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ARTICLE

COVID-19 and short-term housing: economic and social impacts and implications

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Abstract
The rapid spread of the new coronavirus (COVID-19) around the world since early 2020 has caused significant economic, social, psychological, and public health costs. The COVID-19 pandemic hit almost all economic sectors including the hospitality and tourism industry. This review paper examined the impacts of COVID-19 on short-term housing and the factors influencing these impacts. The existing literature reported generally negative effects of COVID-19 on the operating performance of the short-term accommodation industry. COVID-19 impacted on travellers' perceptions, host-guest interactions and psychological well-being when choosing short-term accommodation. This review also provides implications for minimising the impacts of COVID-19 or similar future disruptive events on short-term accommodation operations and surviving the crisis in the short-term accommodation sector.

Keywords COVID-19 · Short-term housing · Economic impacts · Social impacts · Airbnb

1 Introduction

Short-term housing, also called short-term rental or short-term living accommodation, is a viable option for travellers in need of accommodation as a temporary living place. By offering similar benefits to extended hotel stays, short-term housing normally is more affordable, unique and flexible, allowing travellers to choose from many different living options e.g. apartments, units, townhouses and houses (either single rooms or whole properties), services, facilities and amenities according to their needs. Short-term housing may include

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vacation rental, short-term accommodation rental (including Airbnb), and home-based accommodation.

In recent years, short-term housing options, particularly Airbnb, have developed rapidly. There are nearly 5 million Airbnb listings in over 190 countries, and this has challenged traditional economies in many countries in the world (Pforr et al., 2021). Paid peer-to-peer (P2P) models such as Airbnb have been criticised for threatening the traditional hotel industry by stealing potential customers and market share, adopting innovative ways to access services, and offering customers special experiences, competitive prices and enhanced social and physical interactions (Bresciani et al., 2021).

The rapid spreading of the new coronavirus (COVID-19) around the world since early 2020 has led to devastating social, economic and urban system impacts, causing significant economic, social, psychological, and public health costs. The COVID-19 pandemic hit almost all economic sectors including the hospitality and tourism industry (Zhang et al., 2021). Short-term rental, despite recent trends in the accommodation sector, was not immune from this crisis and did not escape the impacts of lockdowns, travel bans, border closures, flight cancellations, and quarantine measures implemented by authorities (Liang et al., 2021; Xu et al., 2021). These responses to the crisis made renting an apartment via renting, sharing, and exchanging platforms, e.g. Airbnb and Love-HomeSwap, difficult and even impossible (Farmaki et al., 2020).

The COVID-19 pandemic impacted the short-term housing industry but also influenced the development of large cities with respect to changes in population movements, tourism, and therefore the economy. Prior to COVID-19, tourism was one of the most important sectors in the world economy, contributing to a considerable share of global GDP and over 3 million jobs throughout the world. The COVID-19 pandemic brought a reduction of more than 65% of tourist arrivals globally in the first half of 2020 and threatened 100 million jobs, especially in small- and medium-sized enterprises, including short-term housing businesses. Such contact-intensive services were disproportionately influenced by the COVID-19 pandemic (International Monetary & Fund, 2020). The COVID-19 pandemic also impacted international migration and human mobility. Following a robustly growing trend in migration in the last two decades, from 173 million in 2000 to 281 million in 2020, the growth in the number of international migrants who lived outside their country of origin slowed by 27%, due to COVID-19 (United Nations Department of Economic and Social Affairs, & Population Division, 2020).

Airbnb short-term accommodation bookings experienced a constant decrease nearly to the bottom in the first three months of 2020 compared with one year before because of the COVID-19 pandemic (Jang et al., 2021). In countries like Poland, local restrictions on renting via the platforms, together with travel and movement restrictions, led to significant changes in bookings, a sharp fall in foreign visitors, and a dramatic decrease in demand for short-term accommodation (Kowalczyk-Anioł et al., 2022). Hosts left the short-term accommodation market because of decreased income and reduced rental prices. Cancelled or reduced bookings, additional fees and services and fewer hosts caused massive financial losses for the short-term rental platforms (Kowalczyk-Anioł et al., 2022). Landlords worried about the collapse in tourism shifted their properties to long-term renting, and therefore, the availability of long-term rental properties during the pandemic increased by more than 60% in Dublin, raising the question of how to regulate short-term rental (Scott, 2020).

In the past three years, researchers have explored the impacts of the pandemic on short-term housing from various perspectives e.g. hosts, travellers, policy-makers, short-term accommodation platforms (e.g. Airbnb, Booking.com, and HomeAway), and service providers (e.g. short-term accommodation associations and property management firms). The direct effect of COVID-19 and the subsequent travel restrictions and lockdown policies was the changes in bookings for short-term accommodation (Liang et al., 2021), and accordingly, a change in accommodation prices, occupancy, revenue, supply, demand, and survival rate. These operational performance parameters have been explored by previous researchers. Tourists' short-term accommodation preferences and choices during the pandemic have also been a focus. During the pandemic, tourist decision-making tended to rely on complicated interrelationships among destinations, tourists, and characteristics of the environment (e.g. transport, attractions, safety, and cleanliness) (Jang et al., 2021).

The scale of the disruption caused by the COVID-19 pandemic propelled some to question the survival of the short-term living in the post-pandemic era. Therefore, a thorough investigation to summarise lessons learned would provide important information for the development and resilience of short-term rentals in the future. This paper attempts to address a number of questions. First, to what extent did the pandemic affect short-term housing in world cities? Second, did COVID-19 have similar or different impacts on short-term housing in world cities? Third, what were the factors influencing these impacts? Last, what are the implications for surviving during a crisis such as COVID-19?

Theoretically, this review aims to outline the impacts of COVID-19 on short-term housing and the influencing factors, conceptualise potential adjustments for minimising the impacts in this sector, and offer suggestions for surviving the COVID-19 crisis. Practically, this review aims to help short-term accommodation operators and other stakeholders to develop a better understanding of the broad impact of the pandemic, and provide insights for short-term accommodation stakeholders in creating strategies and formulating appropriate measures in major crises like COVID-19. This paper provides an overview of existing literature on the effects of the COVID-19 crisis on the short-term housing sector. Building on the existing literature, we explore the comprehensive impacts of COVID-19 on short-term housing and the factors influencing these impacts. This review's contributions to developing a comprehensive understanding of the impacts of COVID-19 may lead to improved crisis and disaster management knowledge and skills for the short-term rental industry.

This overview has significant importance. First, while housing can be divided into two segments, i.e. homes for long-term living, and homes for use other than for main residence (e.g. Airbnb rent and investment assets) (Peric et al., 2022), mainstream research has focused on the impacts of the COVID-19 pandemic on housing for long-term living. This overview contributes to a better understanding of the impacts of the COVID-19 pandemic on short-term housing (for both large-scale, e.g. tourism and hospitality industries, and small-scale, e.g. home-based short-term accommodation industries), an area that is receiving increasing research interest. Second, while previous studies investigating the impacts of the COVID-19 pandemic on short-term accommodation seem to focus on the perspective of a certain group of stakeholders while overlooking the perspectives of other groups of stakeholders, this review attempts to provide a balanced perspective by drawing from various stakeholders including hosts, travellers, short-term rental platforms and policy-makers, to fill the gap in the literature. Third, because COVID-19 was previously an unknown virus to scientists, short-term housing hosts, travellers, short-term rental platforms, service providers and policy-makers made decisions very often without any guidance because the disruptions the pandemic crisis brought were unprecedented in modern economic history. This overview, as a summary of the current knowledge of the impacts of COVID-19 on short-term housing and the factors influencing these effects, can offer short-term housing stakeholders worldwide some insights to improve their business performance. The rest of the paper is organised as follows. The methodology of this study is first explained and justified. The overview findings are then presented and discussed, before theoretical and practical implications are drawn and future research directions provided in the conclusions.

2 Methodology

To reach our research goals, the detailed literature overview and analysis are presented based on publications sought from major databases including Google Scholar, Scopus and ScienceDirect. We excluded hotels and extended-stay hotels (which are types of hotels and other properties that specialise in longer stays) in this review. Instead, in our research, any portion (or the whole) of a private house, apartment, townhouse, or other types of private dwelling, as an alternative accommodation option to a hotel room, rented to tourists were considered. This type of living option is attractive to those who pursue home-like environments and personal atmospheres in their short-term living arrangements that are different from what they can obtain in a hotel stay. In addition, this type of living often offers a lower price than traditional hotels. Normally, short-term accommodation is furnished properties that are rented for 90 days or less, and long-term accommodation is properties that have tenants on 6-months or longer leases. The short-term rentals are rented out usually by the day (Shen & Wilkoff, 2022).

This overview searched existing literature using two groups of key words: one group included “short-term housing” and related terms including “short-term accommodation”, “short-term rental”, “sharing accommodation”, “home sharing”, “P2P rental”, “P2P accommodation”, “peer-to-peer rental”, and “peer-to-peer accommodation”, and “Airbnb”; and the other group included “COVID-19” and related terms including “pandemic” and “coronavirus”. We have focused on journal publications for the purpose of this study. These publications include case studies using primary data obtained through surveys or interviews, and analysis based on secondary data e.g. AirDNA data. When selecting publications to be included in this review, we comprehensively considered the following aspects: the relevance to the research questions, the relevance to the research objectives, and the quality of the publications and the journals.

The articles reviewed are shown in Table 1. Most of these publications specifically focus on the impacts on Airbnb, and a few studies investigated short-term rental and home-based accommodation. Some studies focus on the economic (operating performance) and social impacts of the COVID-19 outbreak at a particular time during the pandemic (e.g. March 2020) relative to a time prior to the pandemic (e.g. March 2019). Other studies focus on a particular time period during the pandemic (e.g. March and April of 2020). Some studies examined the physical impacts of COVID-19 on short-term housing, while others focused on the perceived impacts of the COVID-19 pandemic on host practices for short-term accommodation.

Existing literature on the economic and social impacts of COVID-19 is not geographically balanced. Most existing studies were conducted in developed countries, particularly in European countries. Europe was the leader for global tourism, accounting for nearly half of international arrivals worldwide prior to the COVID-19 pandemic (United Nations World Tourism Organization, 2018). Understandably, tourism is a major driver of economic growth and jobs in Europe, and short-term accommodation that has a close relationship with tourism attracted great attention from European researchers. Case studies were conducted at different scales, some focusing on comparison between world cities or regions, some focusing on comparison between two or more countries, some focusing on multiple cities or counties in a country, and some focusing on a single country or city.

A number of studies used primary data collected via survey, interview or laboratory experiment, while others used secondary data from difference sources to conduct the analysis. It is worth noting that with the rapid development of online short-term rental platforms in recent years, a considerable number of studies used secondary data available on these platforms, e.g. Airbnb, Homeaway and Vrbo. Since there are many different user groups of short-term accommodation, there is a considerable amount of data available from the online short-term rental platforms (Liang et al., 2021). Many researchers have indeed used this data as a source for investigating operational performance, and the behaviour and perceptions of tourists. The service providers of short-term rentals include professional and individual providers. Some platforms (e.g. Airbnb and HomeAway) commenced as P2P accommodation providers, and some platforms (e.g. Booking.com) commenced as professional accommodation providers. However, nowadays, all short-term rental platforms offer both P2P and professional accommodation services (Braje et al., 2021).

An analysis of the review themes identified six themes related to the economic impacts of COVID-19 on short-term rentals focusing on operating performance: price, revenue, demand, supply, occupancy and survival rate. The analysis also identified six themes related to social impacts: risk perception, preferences and choices, satisfaction, communication, interaction and psychological well-being. The conceptual framework of this review is shown in Fig. 1.

3 Operating performance

3.1 Price and revenue

Rapid and significant price decreases for short-term accommodation were common across a number of cities worldwide during the COVID-19 pandemic, primarily as a response to decreased demand (Batalha et al., 2022). The Airbnb market in six world cities (Barcelona, Beijing, London, Milan, New York, and Paris) experienced dramatic price decreases (Kourtit et al., 2022). A study of nineteen major European cities found that prices of short-term rental apartments decreased due to COVID-19, with a delay, and lasting for a long time (Guglielminetti et al., 2021).

There are differences regarding price changes between professional and non-professional hosts. For example, in Barcelona, for professionalised supply, the effect was even more dramatic, with prices declining 13.6% for entire flat/house and 9.8% for single rooms. In addition, the minimum rental length (in days) was increased for all types, with profession-

Table 1 Publications reviewed

Reference	Location of Study	Type of Housing	Data type/ Source	Data Time	Impact	Influencing Factor
Batalha et al., 2022	City centre of Lisbon	Short-term rental	Secondary (e.g. SIR and National Short-Term Rental Registry) data	From the third quarter of 2018 to the third quarter of 2020	Operation performance (price and survival)	-
Benítez-Aurioles, 2022	22 cities worldwide	Airbnb	Secondary (Inside Airbnb website) data	Compare February – October 2020 to February – October 2019	Operation performance (price, demand and supply)	Host type (Superhost); property type (entire home vs. other); distance to the city centre; and instant booking option
Bigné et al., 2020	US and Spain	Airbnb	Primary (survey) data	September and October 2020	Preferences and choices (purchase intentions)	Airbnb attributes (e.g. location, price, Anti-COVID-19 protection measures and Airbnb health protocols); attitude towards Airbnb; subjective norm; attitudes towards health and sanitation; and previous use of Airbnb
Boros et al., 2020	15 cities in the world	Airbnb	Secondary (Inside Airbnb website) data	Compare between 2019 and 2020	Operation performance (bookings and occupancy rates)	The evolution of the local pandemic situation; the features of local markets; and the pandemic and economic situations of countries where guests came from
Boto-García, 2022	City of Barcelona	Airbnb	Secondary (Inside Airbnb website) data	From June 2020 to April 2021	Operation performance (price)	Host type (professionals and non-professionals)
Braje et al., 2021	Croatia, Italy, Spain, Turkey and the UK	Short-term rental	Primary (survey) data	From July to September 2020	Preferences and choices (repurchase intention)	Perceived value; authenticity; perceived risk; and trust
Bresciani et al., 2021	A large European university	Airbnb	Primary (laboratory experiment) data	October and November 2020	Accommodation choices	Property type (entire home vs. shared room)
Dogru et al., 2023	49 out of the 50 U.S. states and the District of Columbia	Airbnb	Secondary (e.g. Smith Travel Research (STR), AirDNA, and Centers for Disease Control and Prevention (CDC)) data	From October 2014 to December 2020	Operation performance (occupancy rate, and demand)	Property type (entire home vs. private room and shared room); and policy responses of the government authorities (more restrictive or less restrictive)
Farmaki et al., 2020	Croatia, Cyprus, Greece and Spain	P2P accommodation	Primary (interview) data	From May to June 2020	Operation performance (revenue, bookings, and survival)	Host type (professional hosts)

Table 1 (continued)

Reference	Location of Study	Type of Housing	Data type/ Source	Data Time	Impact	Influencing Factor
Ghaderi et al., 2022	Iran	Home-based accommodation	Primary (interview) data	From early August to December 2020	Risk perceptions	-
Gossen & Reck, 2021	Berlin, Germany	Airbnb	Secondary (Inside Airbnb website) data	From January 2019 to December 2020	Operation performance (survival)	Property type (entire property); long-term options; lockdown and travel restrictions; and unemployment rate
Guglielminetti et al., 2021	19 major European cities located in 15 different countries	Airbnb	Secondary (Inside Airbnb website) data	From April 2018 to September 2020	Operation performance (supply, demand, occupancy, and price)	Infection rates and ICU occupancy
Gyodi, 2022	Nine major EU cities (Amsterdam, Barcelona, Berlin, Lisbon, London, Milan, Paris, Venice and Vienna)	Airbnb	Secondary (Inside Airbnb website) data	From January 2018 to September 2020	Operation performance (price, demand and supply)	-
Hesse & Vilchez, 2022	Barcelona, Spain	Airbnb and Homeaway	Secondary (AirDNA) data	Compare January 2018 – March 2020 (pre-pandemic) and April 2020 – January 2021 (pandemic)	Operation performance (revenue, occupancy rate, and price)	Host type (Professional host vs. non-professional host); property type (entire unit vs. single room)
Hidalgo et al., 2022	Madrid, Spain	Airbnb	Secondary (Inside Airbnb website) data	August 2019 and August 2020	Preferences	Size; and kitchen amenities
Hossain, 2021	A global study	Airbnb	Secondary (articles in newspapers and the popular press, blog posts, and video clips) data	March and April of 2020	Economic and social impact (booking cancellations, job losses and salary cuts, social distancing and safety, and anxiety)	-
Jang & Kim, 2022	Florida counties	Airbnb	Secondary (e.g. AirDNA) data	Compare March 2020 (pandemic) to March 2019 (pre-pandemic)	Operation performance (revenue and bookings)	Leisure and hospitality clusters and three resilience resources (social, community capital, and environmental); and destination-related factors (e.g. urban vs. rural)

Table 1 (continued)

Reference	Location of Study	Type of Housing	Data type/ Source	Data Time	Impact	Influencing Factor
Jang et al., 2021	Florida counties	Airbnb	Secondary (e.g. AirDNA) and primary (experiment) data	Compare April 2020 (pandemic) to April 2019 (pre-pandemic)	Operation performance (revenue) Choices	Tourism clusters; past Airbnb average daily rate; ethnic diversity; destination-related factors (e.g. urban vs. rural); destination attributes (i.e. tourism clusters, airport distance, and food safety violation) Purpose of the trip (e.g. business vs. leisure)
Jiang et al., 2022	A university in the Southwest US	Airbnb	Primary (survey) data	Compare October 2021 (peri-pandemic) to April 2019 (pre-pandemic)	Satisfaction and re-purchase intention	Functional, social, emotional, epistemic, and conditional motivators
Kadi et al., 2020	Four large Austrian cities (Vienna, Graz, Innsbruck, and Salzburg)	Airbnb	Secondary (two of the largest online platforms) data	45 days starting on 31 March 2020	Operation performance (supply and price)	-
Kiczmachowska, 2022	Warsaw and Krakow, Poland	Airbnb	Secondary (AirDNA) data	Two periods: March 2019 – February 2020 (pre-pandemic) and March 2020 – February 2021 (pandemic)	Operation performance (revenue and occupancy rate, Average Rental Revenue per occupied (ADR), and survival)	Host type (professional hosts vs. non-professional hosts); property type (entire home vs. other); and government policies
Kim et al., 2022	US	Airbnb	Primary (laboratory experiment) data	From April 2020	Preferences and choices	Room cleanliness
Kourtit et al., 2022	Barcelona, Beijing, London, Milan, New York, and Paris	Airbnb	Secondary (Inside Airbnb website, viz. GaWC, and GPCI) data	Compare 2021, 2020 and 2019, from January to August	Operation performance (supply, bookings, occupancy rates, and survival rate)	Host type (professional Airbnb hosts); room type; number of reviews per room; frequent use of hosts' restrictions regarding the minimum nights of stay; centrality; proximity to desired amenities; and luxury and budget Airbnb segments.
Kowalczyk-Anioł et al., 2022	14 cities in Poland	Airbnb and Vrbo	Secondary (AirDNA) data	From January 2019 to January 2022	Operation performance (supply)	Property type (entire home and private room rentals); and pandemic restrictions

Table 1 (continued)

Reference	Location of Study	Type of Housing	Data type/ Source	Data Time	Impact	Influencing Factor
Lee & Deale, 2021	-	Airbnb	Primary (survey) data	Compare March of 2020 (peri-pandemic) to February of 2017 (pre-pandemic)	Risk perceptions	Type of tourist (more concerned respondents vs. less concerned respondents); and usage experience
Liang et al., 2021	12 highly internationalised megacities across Asia, Europe, America, and Oceania: Barcelona (Spain), Beijing (China), Berlin (Germany), Copenhagen (Denmark), London (United Kingdom), New York City (US), Paris (France), Rio de Janeiro (Brazil), Rome (Italy), Singapore (Singapore), Sydney (Australia) and Vancouver (Canada)	Airbnb	Secondary (Inside Airbnb website) data	Three-year period (2018, 2019, and 2020)	Operation performance (demand)	Location (densely populated urban centres)
Luca et al., 2022	New York City, US	Airbnb	Secondary (Inside Airbnb website) data	From January 2019 to November 2020	Equity (discrimination)	Platform design choices
Pawlicz et al., 2022	10 Croatian counties, Croatia	P2P accommodation	Primary (survey) data	From July to September 2020	Satisfaction	Host service quality; and facility service quality
Perez-Rodriguez & Hernandez, 2022	The Canary Islands, Spain	Airbnb	Secondary (a database from Airbnb listings) data	From January 2019 to September 2020	Operation performance (revenue)	Host type (Professional host vs. non-professional host); property type (house, apartment, townhouse etc.)

Table 1 (continued)

Reference	Location of Study	Type of Housing	Data type/ Source	Data Time	Impact	Influencing Factor
Petruzzi & Marques, 2022	Multiple countries	P2P accommodation	Primary (survey) data	From July to September 2020	Risk perceptions	Type of tourist (concerned, indifferent, forewarned, and confident)
Romano, 2021	Four Italian cities: Florence, Milan, Rome, and Naples.	Airbnb	Secondary (Inside Airbnb website) data	Compare August 2020 (pandemic) to August 2019 (pre-pandemic)	Operation performance (property supply and demand)	Location (central vs. peripheral areas); and lockdown measures and mobility restrictions adopted
Sainaghi & Chica-Olmo, 2022	Milan, Italy	Airbnb	Secondary (e.g. AirDNA) data	Compare March 2021 (pandemic) to January 2020 (pre-pandemic)	Operation performance (revenue per available room)	Non-locational factors (the cleaning fee, size, centrality, cancellation policy, and professional hosts); and location factors (distance to commercial activities, and availability of transportation systems near each Airbnb listing)
Shen & Wilkoff, 2022	Austin, Texas, USA	Airbnb	Secondary (Inside Airbnb website) data	From July 2018 to July 2020	Operation performance (income, occupancy, and price)	Perceived cleanliness
Shi et al., 2022	Multiple cities, China	P2P accommodation	Primary (interview) data	From April 2021 to July 2021, and in April 2022	Host-guest interaction	Guests' internal psychological capital (e.g. confidence, hope, optimism and resilience); and guests' perceptions of the hygienic attributes of P2P accommodation during their stays
Sthapit et al., 2022	-	Airbnb	Secondary (consumers' reviews from trustpilot.com) data	From February to August 2020	Satisfaction	Friendly host behaviour; communication between host and guest; deception; lack of motivation to help; and dissatisfactory customer service of Airbnb
Türk & Sap, 2021	Istanbul, Turkey	Airbnb	Secondary (Inside Airbnb website) data	From January to October 2020	Operation performance (survival rates)	Property type (entire apartments vs. private rooms); host type (professional host); number of reviews; location (e.g. natural amenities, densely populated location, and proximity to hospitals)
Xu et al., 2021	Multiple cities, China	P2P accommodation	Primary (interview) data	From June to August 2020	Social impact (health and well-being)	Economic stressors, uncertainty, operation-related stressors and social stressors

Table 1 (continued)

Reference	Location of Study	Type of Housing	Data type/ Source	Data Time	Impact	Influencing Factor
Zhang & Tang, 2021	Guangzhou, China	Homestay	Primary (survey) data	From 15 to 30 March 2021	Risk perception	Emotional solidarity (emotional closeness with hosts, feeling welcome, and sympathetic understanding from hosts); and pandemic situation

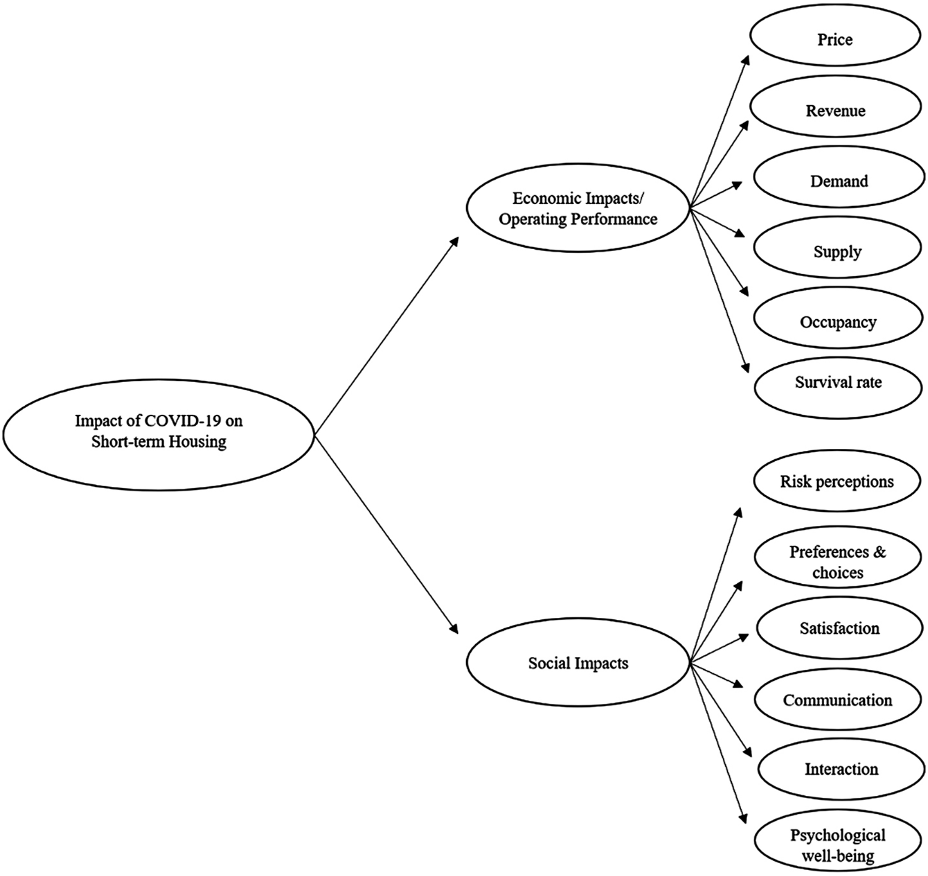

Fig. 1 Conceptual framework

alised accommodations increasing the most (Hesse & Vilchez, 2022). This is consistent with another study in the same city that found Airbnb hosts significantly decreased prices, and professional hosts decreased prices even more, particularly during the worst months of the pandemic. Driven by income, professional hosts were less willing to see vacant rooms, so they reduced prices to increase demand. Once the epidemiological circumstances improved and mobility restrictions had almost ended, professional hosts reacted more quickly and increased property prices (Boto-García, 2022). With regard to superhost (top-rated, most experienced hosts on Airbnb) and instant booking, an examination of twenty-two cities worldwide found that their influence on the prices was altered due to the impacts of the epidemic (Benítez-Aurioles, 2022).

In addition, there are differences regarding price changes between luxury and budget Airbnb segments. An international case study of Airbnb in six world cities revealed that the luxury segment appeared to return to normal price elasticities following relaxation of restrictive policies. Luxury Airbnb segments seemed to be more resilient to the ongoing pandemic shocks (Kourtit et al., 2022). Moreover, there are differences regarding price changes between entire properties and single rooms. For example, in Barcelona, the prices of Airbnb and Homeaway entire flats/houses decreased by 11.3% on average, and for single rooms the decrease was 4.7% during the pandemic (Hesse & Vilchez, 2022). A study in nine major EU cities revealed that, although Airbnb prices were reduced during the pandemic, the decrease was significantly less than for the hotels (Gyodi, 2022).

Regarding the revenue of Airbnb properties, a significant decrease was seen in two Polish cities due to the pandemic. However, professional hosts and properties providing less social contact had lower decreases in revenue (Kiczmachowska, 2022). This is inconsistent with a study in the Canary Islands, Spain by Perez-Rodriguez and Hernandez (2022) that, compared with properties managed by professional hosts, those managed by individual hosts were more technically efficient (thus optimising revenues). In addition to the type of host, type of Airbnb lodging was also an influencing factor for revenue. This study also found that the lowest priced properties were the most efficient accommodation type (Perez-Rodriguez & Hernandez, 2022).

Spatial differences in property revenue during COVID pandemic was a research focus. In Florida counties during the pandemic, the effects of leisure and hospitality clusters and three resilience resources on Airbnb revenue were spatially heterogeneous. Leisure clusters and social resilience negatively affected Airbnb revenue, and social resilience reduced the negative influence of hospitality clusters on Airbnb revenue. Compared with Airbnb listings in urban counties, the impacts of COVID-19 on those in rural counties with leisure and hospitality clusters were less significant (Jang & Kim, 2022). A US study identified spatially heterogeneous effects of COVID-19 on destinations (i.e. urban and rural counties) and destination attributes (e.g. tourism clusters) on Airbnb revenue performance across sixty-seven Floridian counties. Compared with northern areas that are mainly rural with more affordable Airbnb accommodations and less minority populations, southern areas that are mainly urban with more high-priced accommodation and more non-white Americans were less disrupted by the pandemic. Tourism clusters were found to be negatively associated with the growth rate of Airbnb revenue during the COVID-19 pandemic. Ethnic diversity and past Airbnb average daily rate were positively associated (Jang et al., 2021).

In Travis County Austin, Texas in the US, when the pandemic hit, available Airbnb listings decreased by 25%. For those that remained, there were decreases of 22% in income and 20% in occupancy. However, properties with clean perceptions had increases of 17.5% in income and 16.5% in occupancy. Since no increase was seen in rental prices of clean Airbnb properties during the COVID-19 period, the increase in income was attributed to the increase in occupancy (Shen & Wilkoff, 2022). In Milan, Italy, the mean revenue per available room, another key parameter for measuring operating performance, decreased 35% in the 14 months following January 2020 (Sainaghi & Chica-Olmo, 2022). Regarding influencing factors of the mean revenue per available room, compared with the pre-COVID-19 era, during the COVID-19 pandemic the positive influence of cleaning fees on the mean revenue per available room of Airbnb listings was greater; the positive influence of size was less; the positive influence of centrality was less; the positive influence of the cancellation policy was greater; and the positive influence of the superhost badge was greater (Sainaghi & Chica-Olmo, 2022).

3.2 Demand, supply, occupancy and survival rate

Existing literature also examined the impact of COVID-19 on short-term accommodation from a demand and supply perspective, including survival rates. Generally speaking, the number of Airbnb listings, Airbnb booking rates, and the occupancy rate declined.

Airbnb listings in most Florida counties in the US experienced a decline, and Airbnb businesses in Florida were adversely affected in the early stage (March 2020) of the COVID-19 outbreak (Jang & Kim, 2022). In nine major EU cities, compared with pre-COVID levels, the average number of Airbnb listings decreased by over 15% during the pandemic (Gyodi, 2022).

An examination of twenty-two cities worldwide found that in addition to a decrease in Airbnb accommodation supply, the pandemic caused a dramatic decrease in demand in all cities in the study (Benítez-Aurioles, 2022). In Italy, a significant decrease in Airbnb bookings was seen between 2019 and 2020. The decrease was extremely high in some areas (e.g. Sicily, Campania, Apulia, Sardinia, Abruzzo), up to -87%, and very considerable in the other areas of Italy (from −57% to -67%). Only a few peripheral and scattered areas had an increase in Airbnb booking (Romano, 2021). A study of four European countries (Croatia, Cyprus, Greece and Spain) implied that a high share of bookings of tourism cities came from foreigners who were unable to fly to their tourist destinations. Bookings were cancelled and requests to book properties stopped. Except a small number of booking requests from local people, hosting for all others was decreased to zero (Farmaki et al., 2020). This is consistent with a study of nineteen major European cities located in fifteen different countries that found that COVID-19 significantly reduced both the supply and the demand of short-term rental apartments. The impact of COVID-19 was persistent and had containment effects on consumers' behaviour. Shortages in demand had the potential to overcome the decreased supply (Guglielminetti et al., 2021).

After examining six world cities, Kourtit et al. (2022) found that the average Airbnb booking rates in individual cities decreased by 40% to nearly 100% from January to August in 2019–2020, compared with one year before. In Milan and Beijing, the significant drops were largely due to travel bans and lockdowns, and Airbnb businesses decreased to no bookings by March 2020. In May and June 2020, some early recovery was seen in Beijing and London, indicating that hosts in Beijing and London were on track to be back in the marketplace after the first wave of COVID-19. In comparison, in other cities, most hosts withdrew their properties from the platform due to the pandemic in 2021. Liang et al. (2021) analysed the impact of COVID-19 on vacation rentals in twelve highly internationalised megacities in the world. The booking rates declined to different levels because of the epidemic, except in Beijing where the landlords removed their properties from the market, resulting in an extremely high unavailability rate. There was a reduced share of foreign tourists in all tourists visited these cities. The accommodation reservations were spatially sub-urbanised (Liang et al., 2021). A study in Warsaw and Krakow, Poland, found that the occupancy rate and number of active Airbnb properties reduced 41.3% and 20.4% respectively during COVID-19 pandemic compared to the pre-COVID-19 era (Kiczmachowska, 2022).

Although Airbnb hosts were confronted with the same challenges of demand shortfalls as hotels, a higher share of short-term rentals became inactive compared with hotels, indicating a greater elasticity of short-term rental supply. Many hosts withdrew properties from short-term accommodation market, and shifted the use of their properties to long-term rental.

There was an increase in the role of longer stays. However, a shift towards the use of the properties for quarantine or home-office purposes was not found (Gyodi, 2022). In the city centre of Lisbon with intense tourist activities, landlords relocated their short-term rental properties into the long-term rental market, with the number of long-term rentals increasing 20% and their properties' prices decreasing 4.1%. In comparison, no significant impact was found on the number of properties on the market for sale, and a gradually and increasingly negative impact of 4.8% was found on sale prices, suggesting stronger effects in the rental market than in the sales market. This corresponded with a shift that was free of cost of the properties between the short and the long-term rental markets for the landlords (Batalha et al., 2022). In Austria, holiday homes returning to the long-term rental market were seen in all four Austrian cities (Vienna, Graz, Innsbruck, and Salzburg) considered in the study. No evidence was found that the increased rental supply decreased rent levels (Kadi et al., 2020).

Some studies did not find a statistically significant impact of the COVID-19 pandemic on the bookings of Airbnb properties generally (e.g. Dogru et al., 2023). However, the impacts of the COVID-19 pandemic varied across different Airbnb property types. The COVID-19 pandemic did not adversely affect bookings of entire Airbnb properties, but caused significant decreases in bookings of private rooms and shared rooms in forty-nine US states and the District of Columbia. The reason may be that entire Airbnb properties which facilitated social distancing during the pandemic were preferred by guests, and a private room or shared room in Airbnb properties that might increase the potential of infection and interaction with other guests made guests less comfortable (Dogru et al., 2023). The findings are consistent with another study which indicated that entire apartments had higher chances of survival compared with private and shared rooms during the pandemic (Kourtit et al., 2022).

Gossen and Reck (2021) analysed the shared-housing market in 2019 and 2020 in Berlin, German, and found that hosts relocated their properties from short-term to long-term markets and rented comparatively more entire apartments than shared properties during the pandemic, compared with the pre-pandemic era. Hosts who rented entire apartments on a long-term basis were more likely to stay in the market. This is consistent with a case study of fourteen Polish cities that found the previously high share values of entire property rentals (more than 80% in most cities) in Airbnb and Vrbo increased or remained unchanged from September 2019 to September 2021 in almost all cities, except for two cities that recorded a very small decline. In comparison, the percentages of private rooms (that represented 10-25% of total active rentals) decreased in most cities, except for three (Kowalczyk-Anioł et al., 2022).

In addition to the influence of property type, the locational and physical characteristics of properties in cities affected the likelihood of survival of the properties on the platform (e.g. Airbnb). Romano (2021) examined four Italian cities and found that the decline was more evident in the central areas where an increase in short-term rental supply was experienced in recent years. There were small areas with a growth in short-term rental supply, and they were more scattered, less spatially clustered and peripherally located (Romano, 2021). Liang et al. (2021) analysed the impact of COVID-19 on vacation rentals in twelve highly internationalised megacities. The spatial distribution of Airbnb reservations appeared to be suburbanised. Suburbs instead of central areas were preferred by tourists when selecting destinations. This is consistent with another study of six world cities that found a clear degree of city-level variation in the effect of COVID-19 (Kourtit et al., 2022). The spatial heterogeneity at the city level between city centres and periphery may be due to the low population density or the availability of isolated accommodation in the peripheral locations. Airbnb accommodations in inner cities with high density were less attractive during the pandemic. As a result, listings located in central areas had lower likelihood of survival due to an actual or perceived lower level of health and safety compared with those located far from the city centres in 2020. However, in 2021, except in Milan and Beijing, centrality did not appear to be a significant determinant of the probability of survival (Kourtit et al., 2022).

The probability of remaining in the platform increased if short-term rentals were located near natural amenities. The natural amenities became significant determinants of the likelihood of survival on the platform during the pandemic, reflecting guests' preference for isolated locations instead of locations with high population density (Türk & Sap, 2021). Moreover, the proximity of touristic attractions increased the level of vulnerability of Airbnb listings in New York, Beijing and Paris, while it decreased the vulnerability level in Milan and Barcelona in 2020 and 2021, despite the spatial distribution of touristic attractions varying considerably in different cities (Kourtit et al., 2022). In Istanbul, proximity to previously attractive amenities such as public transport, shopping centres and tourist attraction sites did not increase the likelihood of survival of the listings during the pandemic but potentially increased the level of vulnerability (Türk & Sap, 2021). Perhaps unsurprisingly, proximity to hospitals decreased the probability of survival. This might have been associated with psychological worries about being near hospitals due to the risk of infectious disease (Türk & Sap, 2021).

The type of hosts affected COVID-19's impacts. Properties managed by professional hosts (hosts with multiple listings) with less social contact opportunities experienced lower decreases in occupancy rate, and a higher proportion of these properties survived one year after the outbreak of coronavirus (Kiczmachowska, 2022). This is consistent with another study of six world major cities that found the number of Airbnb listings per host (representing hosts' experience and expertise on Airbnb) was significantly and positively associated with remaining on the listings in the platform in 2020. Professional hosts were believed to use more effective pricing strategies and yield higher revenues per room (Kourtit et al., 2022). Farmaki et al. (2020) argued that professional hosts whose main source of income was hosting suffered the most significant impact. Although, generally speaking, hosts experienced hardship in repaying mortgages, paying rent, and paying maintenance fees because of booking declines, professional hosts even suffered from loss of ability to pay salaries to cleaning staff and other operational expenses.

The evolution of the local pandemic situation was found to have the greatest influence on bookings and occupancy rates. In addition, the features of local markets and the pandemic and economic situations of countries where guests came from also had substantial impact on bookings and cancellations (Boros et al., 2020). COVID-19 infection rates and ICU occupancy together strongly influence the demand for vacation rentals in 19 major European cities during the pandemic (Guglielminetti et al., 2021). Regarding the impacts of the policy responses of government authorities, regardless of the degree of restrictions imposed to contain the COVID-19 pandemic across states in the US, there were no adverse impacts on Airbnb property occupancies. This might indicate that travellers stayed in Airbnb properties during the pandemic, or privately owned Airbnb properties might not have applied the same restrictions as commercially operated hotels. Airbnb properties appeared to be more resilient to the COVID-19 pandemic across states regardless of the levels of restrictions (Dogru et al., 2023). Liang et al. (2021) found that vacation rentals in all twelve highly internationalised megacities in the study were adversely affected by COVID-19. The specific time of the impact was related to the time when the pandemic breakout occurred, and the time when lockdown policies and border restrictions were implemented. Figure 2 shows the impacts of COVID-19 on the operating performance of short-term accommodation and the factors influencing these impacts.

4 Perceptions, interactions and psychological well-being

4.1 Travellers' risk perceptions, preferences and satisfaction

4.1.1 Travellers' risk perceptions

Risk perceptions of tourists at their trip destinations provide important implications for hospitality and tourism industry practitioners, and this is becoming of unparalleled concern since the pandemic (Zhang & Tang, 2021). Due to the pandemic, the importance of cleanliness, sanitation and hygiene to people increased when selecting short-term accommodation. COVID-19 impacted on people's perception of risks associated with using short-term accommodation across various dimensions such as destination, social, physical, financial, psychological, behaviour, performance and convenience factors (Jang et al., 2021; Lee & Deale, 2021).

In urban areas, due to high population density and therefore the difficulty of social distancing, destination-related risks were higher than for rural areas. Destination-specific risks are difficult to control proactively, and the impacts of these risks varied depending on the nature of the risks and their levels of intensity or severity. In addition, perceptions of personal and behaviour-related risks that are linked to tourists' physical conditions and trip purpose tended to affect tourists' preferences and destination choices during the pandemic (Jang et al., 2021). A US study found that Airbnb guests changed their perceptions of risks associated with staying at sharing accommodations before and during the pandemic, and their perceptions of physical, social, convenience, and performance risks increased during the pandemic. Among different types of risks, social risk perceptions increased more dramatically than perceptions of other types of risks. Guests might have been anxious

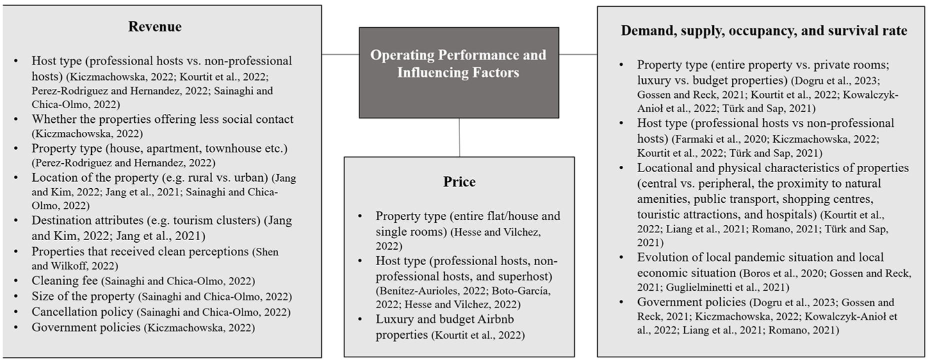

Fig. 2 Impacts of COVID-19 on the operating performance of short-term accommodation and the factors influencing these impacts (compiled by authors)

about disappointing a host if they were dissatisfied with the cleanliness of the properties or cancelled their stays. They might also have worried that if things went wrong when they checked out, there might be no one to help on site, indicating that insufficient service may cause an issue (Lee & Deale, 2021).

Regarding the influencing factors of risk perceptions, a US study found that people with higher levels of awareness of the pandemic (e.g. anxiety and concern) changed their risk perceptions more significantly. Moreover, whether or not people had usage experience of sharing lodging services impacted on changes in risk perception (Lee & Deale, 2021). Tourists' perceived risk was found to be negatively associated with emotional solidarity including emotional closeness with hosts, feeling welcome, and sympathetic understanding from hosts. The lower the risk that tourists perceived, the higher the possibility that they felt welcome, and felt closeness and togetherness with and a mutual understanding of their hosts. Significantly and positively impacting on customer loyalty, emotional solidarity played a role in partially mediating the relationship between perceived risks and customer loyalty (Zhang & Tang, 2021).

Safety perceptions of different types of tourists vary. An international study of multiple countries examined the perceptions of safe practices, namely information and hygiene, and protection, of different types of tourists. It found that the type of concerned tourist valued all safety practices most. In comparison, the type of indifferent tourist did not consider it was essential to access information about safety measures, although this type of tourists did want to know updates on the COVID-19 regulations in their destination countries. The type of forewarned tourist is the type of tourists who valued information and hygiene aspects least, and the protection aspect greatest. In contrast, the type of confident tourist attached importance to all information practices and hygiene measures but did not value protection aspects such as specialised cleaning and insurance against cancellation. These findings suggest implications for short-term rental accommodation providers who wished to customise services during and after the COVID-19 pandemic (Petruzzi & Marques, 2022). Perceived risk might be low when the pandemic situation is stable (e.g. with no new COVID cases in a time period). A case study in Guangzhou, China found that homestay was not perceived as a main source of risk by tourists, and lodging in homestays was not perceived to cause inconvenience to their travel, based on surveys in March 2021, a time when the city's pandemic situation was stable. It was therefore concluded that after the pandemic, homestays did not present any concerns in addition to those tourists normally had (Zhang & Tang, 2021).

4.1.2 Travellers' preferences, choices and satisfaction

Some studies focused on travellers' preferences and choices of short-term rentals, taking into consideration COVID-19, determinants and rationales. A European study confirmed that travellers' choices regarding accommodation type were affected by COVID-19. Due to the pandemic, travellers preferred full flats to hotel rooms or shared flats because of their need for physical distance. Ensuring physical distance decreased concerns about hotel room and shared-flat accommodation options. The research highlighted the psychological process behind travellers' accommodation choices and concluded that the level of physical distance determined the influence of the COVID-19 pandemic on choice of short-term accommodation (Bresciani et al., 2021). The characteristics of short-term rental properties that better allowed for maintaining social distancing were examined. Based on Airbnb data on Madrid from August 2019 to August 2020, it was found that guests' marginal willingness to pay for listings with kitchen amenities rose 15.2% in August 2020 compared with the previous year. This indicated that the availability of well-equipped kitchen amenities should be advertised by hosts to attract potential guests' consideration on these listings as comfortable and safe accommodation options. Meanwhile, listings with size-related characteristics fell 2.7% from their premium price. This implies that due to reductions in group sizes of travellers during the pandemic, hosts' strategies for attracting large groups of guests needed to be reconsidered (Hidalgo et al., 2022). During the pandemic, consumers were less likely to choose sharing economy products, and room cleanliness was more important than location in consumers' considerations when choosing Airbnb accommodation (Kim et al., 2022).

During the COVID-19 pandemic, the significance of traditional factors under typical normality (e.g. location, facilities, services, price, and social media reviews) on customers' purchase intentions in shared accommodation changed, according to an empirical study in the US and Spain. Generally, location and price were the second and third important factors, respectively, while facilities, services, and social media reviews were less important. Anti-COVID-19 protection measures were ranked by Spanish travellers as the most important factor for purchasing shared accommodation, while Airbnb health protocols were ranked by US travellers as the second factor in importance for purchasing P2P accommodation. Attitudes towards health and sanitation in Airbnb had a negative impact on purchase intentions in Spain and a very low impact on US travellers. Previous use of Airbnb had significant impact for Spanish travellers, but in the case of US travellers, the impact was not significant (Bigné et al., 2020). Tourists for business purposes with low threat perceptions of COVID-19 showed higher willingness to stay in Airbnb accommodation than tourists staying for leisure purposes. Regardless of destination type (i.e. urban vs. rural), the impact of trip purpose (i.e. business vs. leisure) on P2P accommodation choice during the pandemic was still valid in the case study of Florida counties of the US (Jang et al., 2021).

A US study found that two functional motivators (financial and neighbourhood) consistently impacted on the repurchase intention of P2P accommodation before and during the COVID-19 pandemic. Neighbourhood was the strongest motivator of repurchase intention. Some functional and social motivators (including technology function, host, and sustainability) strongly affected repurchase intention only in the pre-pandemic era. In comparison, other functional, social, and epistemic motivators (including convenience, social influence, and authenticity) strongly affected repurchase intention during the pandemic. Two motivators (online review and novelty) had negative effects during the pandemic (Jiang et al., 2022). A study in five European countries during 2020 examined perceived value, authenticity, perceived risk and trust as determinants of customers' repurchase intention for short-term accommodation during and after the pandemic. Perceived value and authenticity resulted in positive attitudes towards repurchase intention for short-term accommodation, even in the post-pandemic era. Perceived risk positively affected repurchase intention before COVID-19 but had a negative effect after the pandemic. Trust had a significant impact on repurchase intentions only in the post-pandemic era (Braje et al., 2021).

Research investigated the determinants of customer satisfaction in P2P accommodation during the pandemic. Host service quality and facility service quality had significant and positive influences on customer satisfaction. Different from some accommodations (e.g. hotels and hostels) that have trained staff to perform specific work and serve guests, the hosts of P2P accommodation most commonly work on all tasks by himself or herself before, during, and after guests' stays. They need to have a personal approach, essential knowledge and skills, and are expected to always be helpful to guests. Host service quality was a significant determinant of customer satisfaction. Facility service quality in P2P accommodation is a dimension that was of particular importance. It is, therefore, crucial to consider national criteria and to introduce quality label criteria to improve the process of service delivery (Pawlicz et al., 2022). A US study found that customers with high COVID anxiety had high probability of being satisfied with P2P accommodation when they stayed in properties featuring high levels of amenities, convenience, and neighbourhood. Therefore, these functional motivators were important for the satisfaction of customers with high COVID anxiety (Jiang et al., 2022).

4.2 Communication, interaction and psychological well-being

Understandably, the COVID-19 pandemic impacted on communication manner, behaviours and interactions between customers and hosts of short-term accommodation. According to a study of China's multiple cities, guests' internal psychological capital (e.g. confidence, hope, optimism and resilience) were found to enhance host-guest interaction and release anxiety and depression generated by COVID-19. In addition, guests' perceptions of the hygienic attributes of P2P accommodation during their stays impacted on their perceptions of infection risk and therefore, their willingness to interact with the host. When guests were concerned with the hygienic attributes of P2P accommodation, they perceived a high infection risk and tended to choose contactless or no interaction with hosts, despite having strong psychological motivation. On the other hand, when guests had a high perception of P2P accommodation's hygienic conditions, together with their internal psychological motivation, they were more likely to participate in face-to-face interactions with the host (Shi et al., 2022). Friendly host behaviour and timely communication between host and guest resulted in value co-creation at Airbnb during the epidemic. It was vitally important for customer service agents to maintain excellent and prompt communication with customers and help them to find solutions to their problems, particularly during the epidemic situation. In comparison, insufficient communication, deception and lack of motivation to help, led to value co-destruction. Dissatisfactory customer service of Airbnb resulted in value co-destruction when guests were unable to obtain resolution and costs were incurred in the process (Sthapit et al., 2022).

The dramatic decrease in short-term accommodation bookings forced employees and business owners to perceive a high risk of losing income and revenue, worsening job security in the local area, and therefore affecting their health and well-being (Xu et al., 2021). It has been confirmed by existing research that a major impact of the COVID-19 pandemic on global society was on people's mental health. Psychological conditions such as anxiety, stress, depression and insomnia have been reported not only by COVID-19 patients and healthcare workers, but also by the general population. Thus, researchers paid attention to health and well-being of short-term rental customers and hosts during the COVID-19 pandemic, with special attention to anxiety, stress, threat and equity (Ghaderi et al., 2022; Hossain, 2021; Luca et al., 2022; Xu et al., 2021).

Customers had to cancel Airbnb accommodation reservations, and as a result the platform struggled to satisfy their customers, service providers, and investors. Thus, anxiety spread, producing further effects throughout the different levels of the activity. Criticisms from unhappy customers and service providers overwhelmed social media. Many Airbnb employees lost their jobs due to the significant decrease in accommodation reservations (Hossain, 2021). In addition to revenue loss, hosts were confronted by challenges due to limited support from governments and platforms during the pandemic. Although these hosts had greatly contributed to global tourism growth in recent years, since they were viewed as informal labour, they were not eligible for government financial support in some countries. A study in China's multiple cities found almost all hosts of P2P accommodation who participated in the research project experienced short-term or long-term adverse mental effects. The major sources of stress were economic stressors and uncertainty. P2P accommodation played an increasingly important role in society. It was not only a source for additional income, but also the livelihood of a large number of people. Economic stressors were able to activate social stressors. These stressors seemed to be compounded together and affecting people's psychological status (Xu et al., 2021).

Previous studies also developed an understanding of the hosts' perception of the threat and their vulnerabilities. A study from Iran found that nearly all the local home-based accommodation operators who participated in the study acknowledged that in addition to economic losses, the pandemic damaged their businesses by creating uncertainty and panic over the health and safety of operators and the public. Unsurprisingly, almost all respondents reported significant falls in income in the five months after March 2020 compared with the same period one year before. The loosening of restrictions and a decrease in the number of COVID patients in Iran saw slow recovery of local home-based accommodation businesses between mid-July and October. The operators viewed themselves and their staff as the group most vulnerable to the crisis (Ghaderi et al., 2022). A study found that discrimination against Asian-American Airbnb users dramatically rose at the beginning of the COVID-19 pandemic. For hosts with distinctively Asian names, their guests decreased by 12% compared with hosts with distinctively White names. There was no evidence to show discrimination against Black or Hispanic hosts. Platform design choices enabled discrimination (Luca et al., 2022). Figure 3 shows the social impacts of COVID-19 on short-term accommodation and the factors influencing these impacts.

5 Conclusion

In this paper, the impacts of COVID-19 on short-term housing were discussed. The pandemic has affected the short-term housing industry in world cities to a large extent. The existing literature reported generally negative effects of COVID-19 on the operating performance of short-term accommodation in the areas of price, revenue, occupancy, revenue per available room, property survival rate, booking, supply and demand. However, the decreases depended on many influencing factors, and some influencing factors that were highlighted in previous studies include property type (entire property rentals vs. private rooms), host type (professional vs. non-professional hosts), the location of the properties, and physical characteristics of the properties.

COVID-19 impacted on travellers' perceptions, preferences, choices, satisfaction, communication, host-guest interactions and psychological well-being when selecting short-term accommodation. The perceptions of physical, social, convenience, and performance risks of guests of short-term accommodation increased during the pandemic. Travellers pre-

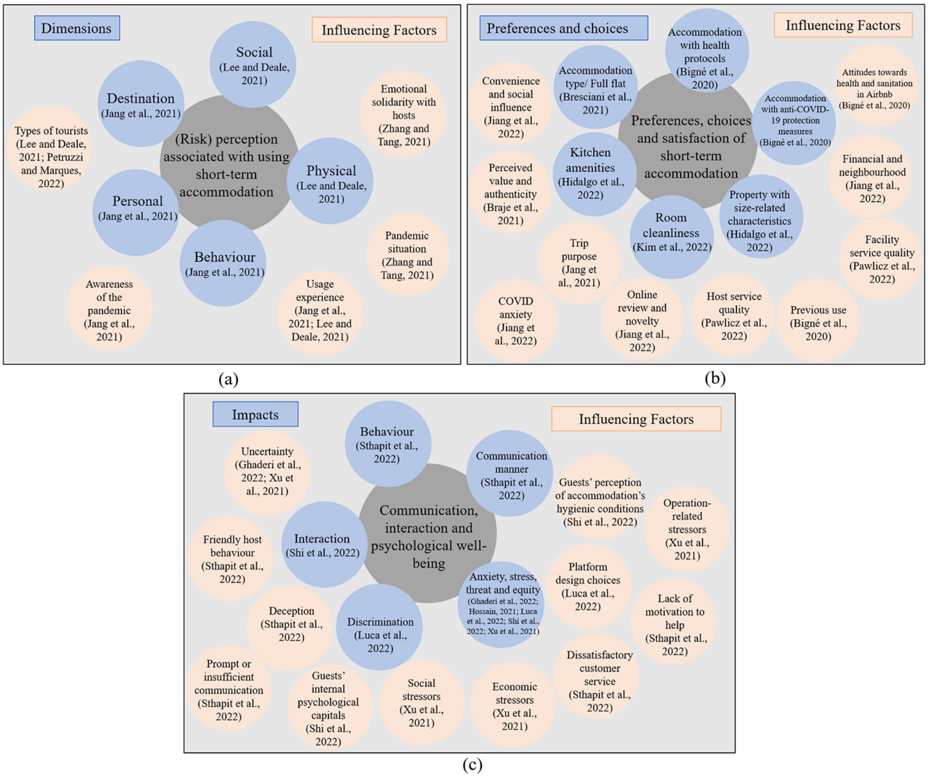

Fig. 3 Social impacts of COVID-19 on short-term accommodation (a. Risk perception associated with using short-term accommodation; b. Preferences, choices and satisfaction of short-term accommodation; c. Impacts of COVID-19 on communication, interaction and psychological well-being) and the factors influencing these impacts

ferred full flats and properties that better allowed for maintaining social distancing (e.g. kitchen amenities and size-related characteristics). Previous research highlighted the influence of destination attributes, trip purpose, personal experience, awareness and psychological capital, anti-COVID-19 protection measures, health protocols, host service quality and facility service quality, friendly host behaviour and speedy communication, and social and economic stressors on the impacts of COVID-19 on travellers' perceptions, preferences, choices, satisfaction, communication, host-guest interactions and psychological well-being when selecting short-term accommodation.

The research findings of this review suggest implications for minimising the impacts of COVID-19 or similar future disruptive events on short-term accommodation operation and surviving the crisis in the short-term accommodation sector:

- Short-term rentals managed by professional hosts had lower decreases in revenue, lower decreases in occupancy rate, and higher survival rates. The positive influence of professional hosts on revenue was greater during the pandemic compared with the pre-COVID-19 era. Professional hosts normally had more hosting experience, which allowed them to use more effective pricing strategies compared with individual hosts. In addition, properties managed by professional hosts were able to offer less social contact, as preferred by short-term rental guests. Individual hosts of short-term rentals could seek the services of professional hosts during special time periods, e.g. the COVID-19 era, to reduce income loss.

- Properties that were perceived to be clean experienced lower decreases (even increases) in occupancy and income. Therefore, service providers need to pay great attention to cleanliness, a key element of the service, and provide better cleaning. In addition, service providers also need to convince potential customers of their emphasis on hygiene via better demonstrations. When guests had a high perception of P2P accommodation hygienic conditions, together with their internal psychological motivation, they were more likely to participate in face-to-face interactions with their hosts.
- Entire property rentals experienced less adverse effects from COVID-19 compared with private or shared rooms since entire properties which facilitated social distancing during the pandemic were preferred by guests. Hosts could prioritise entire properties in their renting strategies during crises such as the COVID-19 pandemic. Moving short-term rental properties into the long-term rental market and renting the properties as entire properties is another short-term strategy to be considered by hosts.
- During the COVID-19 pandemic, the importance of traditional factors during typical normal times (e.g. location, facilities, services, price, and social media reviews) on customers' purchase intentions in shared accommodation changed. For example, proximity to previously attractive amenities such as public transport, shopping centres and tourist attraction sites did not increase the likelihood of survival of the listings but potentially increased the level of vulnerability during the pandemic. The proximity to hospitals decreased the probability of survival. Tourism clusters were found to be negatively associated with the growth rate of Airbnb revenue. Compared with revenues of Airbnb listings in urban counties, the impacts of COVID-19 on those in rural counties with leisure and hospitality clusters were less significant. Potential customers of short-term accommodation valued anti-COVID-19 protection measures and Airbnb health protocols. Previous use of Airbnb might have significant impact on the purchase intention of potential customers. These changes can suggest implications for short-term accommodation providers during and after crises such as the COVID-19 pandemic.
- Short-term accommodation guests' perceptions of physical, social, convenience, and performance risks increased during the pandemic. Friendly host behaviour and speedy communication between host and guest resulted in value co-creation at Airbnb during the epidemic. It is vitally important for customer service agents to maintain excellent and prompt communication with customers and to help them find solution to their problems, particularly during epidemic situations. Host service quality was a significant determinant of customer satisfaction.

This overview mainly focused on the impacts of COVID-19 on short-term accommodation, and articles included in the review focus on the short-term impacts of COVID-19. Therefore, the impacts during the post-COVID-19 period are not the main focus of the paper, and the long-term impacts of COVID-19 on short-term housing are not covered by this review. Future studies could explore the impacts of COVID-19 on short-term accommodation, adopting a long-term perspective. In addition, the COVID-19 pandemic or similar future disruptive events could have prolonged impacts on the management of the short-term housing sector, people's perceptions of and preferences for short-term housing, and the psychological well-being issues associated with short-term housing. These topics need to be carefully examined to develop a better understanding of the comprehensive impacts of COVID-19.

Furthermore, this review mainly focused on the economic (operating performance) and social impacts of COVID-19 on short-term accommodation operation. The COVID-19 pandemic that has had catastrophic effects on the hospitality and tourism industry could have caused greater costs to the economic, social, psychological, and public health development associated with the short-term accommodation sector. This review adopted a social science and urban studies perspective, and this is a limitation of this research that can be improved by future studies. By applying a wider disciplinary perspective, further consideration of the impacts of COVID-19 on short-term accommodation can be examined by future studies to advance our understanding of the impacts of COVID-19, and strategies to remedy the consequences. Finally, most existing studies on the economic and social impacts of COVID-19 were conducted in developed countries particularly in European countries. Future research in developing countries and countries in continents other than Europe is needed for the development of a balanced understanding of the topic.

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