdTech) global market is estimated at $186 billion. Considering the impact of COVID-19, the market is expected to grow between 14.5 and 16.4% per year to a total value of $368 billion to $406 billion in 2025 (Timchenko et al., 2020). The COVID-19 pandemic accelerated the existing trend of the educational process digitalization. Some universities were already experiencing the digitalization of educational processes and others were forced to adjust to the new normal (Osina et al., 2021). A significant historical lack of investment in digital learning resources and skills has resulted in educational debt in both corporate and educational sectors limiting development opportunities (Timchenko et al., 2020). Education platforms such as Coursera or Udacity, which have already featured online courses in collaboration with many global universities, could offer courses to train teachers at universities and schools on the proper use of online platforms. The previously developed experience of Coursera or Udacity with students before the COVID-19 pandemic could put them at the center of future developments in the education industry for the upcoming years.

Entertainment Platforms

As lockdowns went into effect, people have increasingly turned to video games to spend their spare time and interact with friends and family they could not see in person (Howley, 2020). Due to the closure of cinemas, video streaming services such as YouTube, Netflix, Disney+, and Amazon Prime have become the most popular sources of entertainment. All streaming platforms have enjoyed a huge boost in subscriptions and usage (Batool et al., 2020). During the COVID-19 pandemic, independent theaters across the USA have temporarily closed their doors and moved to various technologies to augment their virtual presence and connect back with their communities online (Ankenbauer & Lu, 2020). For example, several initiatives have surged, such as virtual cinema, virtual concerts, and real-time group interactions replacing traditional entertainment channels.

In early April 2020, Airbnb launched a new service through their platform called "Online Experiences." Hosts can now offer online cooking classes, travel planning classes, meditation classes, guided tours to visit zoos, bee-keeping virtual tours, or even magic shows. That is, Airbnb online experiences are multidimensional experiences that enable small local entrepreneurs to reach international market segments without requiring initial investments (Zhu & Cheng, 2021). While there is exist a large variety of types of online experiences offered on the platform, about 30% of them have been centered around digitally mediated food-preparation (Lim et al., 2021). On the one hand, many Airbnb online experience guests discuss these online food activities in terms of the social connections promoted by the act of cooking or baking together when performed as a joint online action. In this innovative context, online food-related experiences tend to stimulate a sense of a virtual trip (Cenni & Vásquez, 2021). On the other hand, from the hosts' side, many are highly motivated to participate in Airbnb online experiences due to the extra income that can be

generated (Norum & Polson, 2021). Virtual experiences highlight an opportunity for collaboration between peer-to-peer accommodation platforms such as Airbnb and the tourism industry to create a virtual tourism industry even after the COVID-19 pandemic, creating once more a new industry. We expect that virtual entertainment platforms will be likely considered as an alternative to traditional entertainment events and will expand significantly in the post-COVID-19 era (Vinod & Sharma, 2021).

Healthcare Platforms

With the COVID-19 pandemic, many home hospitalization systems began allowing patients to recover and receive treatments in their homes, implementing (peer-to-peer) delivery services. Such services made patients, and particularly older ones, avoid the difficulties of moving to hospitals and limit their risk of infection with SARS-CoV-2. Also, patients with chronic conditions would have been put at risk if they had to travel or gather in groups to receive medication. During the pandemic, Metropolitan Health Services in Cape Town used delivery services and decided to offer home delivery of medication. Local non-profit organizations used a variety of means such as Uber, bicycles, and electric scooters to help deliver the parcels (Ben Hassen et al., 2020; Brey et al., 2020). In the future, Uber could collaborate with hospitals to implement delivery services using their idle drivers to facilitate treatments and care of vulnerable patients.

The COVID-19 pandemic has often been linked to stress and depressive symptoms, as a result of feeling lonely (Gössling, 2020). For instance, New York state residents and frontline workers were affected by mental health issues at disproportionately high rates during the pandemic (Clay & Rogus, 2021; Gössling, 2020). More than two-thirds of employees stated that the COVID-19 pandemic was the most stressful time of their careers (Anderson & Anderson, 2020). With COVID-19 restrictions, many peer-to-peer telecounseling platforms, such as Talkspace, which connect patients and psychologists, experienced a surge in demand during March 2020. Many parents have worked from their houses trying to balance work and family, therefore resulting in a stress increase (Stoll, 2020). The pandemic has accelerated the adoption of telemedicine after proving several health benefits, particularly when used proactively rather than reactively (Mouratidis et al., 2021). Lin et al. (2021) have suggested that peer-to-peer telecounseling reduces the pressure of seeing doctors for patients, as well as adding a more accessible alternative. The pandemic has also underscored the usefulness of remote consultations, digital medical emergency support, and digital platforms for the collaborative sharing of patient data. Direct access to the health data of patients and a more robust data-sharing infrastructure could better prepare the healthcare system to manage public health threats during the emergence of deadly disease outbreaks such as COVID-19.

Blockchain technology can be used to keep important medical data safe and secure, but also could make the process of sharing healthcare data significantly easier and help end the interoperability problem in the healthcare industry (Attaran, 2020). The pandemic has catalyzed a renewed interest among patients and healthcare providers in telemedicine applications, including the use of artificial intelligence in remote health diagnosis (Gleiss et al., 2021; Raghavan et al., 2021). All

these technologies may constitute the base of post-COVID-19 healthcare services under a sharing economy perspective.

Fashion Platforms

Today's fashion rental platforms offer the right to use a product temporarily, redesigning the fashion business into *clothing-as-a-service* (Arrigo, 2021; Henninger et al., 2021). H&M, a giant fast-fashion retailer, announced their intention to enter the rental market in 2019 (Baek & Oh, 2021). Fashion rental platforms, such as Rent the Runaway and Vinted, not only rent single pieces, but they also provide the possibility of subscribing to their membership plans that provide "virtual closets." Unlike other disruptive innovations, the nature of fashion rental products makes fashion platforms peculiar in terms of potential challenges. In fact, the COVID-19 pandemic has underscored how consumers became even more concerned about longstanding issues in the fashion industry, such as sustainability, lack of trust in providers, hygiene, and health risks associated with materials worn close to the skin. As a result, it has been argued that the COVID-19 pandemic may end up slowing down the progress of many fashion rental initiatives. In fact, Lee et al. (2021) have shown that many fashion-sharing platforms have ceased their activities, with few of them advertising hygiene services of shared products, such as laundry and sterilization. Nevertheless, a study predicts that the future of fashion is digital, and rental platforms may be in leading positions to head the industry post-pandemic (Brydges et al., 2020). Fashion platforms have been surely facing hygiene challenges to ensure product cleanliness. Nonetheless, they have the opportunity of exploiting their rental proposition of less expensive access to fashion over traditional businesses that have higher contact during in-store shopping.

A Sharing Economy Framework After the COVID-19 Pandemic

This section uses the insights and the evidence provided by the emerging literature categorized above, to conceptualize and introduce a framework useful to analyze future issues regarding the sharing economy in the post-COVID-19 era. The framework proposed in this study combines two main perspectives when examining the sharing economy ecosystem. The first perspective is the pre-COVID-19 perspective that acknowledges the presence, the roles, and the interactions of five main actors in the sharing economy, namely traditional businesses, policy makers, sharing economy platforms (service enablers), sharing economy service providers, and final customers (Breidbach et al., 2016; Geissinger et al., 2020; Hossain, 2021; Kumar et al., 2018; Wirtz et al., 2019). Namely, traditional businesses and sharing economy platforms compete in the same market, with policy makers regulating and monitoring such market. Policy makers are government institutions at a national or local level in different countries. Final consumers and sharing economy service providers are ordinary people that, in the first case, look for a service (i.e., renting an underutilized resource) through a sharing economy

platform, while in the second case, offer a service (i.e., renting out an under-utilized resource) to other consumers through a sharing economy platform in exchange for a payment that is partially shared with the platform.

The second perspective incorporates the recent implications of the COVID-19 pandemic examined in the previous section. Such implications led us to introduce a new factor, namely the *level of required physical interaction for service delivery*, which, we believe, will be particularly important in the post-COVID-19 era. This variable is indeed highly correlated to the infection rate that the given sharing economy service exhibited during service delivery, which has often determined the restrictions imposed by policy makers on that specific sharing economy service, and at any rate influences consumers' attitudes towards sharing economy services and their behavior when using them. To assess the level of required physical interaction for every sharing economy service, we considered three factors: first, the physical space or resources shared between sharing economy service providers and final consumers; second, the need to have physical interactions in place, e.g., requiring face to face meetings, physical contact, etc.; third, the need for transportation of sharing economy service providers and/or final consumers in order for the service to be delivered.

The extant literature suggests different degrees of COVID-19 impact on different categories of sharing economy platforms. On the one hand, some platform categories were significantly hit by the pandemic; on the other hand, some even benefited from the pandemic. Different service categories characterizing the sharing economy naturally imply different degrees of physical interaction among the involved players (providers and customers), and thus different risks of contagion. We advance that the level of impact that the COVID-19 pandemic had (and will have in the near future) on a specific sharing economy platform can be explained by looking at the physical interaction that the service requires. The level of physical interaction required for service delivery can be used to estimate the growth of such service caused by the COVID-19 pandemic. Remote services that can be delivered online without deterioration, such as online entertainment, and thus require low physical interaction among peers, have experienced no negative consequences from the COVID-19 pandemic. Rather, such services have benefited from the pandemic resulting in high growth rates. Vice versa, services for which physical interaction or where travel is by nature necessary, such as ride-hailing or peer-to-peer accommodation platforms, were severely hit by the pandemic. As discussed, the economic crisis due to the COVID-19 pandemic has become a stress test for these sharing economy players, including Uber and Airbnb, forcing them to deal with intrinsic vulnerabilities and the long-term viability of the sharing economy business model in their fields (Proserpio, 2020).

Figure 3 provides a graphical representation of the framework proposed in this study. The main actors involved in the sharing economy (and their relationships), namely platform owners, peer-to-peer service providers, consumers, traditional service providers, and policy makers (regulators or governments), are reported on top. In the framework proposed, two different sets of actions carried out by policy makers are highlighted. First, the laws that governments introduce to regulate sharing economy markets in the pre-COVID-19 period are represented by using the dotted lines. Second, COVID-19 restrictions imposed by policy makers

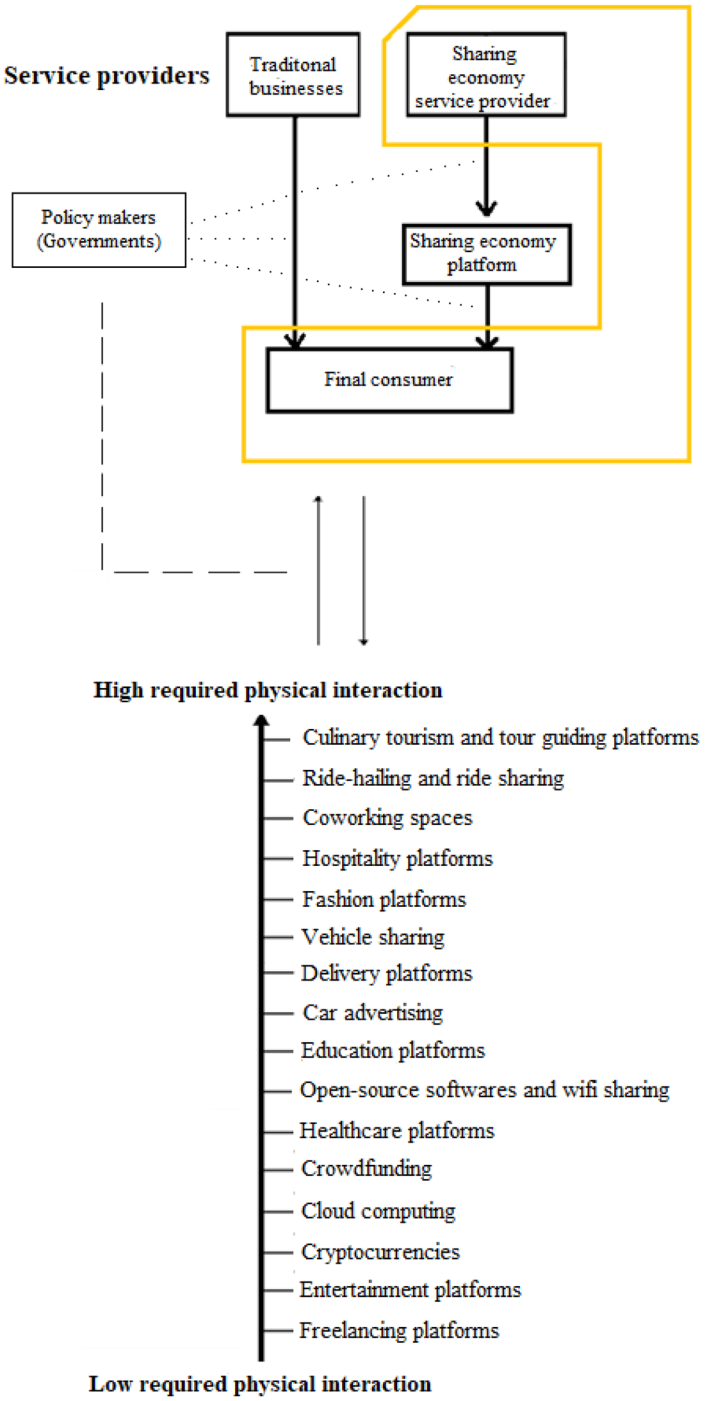

Fig. 3 Sharing economy framework after COVID-19 pandemic

are distinguished by using the dashed lines. Such restrictions negatively affected some businesses and sharing economy platforms directly and indirectly, and may have consequences in the post-COVID-19 era as well. As pointed out, direct restrictions were based on the level of required physical interaction to deliver the service. For example, sharing economy services that required high physical interaction, such as hospitality, were among the most affected since governments quickly imposed lockdowns, for instance halting tourist entries. While sharing economy categories that required no or little physical interaction, such as freelancing, were not affected negatively, rather they started facing growing demand.

The government not only has directly influenced the sharing economy services by imposing direct restrictions, but they have also caused indirect effects by influencing consumers' purchasing behaviors, which may remain in the post-COVID-19 era. During the COVID-19 pandemic, most consumers have preferred fewer daily interactions to avoid getting infected; by doing so, they changed certain habits and their perception of essential products. As it generally happens after huge pandemic shocks, these changes in consumer purchase behavior are likely to be permanent in certain circumstances for many years after (Campbell et al., 2020). For these reasons, in the proposed framework, we have connected policy makers with the two-way arrow that connects the level of physical interaction requested by different services (direct effect) and final consumers (indirect effect). Such connection highlights that consumers' purchase decisions regarding different services would be directly or indirectly influenced by government regulations both during the pandemic and even quite long after it. For instance, in Fig. 3, we can see that freelancing and entertainment platforms are at the bottom of the scale since both offer services that are completely delivered remotely, thus exhibiting low required physical interaction. Sharing economy services with low physical interaction experienced increased growth due to little or almost no effects of restrictions related to COVID-19. While tourism platforms and ride-sharing services that typically require high physical interaction are at the top of the scale. Such services were mainly impacted by both a direct effect, e.g., government restrictions to limit infections, and an indirect effect, which is represented by a change in consumers' behavior due to COVID-19 fear of contagion and the economic recession generated by the pandemic. Both positive and negative effects may remain in the post-COVID-19 era. In this respect, policy makers' task is to help businesses mitigate the previously mentioned indirect effects by raising awareness when restrictions are no longer in the act. Otherwise, businesses will find it difficult to return to their normal state.

As discussed in the next section, by looking at a crucial dimension, i.e., the level of physical interaction required for the service delivery, the proposed framework aims not only to help future studies to understand the effects of the pandemic across various sharing economy services. It also helps identify a number of research gaps related to the sharing economy that have emerged as a result of COVID-19, and will likely become relevant issues to investigate in the post-pandemic era for both researchers and practitioners.

Research Gaps, Future Research Directions, and Conclusion

A large body of literature has emerged to examine the disruptive impacts of the COVID-19 pandemic on the sharing economy and all its relevant players. In this article, we have analyzed the most important articles already published on the topic and developed a framework that provides a better view of the sharing economy in the post-COVID-19 era. In this section, we conclude by utilizing our literature-grounded framework to identify different research gaps. Such gaps focus on three main areas directly connected with the actors involved in the sharing economy (top of Fig. 3) and their relationships, namely consumer behavior, competitive issues between sharing economy and traditional businesses, and government interventions in the sharing economy. Within these areas, we identify several emerging research directions that could guide future studies on the examination of post-COVID-19 issues related to the sharing economy.

However, before we proceed with identifying research gaps and directions, it is useful to discuss the implications of our framework especially in relation to the new normalcy after the COVID-19 pandemic, as well as some limitations of our study. As for the first point, we can observe that some aspects of the proposed framework have been reflected in the sharing economy's post-pandemic landscape. The shift towards remote services and low physical interaction among peers has become the main driver of growth in some sharing economy categories. For instance, freelancing and online entertainment services have experienced an increasing demand. In contrast, hospitality and ride-hailing platforms are still recovering from the pandemic's impact due to their high physical interaction requirements. The COVID-19 pandemic has highlighted the importance of healthier lifestyles since healthy people displayed a lower risk of hospitalization. Bike-sharing platforms will definitely benefit from such consequences even after the pandemic (Shang et al., 2021; Shokouhyar et al., 2021; Teixeira, & Lopes, 2020). We also notice that the COVID-19 pandemic has raised public health standards in restaurants, accommodation services, transportation, and almost every business supported by the sharing economy, therefore increasing hygiene requirements, most of which have not been eliminated nowadays (Belarmino et al., 2021a). COVID-19 pandemic cleaning procedures are still considered to be the new normalcy by many consumers, and businesses will risk losing their clients if they abandon such procedures. This particularly applies to sharing economy activities (e.g., Airbnb hosting), which by nature involve individuals as service providers, who differently from companies cannot rely on structured processes to manage operations. Based on these considerations, the main practical implication of our framework is that the added dimension (*the level of physical interaction*) should be considered a key factor in the evolution of the sharing economy even in the post-COVID-19 era, since many COVID-19-related behaviors have been rooted into consumers. From a theoretical perspective, the proposed framework provides a useful starting point for analyzing the impact of the pandemic on the sharing economy and for studying the performance trajectories of different types of sharing economy platforms in the post-pandemic era.

Despite the valuable insights offered by this study, there are some limitations that need to be acknowledged. First, the scope of this research is limited to the period up to December 31, 2021, while the impact of the COVID-19 pandemic on the sharing economy may continue to evolve beyond this time frame. Second, this research may have only focused on specific regions or sectors of the sharing economy, since it was based on recent literature, which may not be representative of the broader impact of the COVID-19 pandemic on the sharing economy as a whole. Third, being a conceptual analysis of the extant literature, this study is unable to establish causal relationships among the COVID-19 pandemic, the level of physical interaction, and the observed changes in the sharing economy, as other factors may also have contributed to these changes. These limitations should be considered when interpreting the results of this study and designing future research in this area.

Research Gaps and Directions on Consumer Behavior

This section closely examines the different research gaps related to final consumers and their purchase behavior before, during, and after the pandemic in different industries. These research gaps are summarized in Table 2. As we previously pointed out in our framework, during the pandemic, final consumers purchasing decisions were dictated by the level of required physical interaction during service delivery. Many researchers have observed a number of noticeable changes in consumer behavior due to the fear of infection and contamination (De Vos, 2020; Zhu & Liu, 2021; Hazée & Van Vaerenbergh, 2020; Baek & Oh, 2021; Wen et al., 2021; Jayasimha et al., 2021), including preferring car sharing over using public transport (Molina et al., 2020), reducing mobility to avoid infection (Martin et al., 2021), considering owning a car (Wang & Wells, 2020), increasing interest of bike and electric scooters sharing systems (Agatz et al., 2021; Bergantino et al., 2021; Butler, 2020; Campisi et al., 2020; Chen, 2020; Goldbaum, 2020; Shang et al., 2021; Teixeira, & Lopes, 2020), quickly canceling trips (Boros et al., 2020), having trust issues with crowded public transport (Shokouhyar et al., 2021), avoiding crowded locations (Craig, 2020), requestioning their essential products (Campbell et al., 2020), and considering health and safety as the most important purchasing decision factors during the pandemic (Kuhzady et al., 2020; Pappas & Glyptou, 2021). It is important to understand the magnitude of these changes across the various sharing economy service categories as well as whether they are going to be permanent in the long run. Moreover, a relevant question is whether the COVID-19 pandemic has worsened sharing economy platforms' brand image.

Different studies have highlighted how accommodation guests have changed their preferences during the pandemic with many individuals avoiding crowded locations regardless of the accommodation type (Craig, 2020). Others were afraid of sharing spaces with other people because of contamination concerns, which made health and safety the main decision factors (Zhu & Liu, 2021; Hazée & Van Vaerenbergh, 2020; Kuhzady et al., 2020; Pappas & Glyptou, 2021; Baek & Oh, 2021; Gerwe, 2021). Interestingly, during the pandemic, tourists have shown an increasing interest towards destinations with an open natural setting (Li et al., 2020c), and manifested

Table 2 Future research directions focusing on consumer behavior changes

Related literature	Research direction	Research questions
Kuhzady et al., 2020; Teixeira, & Lopes, 2020; Campisi et al., 2020; Butler, 2020; Chen, 2020; Goldbaum, 2020; Wang & Wells, 2020; Boros et al., 2020; Craig, 2020; Campbell et al., 2020; Molina et al., 2020; De Vos, 2020; Zhu & Liu, 2021; Hazée & Van Vaerenbergh, 2020; Baek & Oh, 2021; Martin et al., 2021; Shokouhyar et al., 2021; Agatz et al., 2021; Shang et al., 2021; Bergantino et al., 2021; Pappas & Glyptou, 2021; Wen et al., 2021; Jayasimha et al., 2021; Singh et al., 2021; Simonovits et al., 2021	Consumers' behavioral models during and after the COVID-19 pandemic.	• How much did the pandemic change consumer behaviors? • Were such changes the same for different industries? • Did the pandemic worsen sharing economy platform brand image due to the poor working conditions of its service providers? • Did the COVID-19 pandemic induce changes in consumer behavior that will be permanent in the long run?
Wojcieszak-Zbierska et al., 2020; Li et al., 2020c; Craig, 2020; Zhu & Liu, 2021; Hazée & Van Vaerenbergh, 2020 Kuhzady et al., 2020; Pappas & Glyptou, 2021; Baek & Oh, 2021; Hidalgo et al., 2021; Karthik & Sinha, 2021; Gossen & Reck, 2021; Benítez-Aurioles, 2021a, b; Minoia and Jokela, 2021; Gyódi, 2021; Bresciani et al., 2021	Specific consumers' behavioral models in the accommodation industry and their preferences.	• Which accommodation preferences guests had during COVID-19 vacations, and how will they change in the future? Will we observe a noticeable preference towards traditional businesses or peer-to-peer accommodation? • Does the accommodation size of Airbnb listings matter more after the COVID-19 pandemic, thus resulting in higher price premiums? • What are the most important factors for choosing accommodations in the post-COVID-19 era?
Melián-Alzola et al., 2020; Kuhzady et al., 2020; Pappas & Glyptou, 2021; Hossain, 2021; Gerwe, 2021; Li et al., 2021	Specific consumers' perceptions after the pandemic regarding service hygiene in the hospitality industry.	• Will the COVID-19 pandemic cleaning procedures remain part of customer requirements in the long run? • Will the COVID-19 cleaning standards affect customer purchasing decisions both in the short and long run? • Given that robots and AI-powered services are able to reduce the physical interactions between providers and consumers, how will the adoption of such innovations will affect consumers' preference towards peer-to-peer accommodation versus traditional business?

Table 2 (continued)

Related literature	Research direction	Research questions
Molina et al., 2020; Wang & Wells, 2020; Campisi et al., 2020; Teixeira, & Lopes, 2020; Butler, 2020; Chen, 2020; Goldbaum, 2020; De Vos, 2020; Wen et al., 2021; Agatz et al., 2021; Shang et al., 2021; Bergantino et al., 2021; Shokouhyar et al., 2021; Rasheed Gaber & Elsamadicy, 2021; Borowski et al., 2021; Xu et al., 2021a, b; Zhou et al., 2021; Naghiro and Weilin, 2021; Esposti et al., 2021	Consumers' behavioral models for traveling and transportation during and after the COVID-19 pandemic.	• During and after the pandemic what are (and will be) the consumer preferences for intracity, intercity, and international travel within travel bubbles? • What are (and will be) the leading causes behind the increasing demand for bike sharing systems compared to public transport systems?
Timchenko et al., 2020; Schweiker & Levonis, 2020; Förster et al., 2020; Hussein et al., 2020; Khan et al., 2021; Börnert-Ringleb et al., 2021; Osina et al., 2021; Foo et al., 2021	COVID-19 consequences on the education industry and how the education industry will evolve in the post-COVID-19 era.	• Will students and teachers prefer the use of e-learning (peer-to-peer) platforms or traditional face-to-face classes? • Will online platforms replace physical classrooms or a mixed-mode approach will be used? • Will universities and schools become online platform providers that connect educators with students? • Will universities collaborate with educational (peer-to-peer) platforms such as Coursera to train their instructors on the proper use of online platforms?

an increased interest towards agritourism farms (Wojcieszak-Zbierska et al., 2020). It will be therefore important to examine whether these new trends will confer, in the future, an advantage to traditional businesses over peer-to-peer accommodation providers, or vice versa. Moreover, it would be interesting to determine whether the space of accommodation facilities will result in higher price premiums after the pandemic (Hidalgo et al., 2021; Karthik & Sinha, 2021).

Since the beginning of the pandemic, consumers have been alarmed by crowded spaces and feared sharing spaces or items with others (Campbell et al., 2020; De Vos, 2020; Zhu & Liu, 2021; Kim et al., 2021). But at the same time, consumers appreciated physical cleaning actions to mitigate COVID-19 infections (Baek & Oh, 2021; Hazée & Van Vaerenbergh, 2020; Hossain, 2021; Li et al., 2021). Taking into account such consumer views, we wonder whether COVID-19 cleaning procedures are here to stay. And we question whether they will heavily impact consumers' purchasing decisions both in the short and long run. Moreover, the pandemic has accelerated the adoption of AI-powered services (Melián-Alzola et al., 2020), and robots in the hospitality industry. As these innovations can reduce the physical interactions between providers and consumers, it is of great interest to understand how this trend will affect consumers' preference towards peer-to-peer accommodation versus traditional businesses.

With the emergence of the pandemic and its relative lockdowns, people started avoiding public transport since they were considered sources of infection (De Vos, 2020; Wen et al., 2021); people started replacing public transport with bike and electric scooter–sharing systems (Agatz et al., 2021; Bergantino et al., 2021; Butler, 2020; Campisi et al., 2020; Chen, 2020; Goldbaum, 2020; Shang et al., 2021; Shokouhyar et al., 2021; Teixeira, & Lopes, 2020). Many daily commuters started to consider owning cars to avoid unnecessary daily contact (Wang & Wells, 2020), while others considered car sharing to avoid crowds in public transport (Molina et al., 2020). Future studies could find out the different travelers' preferences during and after the pandemic, but also whether such preferences were the same for intra-city, inter-city, and international travel where travel bubbles (may) exist. In this regard, it would also be interesting to unravel the leading drivers behind the increasing demand towards bike-sharing systems compared to public transport during and after the pandemic.

The pandemic has moved education from physical classrooms to digital platforms. Online platforms have gained a noticeable increase in their growth due to COVID-19 (Timchenko et al., 2020). Students and teachers have gained more interest in peer-to-peer education platforms (Förster et al., 2020; Hussein et al., 2020; Ionescu et al., 2020; Khan et al., 2021). Since traditional education is defined in terms of place and time, peer-to-peer education can offer barrier-free education and reach isolated locations (Börnert-Ringleb et al., 2021; Osina et al., 2021; Schweiker & Levonis, 2020). Given such motivations, future research could examine long-term students' and teachers' preferences towards these platforms. Moreover, will online platforms replace physical classrooms in the future, or a mixed-mode approach will be used? Will universities and schools become online platforms that connect educators with students? Finally, it would be interesting to investigate whether universities will collaborate more often with experienced online education platforms, such as Coursera, to train their employees to improve their skills on the use of digital platforms.

Research Gaps and Directions on Competitive Issues Between Sharing Economy and Traditional Businesses

In this section, we closely examine how the sharing economy platforms and traditional businesses, interacting with each other, are responding to the financial crisis induced by the COVID-19 pandemic. In Table 3, we illustrate some important research gaps regarding the sharing of the economy's future developments and the competitive interactions between sharing economy platforms and traditional businesses.

Airbnb has introduced its new service "Airbnb online experiences" during the pandemic (Cenni & Vásquez, 2021; Lim et al., 2021). This raises the relevant question of whether the tourism industry with its various actors and Airbnb will collaborate to create the *virtual tourism industry* in the future. More intuitively, it would be important to understand whether after the pandemic, in light of the changes in consumer behavior, the sharing economy in the tourism industry (e.g., Airbnb) will remain a dangerous threat to traditional businesses, such as hotels, and which competitive trends between new entrants (i.e., sharing economy players) and incumbents (i.e., hotels) will be observed. In other words, will the sharing economy survive and prevail over traditional businesses or will we witness a return to the past where only incumbents will have a non-negligible role?

The pandemic had different impacts on several sharing mobility operators. For instance, car-sharing demand has suffered during the pandemic (Hossain, 2021; Liu et al., 2021; Roblek et al., 2021), with many consumers thinking about owning a car to avoid contact (Wang & Wells, 2020). Similarly, ride hailing, car pooling, and public transport demand have plummeted, with public transport having the most dramatic repercussions (Batool et al., 2020; Zhu & Liu, 2021; Molina et al., 2020; De Vos, 2020; Shokouhyar et al., 2021; Wen et al., 2021). This has not been the case for bike and electric scooters sharing operators, which have displayed an increase in demand (Agatz et al., 2021; Bergantino et al., 2021; Butler, 2020; Campisi et al., 2020; Chen, 2020; Goldbaum, 2020; Shang et al., 2021; Teixeira, & Lopes, 2020). Future research could investigate whether the growing trend of micro-mobility services will continue in the long run and replace public transport systems and other traditional transport systems. Moreover, it is important to study whether public transportation services will maintain or change their structure to compete with micro-mobility services and recover from the consequences of the pandemic. Another relevant issue is to examine the economic impact of the evolution of the sharing economy on vehicle manufacturers. In particular, if the sharing economy will remain in the market and continue to grow after the pandemic, what would be the profitability consequences for vehicle manufacturers? From the extant analytical literature, we know that the presence of sharing economy has a non-trivial effect on vehicle manufacturers' profits (Jiang & Tian, 2018; Tian & Jiang, 2018), but it is unclear whether the effects of the pandemic will change such effect. In this regard, an empirical investigation, before and after the pandemic, will be of clear relevance.

People have relied on delivery services to receive their groceries, food, and medicine during the pandemic, since some people were in quarantine and self-isolation when lockdowns were mandated in many countries (Howley, 2020; Li et al., 2020a; Wang & Wells, 2020). For instance, the demand for delivery services such as Uber

Table 3 Future research directions regarding competitive issues between sharing economy and traditional businesses

Related literature	Research direction	Research questions
Lim et al., 2021; Cenni & Vásquez, 2021; Gerwe, 2021; Zhu & Cheng, 2021, Norum & Polson, 2021; Vinod & Sharma, 2021	Cooperation or competition between peer-to-peer platforms and the tourism industry.	• Will the tourism industry collaborate with peer-to-peer platforms (such as Airbnb) to create the virtual tourism industry? • In light of the changes in consumer behavior will peer-to-peer accommodation survive and prevail over traditional businesses, or will we witness a return to the past where only incumbents will have a non-negligible role?
Jiang & Tian, 2018; Tian & Jiang, 2018	Transportation industry future developments and its impact on vehicle manufacturers.	• How will the pandemic shape the non-trivial effect of the sharing economy on car manufacturers' profitability?
Teixeira, & Lopes, 2020; Butler, 2020; Chen, 2020; Goldbaum, 2020; Campisi et al., 2020; Wang & Wells, 2020; Molina et al., 2020; Batool et al., 2020; Zhu & Liu, 2021; De Vos, 2020; Shokouhyar et al., 2021; Wen et al., 2021; Hossain, 2021; Liu et al., 2021; Roblek et al., 2021; Agatz et al., 2021; Shang et al., 2021; Bergantino et al., 2021; Alharthi et al., 2021; Almannaa et al., 2021	Competition between peer-to-peer micro-mobility services and public transport systems.	• Will the demand increase for peer-to-peer micro-mobility services observed during the pandemic continue in the long run and replace the public transport systems and other traditional transportation systems? • Will public transport systems and other traditional transportation systems maintain or change their current structure to compete with micro-mobility and recover from the pandemic?
Batool et al., 2020; Williams et al., 2020; Wang & Wells, 2020; Buchwald, 2020; De Vos, 2020; Howley, 2020; Li et al., 2020a; Howley, 2020; Raj et al., 2020; Yang et al., 2020; Shankar et al., 2020; Kim et al., 2021; Shokouhyar et al., 2021; Belanche et al., 2021; Chen McCain et al., 2021; Belarmino et al., 2021a, b	The future of delivery service platforms and their relationships with different types of restaurants and food service providers.	• Given the increase in demand in the delivery industry during the pandemic, will the peer-to-peer sharing mobility platforms and traditional businesses add delivery services to their business models? And how will they compete with these added features? • Has the COVID-19 pandemic deteriorated the delivery service quality? Will this deterioration remain in the near future? • Will delivery platforms using riders to deliver products survive or co-exist with drone delivery services? • Will the growth of delivery services provide a competitive advantage to take-away restaurants over full-service restaurants?

Table 3 (continued)

Related literature	Research direction	Research questions
Raj et al., 2020; Brydges et al., 2020; Ankenbauer & Lu, 2020; Timchenko et al., 2020; Börnert-Ringleb et al., 2021; Osina et al., 2021; Lim et al., 2021; Cenni & Vásquez, 2021; Lim et al., 2021; Cenni & Vásquez, 2021; Raghavan et al., 2021	The impacts of COVID-19 digitalized businesses on the sharing economy and traditional businesses.	• How will the digital entry of offline businesses due to COVID-19 impact traditional businesses as well as sharing economy platforms in the context of hospitality, food delivery, culture, and entertainment?
Trisnowati et al., 2020; Tran, 2021; Valdez-Juárez et al., 2021	Impact of sharing economy platforms on traditional distribution channels.	• After the pandemic, will sharing economy platforms serve as a dominant distribution channel for all industries where they have emerged? Will traditional distribution channels survive the pandemic?
Umar et al., 2020; Batool et al., 2020; Kylili et al., 2020; Hudek et al., 2021	The relationship between landlords, construction companies, freelancing, and remote working during the COVID-19 pandemic.	• How will the emergence of remote working and freelancing during the pandemic impact the trends in the demand for real estate for commercial purposes?
Brydges et al., 2020; Lee et al., 2021	The relationship between fashion rental platforms and clothing manufacturers.	• In light of the changes in consumers' behavior after the pandemic, what will the evolution of fashion rental platforms be? • If the fashion rental platforms will survive the pandemic and continue to grow after the pandemic, what would be the profitability consequences for clothing manufacturers?

Eats has increased during the pandemic (Batool et al., 2020; Belanche et al., 2021; Shankar et al., 2020; Williams et al., 2020). Given such demand increase, future research could examine whether sharing mobility operators and traditional businesses are adapting their business model to add delivery services and how they will compete with these added features (Buchwald, 2020; De Vos, 2020; Howley, 2020; Li et al., 2020a; Shokouhyar et al., 2021). Moreover, further research is needed to examine whether delivery platforms, such as Uber Eats, will be able to survive and co-exist with the novel drone delivery services that are gaining more interest since they reduce contacts. Also, it would be interesting to investigate whether the growth of delivery services will provide a competitive advantage to take-away restaurants over full-service restaurants. Indeed, during lockdowns, small restaurants and take-away restaurants have shown better resilience compared to full-service restaurants (Kim et al., 2021; Raj et al., 2020; Yang et al., 2020). Furthermore, we wonder whether the COVID-19 pandemic has caused delivery services to have a deterioration in service quality, which will remain in the post-COVID-19 era.

The pandemic has highlighted the competitive advantage of digital platforms to ensure better resilience during crisis times and provide continuous access to final consumers (Raj et al., 2020). In fact, many theaters (Ankenbauer & Lu, 2020), tour guides (Cenni & Vásquez, 2021; Lim et al., 2021), healthcare providers (Raghavan et al., 2021), fashion retail stores (Brydges et al., 2020), and universities and schools (Börnert-Ringleb et al., 2021; Osina et al., 2021; Timchenko et al., 2020) have digitalized their services. But also, small businesses have manifested their interest towards increasing their digital presence. Future research should investigate how the digital entry of offline businesses due to COVID-19 will impact traditional businesses and sharing economy platforms. Will small tourism businesses that digitalize their business model impact sharing economy platforms such as Airbnb? Will restaurants implement delivery services on their own (perhaps through consortia or cooperatives) to compete with food delivery service platforms, such as Uber Eats? In the same vein, will the entrance of theaters and cultural entities into the virtual tours and online entertainment markets affect Airbnb online experiences, YouTube, and other online entertainment platforms? Furthermore, given that sharing economy platforms have gained consumers' interest during the pandemic (Trisnowati et al., 2020) since they were regarded as the safest option (Tran, 2021; Valdez-Juárez et al., 2021), will traditional distribution channels survive the pandemic? Will online platforms serve as the main distribution channel in all the industries where they have emerged?

Work offices have been abandoned due to the pandemic with many firms switching to remote working (Hudek et al., 2021; Kylili et al., 2020; Martin et al., 2021; Mehari, 2020). Many companies have turned to freelancers to ensure continuity of their services given that freelancers are experienced with remote working (Batool et al., 2020; Umar et al., 2020). It would be interesting to study the impact of the pandemic on the demand for real estate for commercial purposes (e.g., company offices).

The pandemic has magnified several longstanding issues of the fashion rental platforms, such as lack of trust in providers, hygiene, and health risks associated with materials worn close to the skin (Brydges et al., 2020). It would be interesting to examine the economic evolution of fashion rental platforms and their impact on clothing manufacturers. Particularly, the profitability implications of clothing

manufacturers will likely depend on whether and how fashion rental platforms such as Vinted will evolve. As such, an empirical investigation of this issue, before and after the pandemic, is undoubtedly worthwhile.

Research Gaps and Directions on Government Intervention in the Sharing Economy

.A major peculiarity of the COVID-19 pandemic compared to other crises has been the heavy government intervention in different industries and at several levels, such as full lockdowns of businesses and/or restricted opening hours. This section illustrates some relevant future research directions that scholars could consider when examining the role of COVID-19-related government interventions in the context of sharing economy. We summarize them in Table 4.

Governments implemented heavy restrictions on some businesses, while in other cases, restrictions were not applied at all during the pandemic. As we previously discussed in our framework, such decisions were mainly based on the level of physical interaction among people required by the given business activity. For example, the tourism industry was heavily restricted since tourists were seen as a source of infection (Joo et al., 2021). Travelers found themselves struggling with new traveling procedures that were changing rapidly, such as mandatory self-isolation and negative PCR tests. In fact, the COVID-19 pandemic brought the travel industry to a stand-still worldwide (Gretzel et al., 2020; Niewiadomski, 2020; Yu et al., 2020). The extant literature has preliminarily discussed such government regulations, which affected not only the tourism industry (e.g., Airbnb, Withlocals), but also other industries. Nevertheless, further empirical research is needed to study how the pandemic-related regulations will affect in the near future different industries where both sharing economy platforms and traditional businesses operate, as well as whether such effects will be the same for all these industries. Who will benefit more from the direct and indirect consequences of government intervention: sharing economy platforms or traditional businesses?

It is well known that, during the pandemic, governments have changed many regulations in different industries. Food delivery was almost the only legal way during the pandemic to consume restaurants' food (Batool et al., 2020; Belanche et al., 2021; Kim et al., 2021; Williams et al., 2020). Virtual traveling and online entertainment platforms were the only gateway for people living in very infectious zones (Cenni & Vásquez, 2021; Lim et al., 2021). The use of online platforms was the only way during lockdowns to attend schools and universities (Börnert-Ringleb et al., 2021; Mohammadian et al., 2020; Osina et al., 2021). Such government regulations will surely have their repercussions on the long term in each industry where both sharing economy platforms and traditional businesses operate. In fact, it is of interest to examine how the pandemic experience will change future government regulations. For instance, the extant literature has highlighted a tremendous increase in the adoption of digital services in the short term, but will this shift last in the post-pandemic era, in which shape, and to which extent?

Several studies have highlighted the vulnerability of sharing economy service providers (e.g., gig economy workers) during crisis, since most of them were not

Table 4 Future research directions focusing on government intervention in the sharing economy

Related literature	Research dimension	Research question
Niewiadomski, 2020; Gretzel et al., 2020; Yu et al., 2020; Joo et al., 2021	The impact of government regulation during the pandemic on both sharing economy platforms and traditional businesses.	• How will the pandemic-related regulations affect in the near future the different industries where both sharing economy platforms and traditional businesses operate? And will such effect be the same across these industries? • Who will benefit more from government intervention: sharing economy platforms or traditional businesses?
Mohammadian el al., 2020; Batool et al., 2020; Williams et al., 2020; Belanche et al., 2021; Kim et al., 2021; Lim et al., 2021; Cenni & Vásquez, 2021; Börnert-Ringleb et al., 2021; Osina et al., 2021	Future government regulations in the post-pandemic period.	• How will the pandemic change future government regulations (e.g., spanning from health safety to digitalization) in the pos- COVID-19 period?
Boros et al., 2020; Rani & Dhir, 2020; Katta et al., 2020; Sigala, 2020; Baum et al., 2020; Batool et al., 2020; Chen et al., 2021; Hossain, 2021; Ortiz-Padro et al., 2021; Parwez & Ranjan, 2021; Puram et al., 2021; Allegretti et al., 2021; Umer, 2021; Tashiro & Choi, 2021; Mojumder et al., 2021	Government intervention to protect sharing economy service providers.	• How will governments protect sharing economy service providers (hosts, riders, drivers, etc.…) and provide them with more job stability? • Since traditional businesses tend to provide more job stability to their employees as compared with sharing economy platforms, will the former gain supporting policies favoring them over the latter?
Brydges et al., 2020; Paștiu et al., 2020; Shokouhyar et al., 2021; Tran, 2021; Valdez-Juárez et al., 2021	Government interventions to regain consumers' trust.	• How will governments intervene to help sharing economy platforms and traditional businesses recover consumers' trust (e.g., in the travel industry)?

covered when booking cancellations occurred nor they had health insurance to protect them in case they got infected (Batool et al., 2020; Rani & Dhir, 2020; Sigala, 2020; Baum et al., 2020; Hossain, 2021; Chen et al., 2021; Ortiz-Padro et al., 2021). Given such vulnerabilities, future research could investigate how governments will protect sharing economy service providers and guarantee them more job stability. For instance, will they force sharing economy platforms to consider their service providers as employees rather than independent contractors (Katta et al., 2020)? Moreover, given that traditional businesses provide more job stability compared to sharing economy platforms (Boros et al., 2020), will traditional businesses gain supporting policies favoring them over sharing economy platforms?

During the pandemic, final consumers have been experiencing different trust issues (Brydges et al., 2020; Shokouhyar et al., 2021; Tran, 2021; Valdez-Juárez et al., 2021). Thus, an essential driver for an economic rebound in the post-COVID-19 period is regaining customers' trust (Paștiu et al., 2020). After the pandemic, what kind of mechanisms will governments adopt to help sharing economy platforms and traditional businesses recover their trust?

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