

# The shifting geographies of digital intermediation: the effects of the COVID-19 pandemic on short-term rentals in Italian cities

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## ABSTRACT

The present paper investigates the impact of the Covid-19 pandemic on Airbnb's market and focuses on the crisis's effects on areas affected by digital intermediation. The study's goal is to analyse Airbnb geographies by focusing on short-term rental supply and demand at the intra-urban scale. Using historical data and by adopting a quantitative and spatial data-oriented approach, the work highlights the shifting geographies of digital intermediation. Results show that while the areas that have increased their supply are limited, a large, clustered and contiguous portion of the cities seems to have reversed the exponential growth trend of recent years. Finally, the study offers a reflection on the future of short-term rentals in the post-pandemic city. The case study refers to four Italian cities: Florence, Milan, Rome, and Naples.

## 1. Introduction

The COVID-19 pandemic has dealt a heavy blow to the world, and tourism is one of the industries most affected. Although the tourism and hospitality industry is no stranger to pandemics (Jamal & Budke, 2020), the emergence and rapid spread of COVID-19 has had unprecedented effects on global tourism and hospitality markets. According to the World Tourism Organization, the sharp decline in international travel from January to June 2020 led to a decrease of 440 million international tourists, and the export revenue of international tourism is approximately US \$460 billion. This volume of international tourist revenue is equivalent to nearly five times the decrease experienced in 2009 during the global economic and financial crisis. The hardest-hit area in the world has been Europe: the number of tourists fell by 66% in the first half of 2020 (<https://www.unwto.org/news/international-tourist-numbers-down-65-in-first-half-of-2020-unwto-reports>). According to the report, it could take from 2½ to 4 years to return to 2019 tourist arrival levels (UNTWO, 2020). Fotiadis, Polyzos, and Huan (2021) forecast that the “drop in tourist arrivals can range between 30.8% and 76.3% and will persist at least until June 2021”. The COVID-19 crisis has undoubtedly influenced individual mobility, and consequently tourism; a decrease in movement exacerbated by the restrictive measures adopted by Governments to counter the spread of contagion. The management strategies adopted to contain the virus, in the absence of a vaccine, were:

imposing social distancing, the ‘lockdown’ which took on the form of confinement, closure of public spaces and the prohibition of unnecessary travel. The lockdown measures were adopted at different times and with different intensities in various countries, and in line with epidemic trends. Italy was one of the first countries to adopt these measures (DPCM 9 March 2020) from 11 March to 4 May 2020. In the autumn of 2020 the Italian government undertook new but less intensive measures (DPCM 9 November 2020) which based *ad hoc* restrictions on each Region which changed depending on the COVID-19 penetration rate in each area. In order to get a perspective regarding the temporal context on which the analysis is based, the following graph (Fig. 1) reveals the intensity of the different waves that hit the country, from spring (first wave) and autumn of 2020 (second wave) to spring 2021 (third wave); the period considered in this study corresponds to the beginning of the outbreak of the pandemic and the consequent restrictive measures that have affected individual mobility.

In this context, short-term rental platforms were significantly affected. The most popular platform, Airbnb, faced a rapid decrease in bookings (Boros, Dudás, & Kovalcsik, 2020) due to the COVID-19-induced travel restrictions, leading to a 96% drop (DuBois, 2020). In fact, the platform has lost close to 50% of its market value (Nhamo, Chikodzi, & Dube, 2020): in 2019, the market value for Airbnb was set at \$31 Billion (Sherwood, 2020) while in April 2020 the company was valued at 18 billion dollars (Eglesham & Grind, 2020). As Boros et al.

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pointed out, “the effects of diseases on Airbnb have been rarely analyzed, since the emergence of this accommodation platform, there have been only a few disease outbreaks that affected tourism markets, and only with limited effect” (Boros et al., 2020). In this regard, Dolnicar and Zare (2020) have investigated possible long-term effects of COVID19 on trading short-term rental spaces and put forward two hypotheses: the first that the proportion of investor-hosted Airbnb listings will drop and the second that Airbnb demand will recover but not to pre-COVID19 levels. The study by Farmaki et al. (2020) looks at offers, market perspective and plans to continue hosting on the platform illustrating various hosts' behaviour and intentions to stay in or exit the platform. The authors identified five types of hosts: optimistic, indolent, ambivalent, cautious, and pessimistic (*ibidem*, p.7). Similarly, Krouk and Almeida (2021) hypothesize that “hosts who are able to afford to cover their expenses for the duration of the crisis may choose to remain in the short-term market, while hosts who are not able to afford short-term expenses will opt for mid-term and long-term rentals due to their relative stability to ensure their expenses will be covered” (Krouk & Almeida, 2021, pp. 97–98). In geographical terms Jang, Kim, Kim, and Kim (2021) demonstrate different revenue losses in Airbnb listings across urban and rural areas. The study furthermore highlights a qualitative change in short-term rental demand since business travellers with a low perceived threat of COVID-19 seem to be more willing to utilize Airbnb listings than leisure travellers. Moreover, Kadi, Schneider, and Seidl (2020) find that “in recent weeks a number of property owners have reconsidered their decision to use their units for touristic purposes and converted them back to the regular rental market (*ibid.* p.55). To summarize, the spread of the pandemic has transformed the pre-pandemic condition of overtourism (Goodwin, 2017; Capocchi, Vallone, Pierotti, & Amaduzzi, 2019; Dodds & Butler, 2019; Seraphin, Sheeran, & Pilato, 2018) into a dramatic crisis in the short-term accommodation market and tourism industry in little time (Higgins-Desbilles, 2020).

In this unprecedented and uncertain scenario, the present study analyses the pandemic's effect on Airbnb's geographies by focusing on short-term rental supply and demand at urban scale. While the contraction in demand due to the measures each country adopted to

counter the spread of the pandemic restricting mobility is decidedly evident, hosts' reactions and “its spatiality” is less obvious. Have the listings been reduced? If so, in which areas of the city? Are they spatially clustered or randomly distributed? What is the effect of the pandemic on demand? What are the possible consequences for the short-term rental market in Italy? The cities analysed in this study are Rome, Milan, Florence, and Naples.

## 2. Airbnb and urban space

Airbnb is a platform where people can offer short- and mid-term rentals, discover and book houses and ‘Experiences’ worldwide (Picascia, Romano, & Teobaldi, 2017, Capineri & Romano, 2021). “Airbnb was born in 2007 when two Hosts welcomed three guests to their San Francisco home, and has since grown to 4 million Hosts who have welcomed more than 900 million guest arrivals in almost every country across the globe. Every day, Hosts offer one-of-a-kind stays and unique Experiences that make it possible for guests to experience the world in a more authentic, connected way”(https://news.airbnb.com/about-us/). The platform lists over 5.6 million properties in over 220 countries and more than 100.000 cities (https://news.airbnb.com/about-us/). The spaces rented on Airbnb for short-term rentals are varied, from a sofa in someone's living room to an entire island (Wortham, 2011). More generally, there are three main accommodation typologies: private rooms, shared rooms, or an entire place. Similar to other digital platforms, Airbnb bases its fortune on two pillars, namely the “network effect” and “growth before profits” (Srnicek, 2017) which is in turn based on fast and pervasive new product launch (Capineri & Romano, 2021). The connective platform has indeed become the world leader in short-term rentals by acting exclusively as a “network orchestrator” (Libert, Wind, & Fenley, 2014), and by adopting a ‘lean’ business model (Srnicek, 2017). Like other platforms such as Uber, Airbnb has spread unchecked and almost unregulated for almost ten years. Protests and criticism have arisen worldwide, especially for the inhabitants of over-touristified places and businesses in the hospitality industry (Picascia et al., 2017). The emergence of Airbnb is unquestionably one of the most significant and transformative recent developments within the

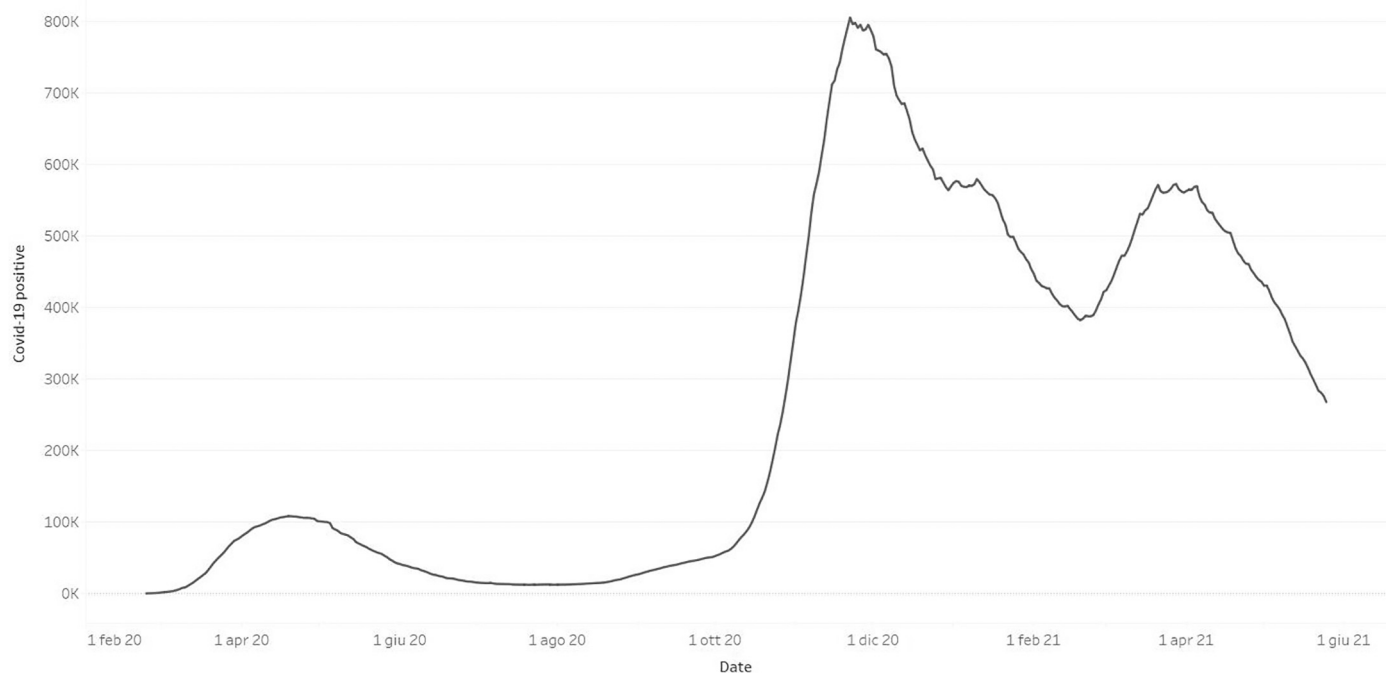


Fig. 1. COVID-19 epidemic trend in Italy (2020–2021). Source: elaboration based on Dipartimento della Protezione Civile dataset, available at <https://github.com/pcm-dpc/COVID-19>

worldwide tourism sector (Guttentag & Smith, 2020) and it has generated disruptive socio-spatial impacts (Guttentag, 2015). Short-term rental platforms such as Airbnb are at the centre of the debate because they produce very visible effects (Picascia et al., 2017), particularly in the most affected neighbourhoods (i.e. overtourism,<sup>1</sup> gentrification,<sup>2</sup> house affordability and availability). More generally, international research has increasingly investigated various domains 'disrupted' by the platform. The socio-spatial effects on existing markets (traditional lodging and hotels in particular) have been primarily explored (Aznar, Sayeras, Rocafort, & Galiana, 2017; Benítez-Aurioles, 2019; Blal, Singal, & Templin, 2018; Coyle & Yeung, 2016; Fang, Ye, & Law, 2015; Gutiérrez, García-Palomares, Romanillos, & Salas-Olmedo, 2017). Many studies have found that Airbnb negatively impacts hotel revenues and influenced hotel's key metrics (Zervas, Proserpio, & Byers, 2017; Dogru et al. 2020, b). Drogu, Mody, & Suess (2019) found that a 1% increase in Airbnb supply decreases the Revenue Per Available Rooms - RevPAR - by 0.02%, Average Daily Rate - ADR - by 0.02%, and occupancy by 0.01% (for more see Drogu et al. 2019).

Studies explore the consequences of the intermediation mechanism, which plays a central role in the platforms' very essence (For more, see Srnicek, 2017). Scholars focused on 'distributional effects' (for more, see Artioli, 2018) the effects of peer-to-peer exchanges across income distributions and (in the case of short-term accommodation) across different neighbourhoods (Artioli, 2018; Guttentag, 2015, 2019; Schor, 2017). Other studies centre on unequal revenue distribution and its geographical patterns (Alizadeh, Farid, & Sarkar, 2018; Arias Sans & Quagliari, 2016; Oskam & Boswijk, 2016; Picascia et al., 2017; Quattrone, Proserpio, Quercia, Capra, & Musolesi, 2016; Roelofsen, 2018) by focusing on socio-economic impacts and their challenging relationship within the urban fabric, and many others have focused on the negative impact on the long-term housing market and zoom in on (in)direct effects on the housing crisis and affordability (Barron, Kung, & Proserpio, 2020; Garcia-López, Jofre-Monseny, Martínez-Mazza, & Segú, 2020; Horn & Merante, 2017; Lee, 2016). For Lee, Airbnb likely reduces the affordable housing supply by distorting the housing market in two interconnected and distort mechanisms: conversion and hotelization (Lee, 2016) by allowing the conversion of entire places previously occupied by a city resident in hotel rooms. "This process decreases the supply of housing and spurs displacement, gentrification, and segregation" (Lee, 2016, p. 230). In particular, scholars broadly investigated the relation between Airbnb and gentrification (Gant, 2016; Dudás, Vida, Kovalcsik, & Boros, 2017; Wachsmuth & Weisler, 2018; Aalbers, 2019; González-Pérez, 2020; Richards, 2019; Cocola-Gant, 2018; Ioannides, Röslmaier, & Van der Zee, 2019; Sequera & Nofre, 2019; Celata & Romano, 2020) by focusing on demographic shifts (e.g. resident population displacement) and real estate shifts (e.g. raise in long-term housing rent) amplified by the growing and pervasive presence of Airbnb. For (Cocola-Gant, 2016), the impact of holiday rentals in the historic centre of Barcelona generated 'collective displacement', a substitution of residential life by tourism. In their study on New York, Wachsmuth and Weisler conclude that "in the areas where short-term rentals have proliferated there has been a substantial loss of long-term housing, driving both direct and exclusionary displacement. City-wide this reduction in effective housing supply has plausibly translated into

a general increase in rents and housing prices" (Wachsmuth & Weisler, 2018; p. 1165). Celata and Romano (2020) argued that platforms such as Airbnb not only contribute to increasing the short-term accommodation capacity of urban areas, but radically change the morphology of the 'tourist city' by producing more direct and immediate effects compared to a generic process of gentrification.

Recently scholars have explored the sustainability of platform-mediated tourism (i.e. Celata & Romano, 2020; Goodwin, 2017; Koens, Postma, & Papp, 2018; Milano, Cheer, & Novelli, 2018; Oklevik et al., 2019). For Oklevik et al., new accommodation offers through Airbnb and other online platforms has led to profound changes in the composition of visitors, length of stay, location of accommodation, tourist expectations and residents' perceptions, especially in places where Airbnb has caused disruptive effects (Oklevik et al., 2019). Furthermore, many studies explore the 'digital reputation' side (Celata, Capineri, & Romano, 2020; Fradkin, Grewal, & Holtz, 2018; Roelofsen & Minca, 2018). Some focus particularly on digital discrimination by looking at the role of emerging algorithmic automation in facilitating racial discrimination (Edelman & Luca, 2014). Celata et al. (2020) argued that the platform's review system produces invisibilities and distributes value unevenly in the city. In this regard, more recent studies have concentrated on lack of regulation (Nieuwland & van Melik, 2020; von Briel & Dolnicar, 2020) and challenges in terms of spatial regulation and planning (Ferreri & Sanyal, 2018; Gurran & Phibbs, 2017; Gurran, Searle, & Phibbs, 2018).

Other studies have focused on hosts, like the professionalization and monopolization of Airbnb by multi-unit hosts (Dogru, Mody, Suess, Line, & Bonn, 2020; Gil & Sequera, 2020) and 'self-entrepreneurship' effects (Kenney & Zysman, 2016). From this point of view, the disruptive effects on the labour market in terms of transformation and fragmentation of work (Kenney & Zysman, 2019; Sigala, 2018) and on the marginality of the non-professional hosts (Bosma, 2021; Semi & Tonetta, 2020) were also explored. In this sense, Airbnb has also an important and direct role in enabling the professionalization processes that "produce inequalities and power asymmetries both on and off the platform, between hosts as well as between the platform owner, platform users, and non-platform users" (Bosma, 2021, p.1). Compared to properties owned by non-professional hosts, Airbnb properties managed by professionals make 16.9% more daily revenue and have 15.5% higher occupancy rates, according to Li, Moreno, and Zhang (2016). Dogru, Mody, Suess, et al. (2020) highlighted that "the most successful and valuable hosts on the site are a rapidly growing class of micro-entrepreneurs - multiple-unit operators and full-time hosts, accounting for around 71% of Airbnb's \$14.1 billion revenue in its top 12 markets (Dogru, Mody, Suess, et al., 2020). Furthermore, Sigala (2018) explored the sub-economies of services created by actors participating in the Airbnb ecosystem that expand the scope and the scale of the impact of Airbnb on economic systems (Sigala, 2018). In their work on the platformization of tourism, Celata and Romano (2020), conclude that the new service 'Airbnb Experiences' become a self-employment opportunity for the hosts, reinforcing the unregulated and permeable environment of the platform.

In the past months attention has shifted to the COVID-19 crisis and its implications to Airbnb. Donilcar and Zare predict that the asymmetric burden of the COVID19-induced super-shock on different types of hosts will lead to systematically different reactions by hosts (Dolnicar & Zare, 2020, p.2). For Bosma (2021), the crisis will reveal a lot about the durability of hosting (Bosma, 2021, p.17) in a context in which "the financial losses experienced by Airbnb hosts are estimated to be approximately 6.5 times greater than the losses incurred by the Airbnb platform itself" (Chen, Cheng, Edwards, & Xu, 2020, p.15). As remarked by Roelofsen and Minca (2021) the concepts itself of home and hospitality, pillars of Airbnb, have dramatically changed with the advent of the pandemic and consequent professionalization processes promoted/enabled by the platform. The effects are manifold, and it could mainly concern 'asset-less hosts' (Bosma, 2021) in a moment in which Airbnb's strategy itself has changed and has had to adapt to the pandemic. This

<sup>1</sup> Overtourism describes destinations where hosts or guests, locals or visitors, feel that there are too many visitors and that the quality of life in the area or the quality of the experience has deteriorated unacceptably (Goodwin, 2017, p.1).

<sup>2</sup> The process whereby the character of an urban area is changed by wealthier people moving in often displacing current inhabitants in the process. "The crucial point about gentrification is that it involves not only a social change but also, at the neighborhood scale, a physical change in the housing stock and an economic change in the landand housing markets. It is this combination of social, physical, and economic change that distinguishes gentrification as an identifiable process or set of processes" (Smith, 1987, p.463).

adaptation would seem like the platform is evolving towards long-term stays rather than short-term forms of accommodation, transforming Airbnb in a sort of real-estate platform (Fields & Rogers, 2021). This last aspect risks discriminating against any host unable to pursue professional hosting (Bosma, 2021). In sum, COVID-19 has ‘disrupted the disruptor’ (Dolnicar & Zare, 2020).

This super shock has generated a whole new series of questions, not limited to the future of Airbnb *per se* but the short- and long-term effects on the territories of intermediation (Barns, 2020) and its actors. For Pirone et al. the “pandemic clearly revealed the overlapping between digital platforms and urban spaces, both as infrastructures and as markets” (Pirone, Frapporti, Chicchi, & Marrone, 2020, p.30). As Lee et al. 2020 well explains, “we understand platform urbanism as the configuring of urban space around platform architectures that emphasize increased forms of data capture, programmability, automation, and third-party evaluation” (Lee, Mackenzie, Smith, & Box, 2020). Moreover, according to Sadowski (2020), “whatever descriptor we ascribe to contemporary capitalism – platform, surveillance, digital, and so on – the city has become a primary site for two related dynamics. The production of space: both digital (platforms) and physical (property). The production of value: both dollars and data capital” (Sadowski, 2020 p.3). It is worth remarking that the platform intermediation mechanism and its effects do not concern merely the digital world but the socio-economic sphere of the users and “produce more profound alterations ever in the structure of the physical spaces in which platforms operate” (Van Dijck, 2020, p.1), making the processes of platform intermediation deeply and intricately part of our everyday environments (Barns, 2020, p.127). In this framework, Airbnb should be understood as a new urban institution that is transforming relations between market, state and civil society actors (Van Doorn, 2020 p.1).

### 3. Objective and methodology

The following work investigates the impact of the Covid-19 pandemic on Airbnb's market, highlighting the crisis's effects on the ‘intermediation spaces’. In particular, the present study's goal is to investigate the pandemic's effect focusing on the short-term rental supply and demand at the urban scale. Accordingly, the analysis is based on Airbnb's supply (measured according to the number of listings) and demand (measured according to the number of reviews) in four Italian cities - Rome, Milan, Florence, and Naples – and in two different timeframes: pre-pandemic and pandemic.

Rome, Milan and Florence were chosen because they are at the top for number of Airbnb listings in Italy in 2019; Naples has been selected for the study because it has boasted the highest growth-rate in tourist arrivals and new listings on Airbnb in recent years (Picascia et al., 2017). The source of data that we used is [www.insideairbnb.com](http://www.insideairbnb.com). Listing variation (between August 2019 and August 2020) has been mapped for each city, focusing on the areas with a growing and decreasing Airbnb supply on at the intra-urban scale. To highlight statistically significant spatial patterns in both areas a spatial autocorrelation index (Moran's  $I^3$ ) was calculated. The index measures spatial autocorrelation based on both feature locations and feature values, it simultaneously evaluates whether the pattern represented is clustered, distributed, or random. The range of distance considered is 1 km. A k-means clustering algorithm was then applied to the identified ‘deactivation areas’ to more profoundly classify negative variation clusters. The period considered in the analysis includes the start of the outbreak of the pandemic in Italy (end of February 2020) and the above-mentioned measures adopted to counter the spread of the COVID-19 up until August 2020. Results have been mapped by using hexagonal tessellation to avoid the so-called modifiable area unit problem (MAUP). In this view, other studies (i.e. Celata & Romano, 2020; Dudás, Boros, Kovalcsik, & Kovalcsik, 2017)

experiment with alternative GIS-based mapping techniques (i.e. rasterization, fractal analysis) that have been used to offer a visual representation of the spatiality of Airbnb.

Furthermore, total review (2008–2020) distributions per month were analysed for each city. Reviews are written commentaries of a maximum of 1.000 words submitted within an average of four days after checkout (Fradkin et al., 2018). According to Airbnb, reviews are left by approximately 70% of guests. The variation of the demand between the pre-pandemic (2019) and the pandemic (2020) phase has been calculated. Finally, we mapped (Fig. 2) the percentage change in short-term rental bookings in Europe (at the NUTS 2 level) between 2019 and 2020 to have a broader contextual view regarding the pandemic's impact within the continent, including Italy, which has been the most affected by the crisis (UNWTO, 2020). As Fig. 2 shows, between 2019 and 2020 there is a significant decline in Airbnb bookings. The drop is very high in Italy, up to –87% in some areas (red) (e.g. Sicily, Campania, Apulia, Sardinia, Abruzzo) and quite substantial in the rest of the country (orange) (Lombardy –57%; Tuscany –67%; Lazio –57%). Likewise, it also highlights limited areas of booking growth (in blue), a preview of the platform's resilience despite the crisis.

### 4. The shifting geographies of intermediation

From the short-term rental supply point of view, there is a remarkable contraction, as seen in (Table 1), albeit with different intensities (from –10.16% in Milan to –3.79% in Florence). The time interval of August 2019–August 2020 is the same for all cities.

The highest intensity of such contraction occurs mainly in the central rather than peripheral areas of the considered cities, which coincides with those areas (e.g. historical centre) that had the highest concentration of supply and demand (Picascia et al., 2017) in pre-pandemic times. Furthermore, Moran's Index registers a more substantial positive spatial autocorrelation (Table 1) in the decreasing areas (Fig. 3) in which listings have been removed from the platform. Such areas of the city can be defined as contiguous and clustered chunks of deactivation that can be explained by several factors, such as the combination of the ‘morphology of the tourist city’ (Celata & Romano, 2020), the polarization of supply and demand in historic centres (Picascia et al., 2017), as well as a host's decision to stay or leave the market, and finally what the long-term perspectives of the pandemic impact (Farmaki et al., 2020). In their study, Celata and Romano showed the delimitation of the ‘short-term tourist city’ and how relatively small it is in terms of extent with respect to the entire municipality; Picascia et al. illustrated a huge concentration of supply and demand in precise parts of Italian cities, the historic centre. In this framework, the ‘deactivation effect’ has a reverberation mainly within the urban areas that before the pandemic was incrementally pervaded by the platform (i.e. the city centre of Florence). It is interesting to observe that the Moran's  $I$  is higher in the areas of the city of Naples (e.g. Chiaia) which registers an increase in Airbnb supply (Fig. 3). Such an aspect could be explained by looking at the exponential growth trend in the Airbnb supply of the last four years and its spatiality, combined with less constrained market saturation. In this sense, the present work highlights the micro areas that can be mirroring a negative, neutral or positive perspective of the hosts in the short-term rental market, which can be identified in the space of place (Fig. 3). In particular, by focusing on the decreasing areas, four clusters with different listing-deactivation intensities are identified in all cities (Fig. 4): the most impacted areas (in red) seem to be the attractive tourist spots (e.g. the vast historical centre of Rome; the historic centre of Florence, the Navigli, Duomo and Chinatown areas of Milan, the Historic centre of Naples) which also had the highest concentrations of STR supply and demand (Celata & Romano, 2020; Picascia et al., 2017). This decrease in supply has also affected residential areas like Città Studi in Milan, Campo di Marte in Florence and Vomero in Naples. More generally, Milan (–10.16%) and Rome (–9.19%) register the highest negative variation in supply. In Florence and Naples, the number of

<sup>3</sup> The index varies between 0 and 1.

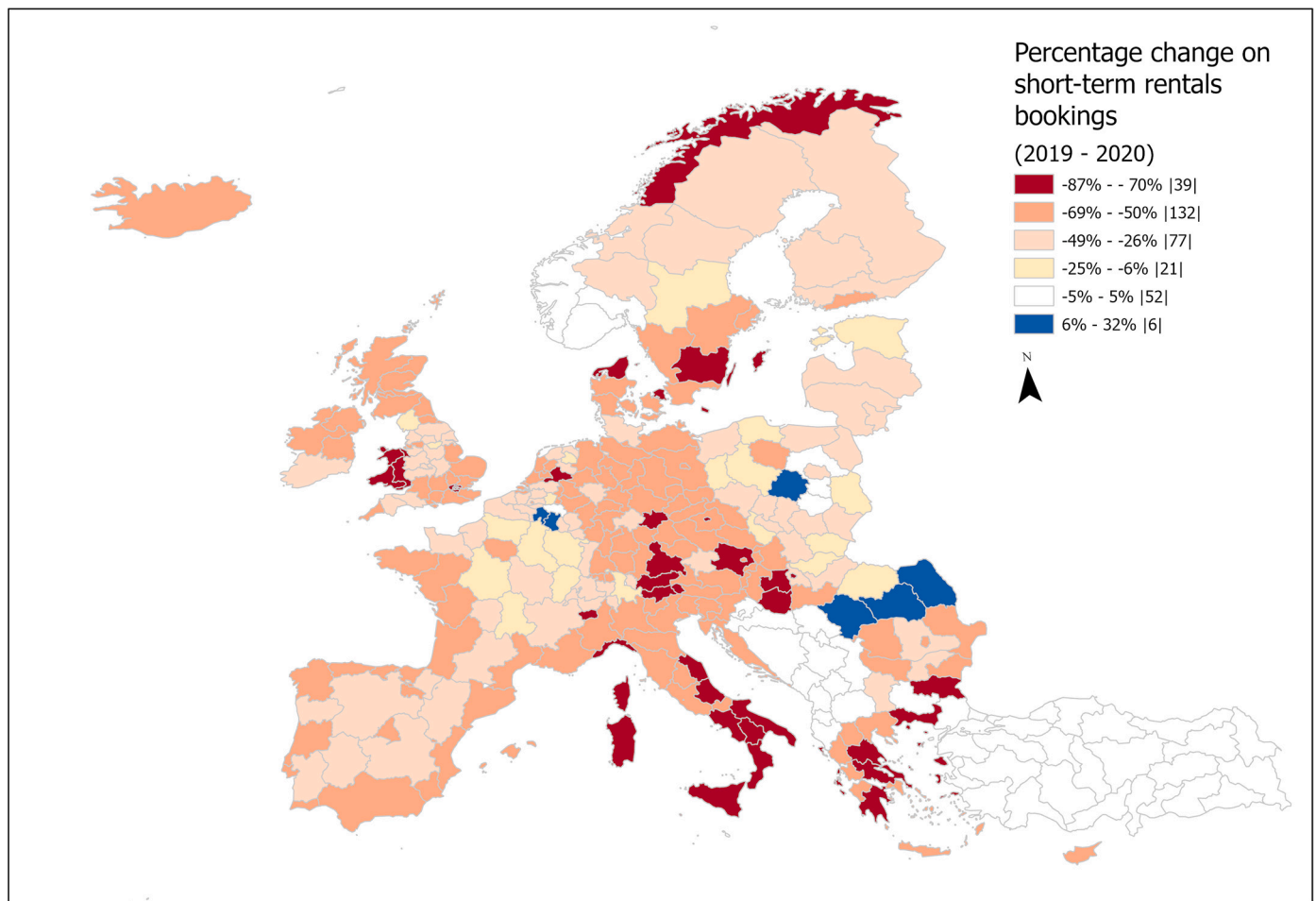


Fig. 2. Percentage change in short-term rental bookings. Data refers to the last week of December 2019 and December 2020. Data: [www.seetransparent.com](http://www.seetransparent.com)

**Table 1**  
Listings and review trends, different years.

City	Listings 2019	Listings 2020	Variation in listings supply	Moran's I (deactivation areas)	Moran's I (increase areas)	Number of reviews 2008–2020	Variation of reviews 2018–2020	Variation of reviews 2019–2020
Rome	31,963	29,023	-9.19%	0.53	0.29	1,158,271	33.65%	-70.07%
Milan	20,908	18,783	-10.16%	0.39	0.22	475,446	133.45%	-77.71%
Florence	12,465	11,993	-3.79%	0.42	0.33	593,669	48.44%	-77.57%
Naples	8571	8103	-5.46%	0.25	0.34	224,854	43.76%	-63.92%

Airbnb properties is more stable, nevertheless, many areas recorded a 100% decrease.

Within this framework, the drop in bookings and reviews (Fig. 5) is evident in all cities, mainly after March 2020. The lockdown measures and mobility restrictions adopted to counter the pandemic's spread can explain this last point. The share of domestic guests has indeed changed in the past year, passing from 59% to 84%, while on the international scale it has decreased to 16% in 2020 ([www.seetransparent.com](http://www.seetransparent.com)). According to Hu and Lee (2020), local lockdowns are associated with a 57.8% fall in booking activity, on average, and an increase in 4.5-fold of cancellations (Hu & Lee, 2020, p.4). Nevertheless, even in Venice, one of the most visited cities globally, the demand for short-term letting in 2020 decreased by -77%. As data shows, if 2019 registered a consistent increase in demand (Table 1) compared to 2018 (e.g. + 133% in Milan), the average drop of -72% in 2020 highlights a consistent turnaround in all considered cities. Despite this general trend, a slight recovery in demand can be observed starting from Summer 2020, when the pandemic crisis had reached its lowest infection rate in the country.

Finally, it is interesting to compare the spatial distribution and volume of reviews (e.g. *This is a unique, beautiful space in a wonderful, quiet part of Rome*, April 2020) located in different areas of Rome during the national lockdown period (from 3 March 2020 to 4 May 2020) and the rest of the year (Fig. 6). The map shows two very different patterns of the pandemic's impact on the temporary geographies of the short-term city, highlighting both the effect of the restrictive measures on demand and the platform's resilience.

### 5. Discussion and conclusion

The purpose of this work was to analyse the impact of COVID-19 on Airbnb's markets, highlighting the effects of digital intermediation on urban spaces at the intra-urban scale. If the contraction in demand is more intuitive due to mobility restrictions, the short-term market's effect on urban space is less obvious. As the data has shown, the COVID-19 pandemic has had a serious impact on the analysed local Airbnb market from a supply and demand point of view. Although the spatiality

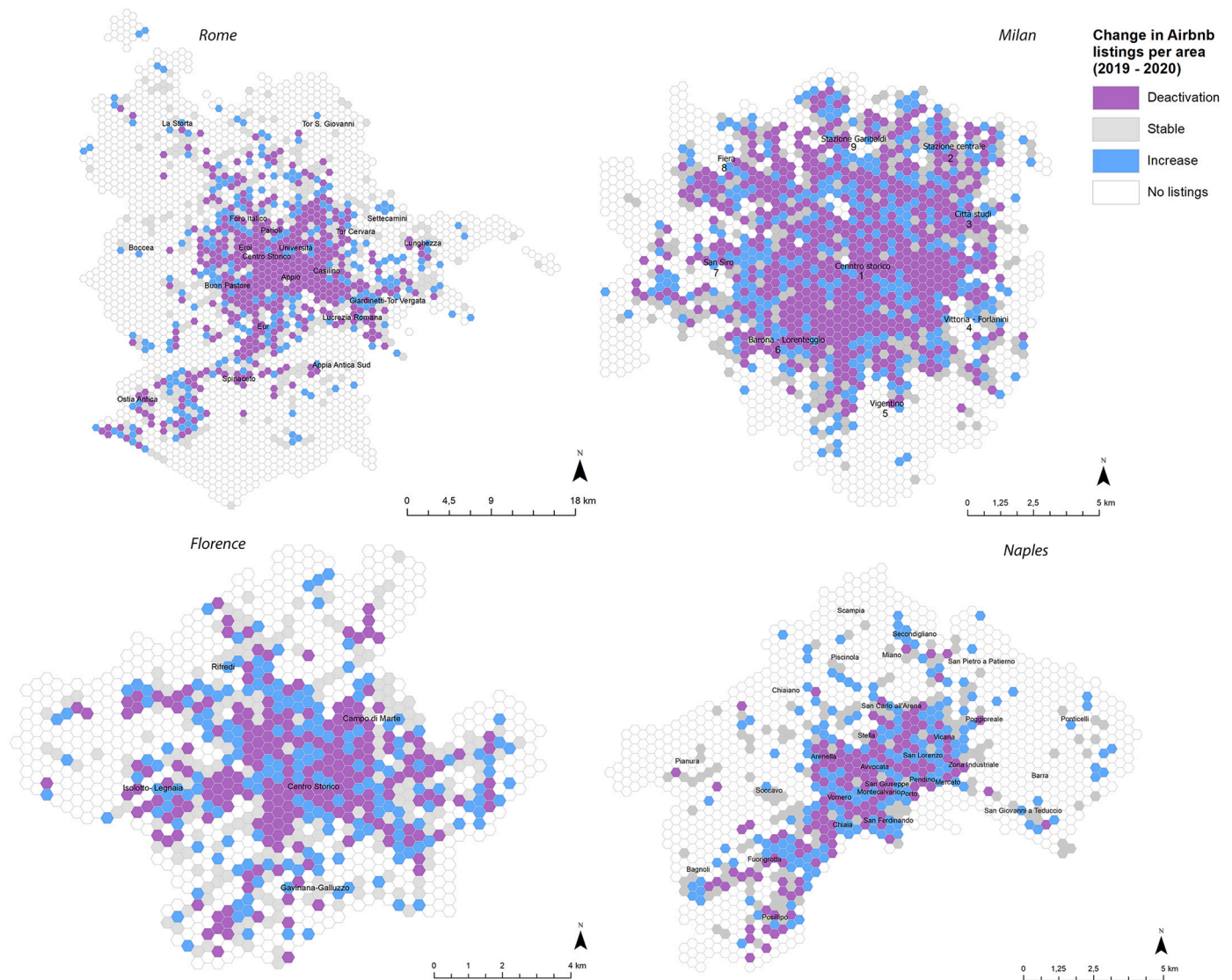


Fig. 3. Airbnb supply. Variation between 2019 and 2020. Rome, Milan, Florence, Naples.

of offers varies from city to city, Airbnb listings in these four cities have decreased all around. However, the decrease is more evident in the central areas, which are precisely the areas that have experienced an increase in supply in recent years and at the centre of the socio-geographic debate regarding the platformization of the city and its consequences (e.g. gentrification, overtourism, impact on residents, disruptive impacts on the traditional market). In this sense, the study identified a large, spatially contiguous deactivation-effect in Airbnb listings. The analysis also highlighted small areas of supply growth, which are more scattered, peripheral, and less spatially clustered, indicating a dynamism of the supply despite the crisis. This could be interpreted as a sign of shifting geographies of digital intermediation, which can be defined as temporary geographies of the platform-mediated city which in turn reflect different expectations concerning the short-term rental market.

On the contrary, short-term demand has undergone a very evident contraction in all cities. Even after the national lockdown, demand is relatively scarce compared to the exponential trend registered in more recent years. From the urban perspective, as Doreen Massey argued, “space is always under construction; it is always in the process of being made. It is never finished; never closed” (Massey, 2005, p.9); it is also the sphere of possibility. In this aspect, the pandemic raises questions regarding not just the future of Airbnb *per se*, but in a wider sense

regarding the future of cities, the role of digital intermediation, the effects on labour and ‘micro-entrepreneurial citizens’ (Van Doorne, 2021) and tourism as well (Rubino, Coscia, & Curto, 2020). The crisis poses questions even more so on the platform business model itself and its strategic pillars, such as users’ networking and the so-called network effect (Srnicek, 2017). The pandemic effect has also had a direct impact on the reduction of revenue and job loss, with simultaneous impacts on both economic and social dimensions (Krouk & Almeida, 2021, p.101). To summarize, the pandemic highlighted the platform’s vulnerability during a time of crisis. This point poses further questions: from a possibly more direct role for public institutions to the challenge of market regulation within this new framework in which a ‘new urban institution’ (Van Doorn, 2020) plays an important role in the fabric of city life.

Moreover, even if the hypotheses on the future of short- and mid-term rentals are more uncertain than in the past, it is possible to put forward some hypotheses about the consequences of the ‘deactivation effect’. Several studies confirmed that the negative effects of the tourism crisis tend to appear quickly while recovery could take longer (Lean & Smyth, 2009; UNWTO, 2020), even years, before returning to a pre-pandemic stage. This last point could have an (in)direct effect on the intended use of properties and their conversion to different forms of leasing. In Italy, according to the “Osservatorio del Mercato

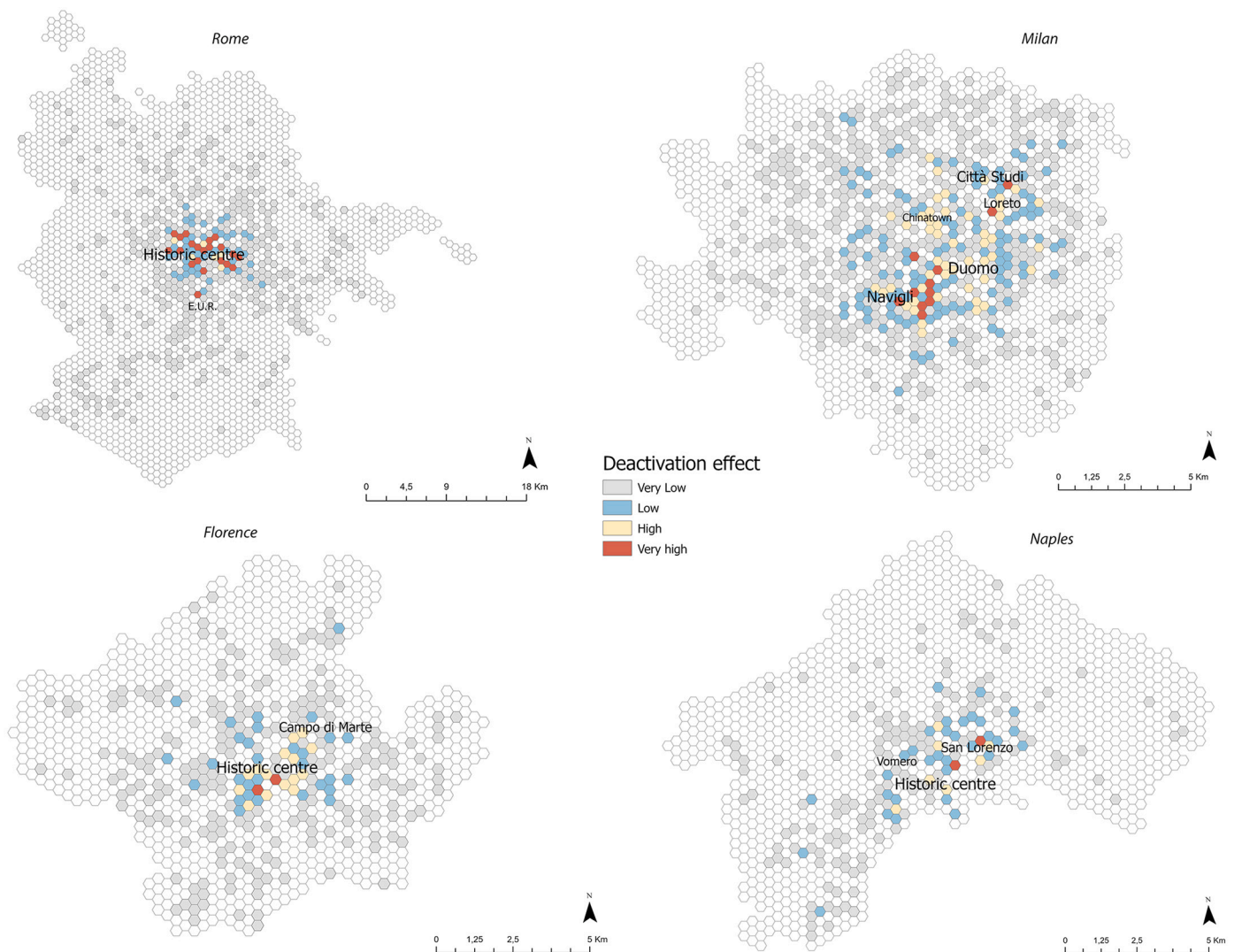


Fig. 4. Airbnb supply. Clusters of deactivation, 2019–2020. Rome, Milan, Florence, Naples.

Immobiliare” by the Italian Revenue Agency, long-term rentals increased significantly in 2020; on the contrary, in 2019, they registered a decrease (*Osservatorio del Mercato Immobiliare, 2019*). According to the report, in 2019 Florence registered more than 4600 homes regularly deemed long-term, equivalent to an IML index (number of properties leased on the potentially rentable stock) equal to 5.5%, the same ratio was 5.2% in 2018. Rome registered 19,666 long-term rental homes, equal to 3.5% IML, which in 2018 was 3.8%. Milan registered 34,326 long-term rental homes, equal to an IML of 9.1%, which was 8.9% in 2018. Naples had 9710 long-term rental homes 2020 with an IML at 4.45%, which was 4.4% in 2018 (*Osservatorio del Mercato Immobiliare, 2020*). Similarly, according to the 2021 report by Immobiliare.it, in the past year the long-term rental market has seen an explosion in supply, with records close to 200% in Venice and Milan. A recent study in four Austrian cities find that “a current shift to the regular rental market is likely, but that medium- and long-term development is uncertain with no evidence that the increased rental housing supply has dampened rent levels” (*Kadi et al., 2020 p.47*). It is not the aim of this study to demonstrate a correlation between the short-term accommodation crisis in favour of the long-term, but at least it is worth remembering that the effects of the pandemic on the Airbnb market concern the physical space in which the platform operates, mostly concerning the city and urban space (*Sadowski, 2020*). The 2021 trend seems to confirm hosts ‘exiting’ rather than ‘staying’ on the market. The number of listings is still

decreasing in all of the cities considered. As of February 2021 Rome registered 27,000 listings, Milan 18,367, Florence 11,436, and Naples 7997. As shown, the pandemic’s impact on short-term rentals conveys a selective and reframing spatiality. Limited areas have increased their supply while large areas of the cities seem to have reversed recent years’ exponential growth trend. This latter aspect represents a novelty both for the platform and for the territory of digital intermediation (*Barns, 2020*) as well as for hosts and local institutions.

In these circumstances, the crisis for demand will have a reverberation for years in the same spaces, adding further questions about the sustainability of Airbnb’s business model. Although the company’s CEO claimed that “Travel in this new world will look different, and we need to evolve Airbnb accordingly”, they consider their hosts contractors, so they hold no responsibility to provide insurance and social benefits (*Farmaki et al., 2020*). As *Krouk and Almeida (2021)* pointed out, many hosts use their activity on the platform as their full-time occupation, thus being in highly vulnerable situations. *Cheng et al., 2020* argued, “when there is an economic boom, there seems to be a win-win situation, where both Airbnb platforms and Airbnb hosts are able to generate income; however, during the COVID-19 crisis, Airbnb hosts can be burdened by a loss of income that will have implications for ongoing mortgage repayments and other debts” (*Chen et al., 2020, p.15*). On this basis there is a need to configure new strategic governance through national and local institutions, taking into account both the vulnerability of the

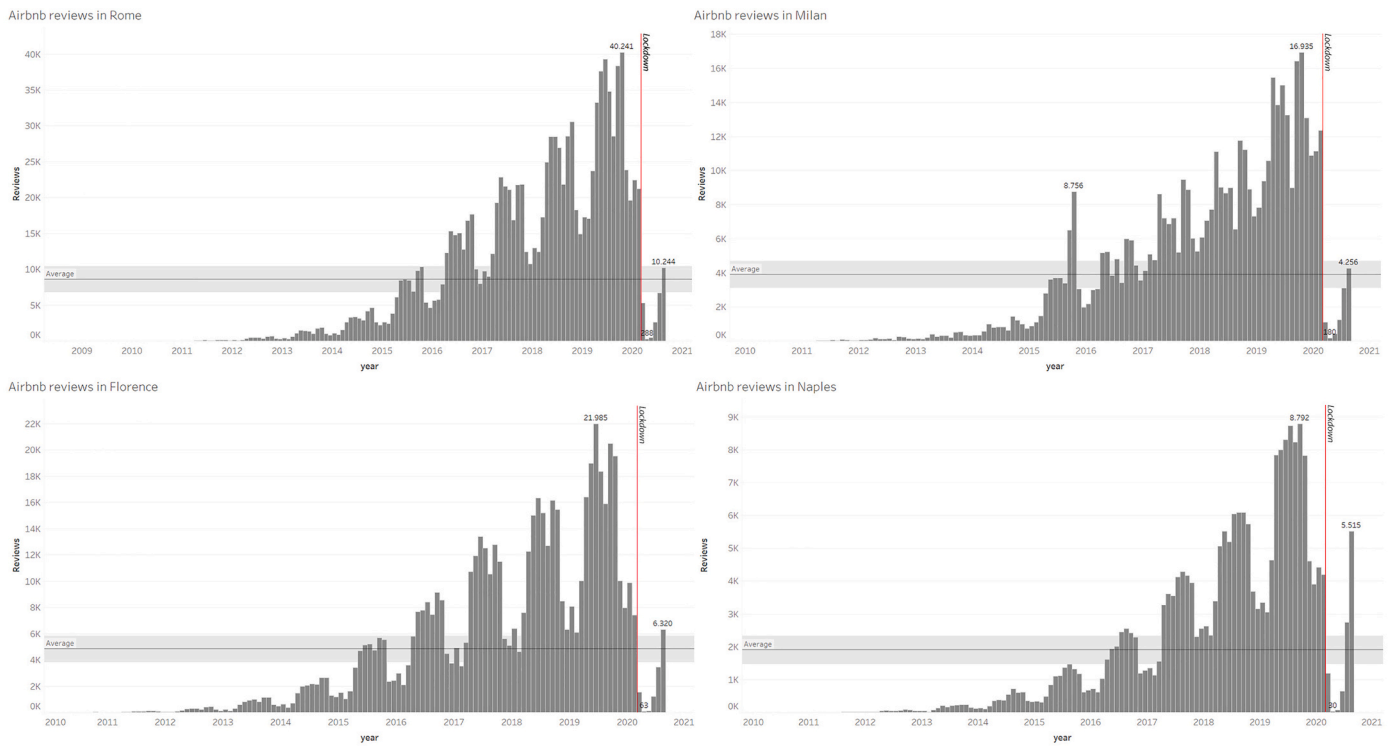


Fig. 5. Trend in Airbnb reviews (2010–2020). Rome, Milan, Florence, Naples.

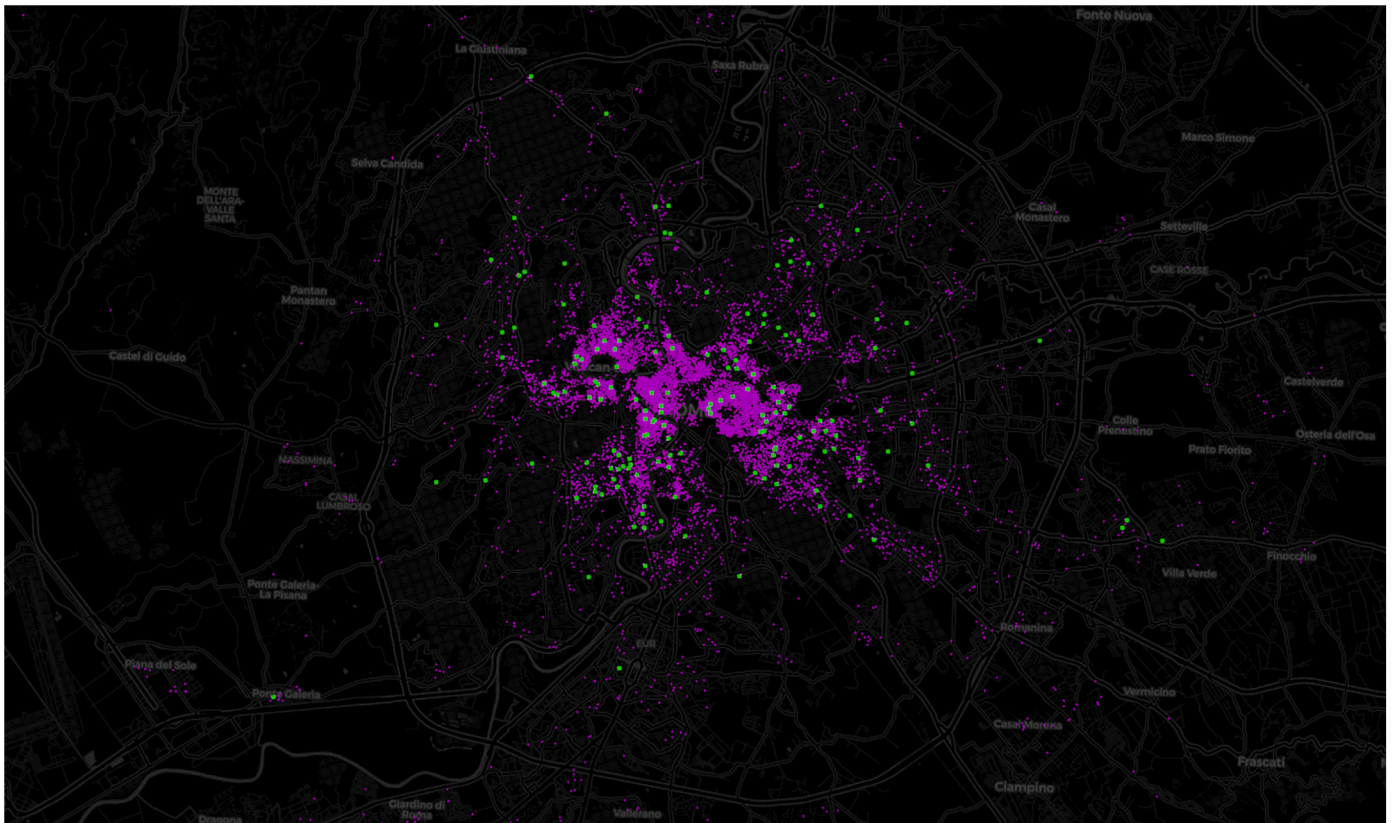


Fig. 6. Distribution of Airbnb reviews in Rome in 2020 (in purple) and during the national lockdown period (in green). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



platform's economy in the moment of crisis and the socio-economic and spatial pervasiveness of such connectors in a new explosion in the post-pandemic city.

This study has many limitations. Firstly, it concerns only four Italian cities. A comparison with other cities, like non-tourist cities, could produce interesting new perspectives. Also, the pandemic has affected non-urban areas so a comparison of different territories could balance the results. Furthermore, a more extended period analysis would strengthen the empirical-understanding of the pandemic's socio-spatial effects and dynamics. Finally, qualitative interviews with hosts could complement our final results.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- Aalbers, M. B. (2019). Introduction to the forum: From third to fifth-wave gentrification. *Tijdschrift voor Economische en Sociale Geografie*, 110(1), 1–11. <https://doi.org/10.1111/tesg.12332>
- Alizadeh, T., Farid, R., & Sarkar, S. (2018). Towards understanding the socio-economic patterns of sharing economy in Australia: An investigation of Airbnb listings in Sydney and Melbourne metropolitan regions. *Urban Policy and Research*, 36(4), 445–463. <https://doi.org/10.1080/08111146.2018.1460269>
- Arias Sans, A., & Quaglieri, D. A. (2016). Unravelling Airbnb: Urban perspectives from Barcelona. In A. P. Russo, & G. Richards (Eds.), *Reinventing the local in tourism: Producing, consuming and negotiating place* (pp. 209–228). Channel View, Bristol, 209–228. Reinventing the Local in Tourism. Channel View, Bristol.
- Artioli, F. (2018). *Digital platforms and cities: A literature review for urban research*. Cities are Back in Town Working Paper 01/2018. Paris: Sciences-Po Urban School.
- Aznar, J. P., Sayeras, J. M., Rocaforat, A., & Galiana, J. (2017). The irruption of Airbnb and its effects on hotel profitability: An analysis of Barcelona's hotel sector. *Intangible Capital*, 13(1), 147–159. <https://doi.org/10.3926/ic.921>
- Barns, S. (2020). *Platform urbanism: Negotiating platform ecosystems in connected cities*. Singapore: Palgrave Macmillan.
- Barron, K., Kung, E., & Proserpio, D. (2020). *The sharing economy and housing Affordability: Evidence from Airbnb*. Available at SSRN: <https://doi.org/10.2139/ssrn.3006832>.
- Benítez-Aurioles, B. (2019). Is Airbnb bad for hotels? *Current Issues in Tourism*, 1–4.
- Blal, I., Singal, M., & Templin, J. (2018). Airbnb's effect on hotel sales growth. *International Journal of Hospitality Management*, 73, 85–92.
- Boros, L., Dudás, G., & Kovalcsik, T. (2020). The effects of COVID-19 on Airbnb. *Hungarian Geographical Bulletin*, 69(4), 363–381.
- Bosma, J. (2021). *Platformed professionalization: Labor, assets, and earning a livelihood through Airbnb*. University of Amsterdam, Centre for Urban Studies Working Paper Series, 49.
- Van Doorne, N. (2021). A new institution on the block: On platform urbanism and Airbnb citizenship. *New Media & Society*, 22(10). <https://doi.org/10.1177/1461444819884377>
- von Briel, D., & Dolnicar, S. (2020). "The evolution of Airbnb Regulation - an international longitudinal investigation 2008–2020." *SocArXiv*. March 12. <https://doi.org/10.1016/j.annals.2020.102983>
- Capineri, C., & Romano, A. (2021). The platformization of tourism: from accommodation to Experiences. *Digital Geography and Society*, 2. <https://doi.org/10.1016/j.diggeo.2021.100012>
- Capocchi, A., Vallone, C., Pierotti, M., & Amaduzzi, A. (2019). Overtourism: A literature review to assess implications and future perspectives. *Sustainability*, 11(12), 3303. <https://doi.org/10.3390/su11123303>
- Celata, F., Capineri, C., & Romano, A. (2020). A room with a (re) view. Short-term rentals, digital reputation and the uneven spatiality of platform-mediated tourism. *Geoforum*, 112, 129–138. <https://doi.org/10.1016/j.geoforum.2020.04.007>
- Celata, F., & Romano, A. (2020). Overtourism and online short-term rental platforms in Italian cities. *Journal of Sustainable Tourism*. <https://doi.org/10.1080/09669582.2020.1788568>
- Chen, G., Cheng, M., Edwards, D., & Xu, L. (2020). COVID-19 pandemic exposes the vulnerability of the sharing economy: a novel accounting framework. *Journal of Sustainable Tourism*, 1–18.
- Cocola-Gant, A. (2016). Holiday Rentals: The New Gentrification Battlefield. *Sociological Research Online*, 21(3). <https://doi.org/10.5153/sro.4071>
- Cocola-Gant, A. (2018). Tourism gentrification. In *Handbook of gentrification studies* (p. 2018). Edward Elgar Publishing.
- Coyle, D., & Yeung, T. (2016). *Understanding AirBnB in fourteen European cities. The Jean-Jacques Laffont Digital Chair Working Papers*. 7088 pp. 1–33.
- Dodds, R., & Butler, R. (Eds.). (2019). *Overtourism: Issues, realities and solutions*. De Gruyter Oldenbourg. <https://doi.org/10.1515/9783110607369>
- Dogru, T., Hanks, L., Mody, M., Suess, C., & Sirakaya-Turk, E. (2020). The effects of Airbnb on hotel performance: Evidence from cities beyond the United States. *Tourism Management*, 79, 104090.
- Dogru, T., Hanks, L., Ozdemir, O., Kizildag, M., Ampountolas, A., & Demirer, I. (2020). Does Airbnb have a homogenous impact? Examining Airbnb's effect on hotels with different organizational structures. *International Journal of Hospitality Management*, 86, 102451.
- Dogru, T., Mody, M., Suess, C., Line, N., & Bonn, M. (2020). Airbnb 2.0: Is it a sharing economy platform or a lodging corporation? *Tourism Management*, 78, 104049.
- Dolnicar, S., & Zare, S. (2020). COVID19 and Airbnb—Disrupting the disruptor. *Annals of Tourism Research*, 102961. <https://doi.org/10.1016/j.annals.2020.102961>
- Drogu, T., Mody, M., Suess, C., et al. (2019). Adding evidence to the debate: Quantifying Airbnb's disruptive impact on ten key hotel markets. *Tourism Management*. <https://doi.org/10.1016/j.tourman.2018.11.008>
- DuBois, D. (2020). Impact of the coronavirus on global short-term rental markets. <http://www.airdna.co/blog/coronavirus-impact-on-global-short-term-rental-markets>.
- Dudás, G., Boros, L., Kovalcsik, T., & Kovalcsik, B. (2017). The visualisation of the spatiality of Airbnb in Budapest using 3-band raster representation. *Geographia Technica*, 12(1), 23–30.
- Dudás, G., Vida, G., Kovalcsik, T., & Boros, L. (2017). A socio-economic analysis of Airbnb in New York City. *Regional Statistics*, 7(1), 135–151.
- Eaglesham, J., & Grind, K. (2020). Airbnb paying more than 10% interest on \$1 billion announced Monday Airbnb's new investors get free warrants based on company valuation of \$18 billion. *The Wall Street Journal*. <https://www.wsj.com/articles/airbnb-paying-more-than-10-interest-on-1-billion-financing-announced-monday-11586297484>.
- Edelman, B. G., & Luca, M. (2014). *Digital discrimination: The case of Airbnb*. com. Harvard Business School NOM Unit Working Paper, (14-054).
- Fang, B., Ye, Q., & Law, R. (2015). Effect of sharing economy on tourism industry employment. *Population*, 1, 0–6321. <https://doi.org/10.1016/j.annals.2015.11.018>
- Farmaki, A., Miguel, C., Drotarova, M. H., Aleksić, A., Casni, A. C., & Eftymiadou, F. (2020). Impacts of Covid-19 on peer-to-peer accommodation platforms: Host perceptions and responses. *International Journal of Hospitality Management*, 91, 102663.
- Ferreri, M., & Sanyal, R. (2018). Platform economies and urban planning: Airbnb and regulated deregulation in London. *Urban Studies*, 55(15), 3353–3368. <https://doi.org/10.1177/0042098017751982>
- Fields, D., & Rogers, D. (2021). Towards a critical housing studies research agenda on platform real estate. *Housing, Theory and Society*, 38(1), 72–94. <https://doi.org/10.1080/14036096.2019.1670724>
- Fotiadis, A., Polyzos, S., & Huan, T. C. T. (2021). The good, the bad and the ugly on COVID-19 tourism recovery. *Annals of Tourism Research*, 87, 103117.
- Fradkin, A., Grewal, E., & Holtz, D. (2018). *The determinants of online review informativeness: Evidence from Field experiments on Airbnb*. Available at. <https://doi.org/10.2139/ssrn.2939064>.
- Gant, A. C. (2016). Holiday rentals: The new gentrification battlefield. *Sociological Research Online*, 21(3), 112–120.
- García-López, M.Á., Jofre-Monseny, J., Martínez-Mazza, R., & Segú, M. (2020). Do short-term rental platforms affect housing markets? Evidence from Airbnb in Barcelona. *Journal of Urban Economics*, 103278.
- Gil, J., & Sequera, J. (2020). The professionalization of Airbnb in Madrid: Far from a collaborative economy. *Current Issues in Tourism*, 1–20.
- González-Pérez, J. M. (2020). The dispute over tourist cities. Tourism gentrification in the Historic Centre of Palma (Majorca, Spain). *Tourism Geographies*, 22(1), 171–191. <https://doi.org/10.1080/14616688.2019.1586986>
- Goodwin, H. (2017). *The challenge of overtourism*. *Responsible Tourism Partnership Working Paper 4, October 2017*.
- Gurran, N., & Phibbs, P. (2017). When tourists move in: how should urban planners respond to Airbnb? *Journal of the American Planning Association*, 83(1), 80–92. <https://doi.org/10.1080/01944363.2016.1249011>
- Gurran, N., Searle, G., & Phibbs, P. (2018). Urban planning in the age of Airbnb: Coase, property rights, and spatial regulation. *Urban Policy and Research*, 36(4), 399–416. <https://doi.org/10.1080/08111146.2018.1460268>
- Gutiérrez, J., García-Palomares, J. C., Romanillos, G., & Salas-Olmedo, M. H. (2017). The eruption of Airbnb in tourist cities: Comparing spatial patterns of hotels and peer-to-peer accommodation in Barcelona. *Tourism Management*, 62, 278–291. <https://doi.org/10.1016/j.tourman.2017.05.003>
- Guttentag, D. (2015). Airbnb: disruptive innovation and the rise of an informal tourism accommodation sector. *Current Issues in Tourism*, 8(12), 1192–1217. <https://doi.org/10.1080/13683500.2013.827159>
- Guttentag, D. (2019). Progress on Airbnb: A literature review. *Journal of Hospitality and Tourism Technology*, 10, 814–844. <https://doi.org/10.1108/JHTT-08-2018-0075>
- Guttentag, D., & Smith, S. L. (2020). The diffusion of Airbnb: A comparative look at earlier adopters, later adopters, and non-adopters. *Current Issues in Tourism*, 1–20.
- Higgins-Desbiolles, F. (2020). Socializing tourism for social and ecological justice after COVID-19. *Tourism Geographies*, 22(3), 610–623.
- Horn, K., & Merante, M. (2017). Is home sharing driving up rents? Evidence from Airbnb in Boston. *Journal of Housing Economics*, 38, 14–24. <https://doi.org/10.1016/j.jhe.2017.08.002>

- Hu, M., & Lee, A. D. (November 28, 2020). *Airbnb, COVID-19 risk and lockdowns: Local and global evidence*. Available at.
- Ioannides, D., Röslermaier, M., & Van der Zee, E. (2019). Airbnb as an instigator of 'tourism bubble' expansion in Utrecht's Lombok neighbourhood. *Tourism Geographies*, 21(5), 822–840. <https://doi.org/10.1080/14616688.2018.1454505>
- Jamal, B., & Budke, C. (2020). Tourism in a world with pandemics: local-global responsibility and action. *Journal of Tourism Futures*.
- Jang, S., Kim, J., Kim, J., & Kim, S. S. (2021). Spatial and experimental analysis of peer-to-peer accommodation consumption during COVID-19. *Journal of Destination Marketing & Management*, 20, 100563.
- Kadi, J., Schneider, A., & Seidl, R. (2020). Short-term rentals, housing markets and covid-19: Theoretical considerations and empirical evidence from four Austrian cities. *Critical Housing Analysis*, 7(2).
- Kenney, M., & Zysman, J. (2016). The rise of the platform economy. *Issues in Science and Technology*, 32(3), 61.
- Kenney, M., & Zysman, J. (2019). *The platform economy and geography: Restructuring the space of capitalist accumulation*. Available at SSRN 3497978.
- Koens, K., Postma, A., & Papp, B. (2018). Is overtourism overused? Understanding the impact of tourism in a city context. *Sustainability*, 10(12), 4384. <https://doi.org/10.3390/su10124384>
- Krouk, R., & Almeida, F.. **Exploring the impact of COVID-19 in the sustainability of Airbnb business model.**  
**arXiv preprint. (2021). arXiv:2101.00281.**
- Lean, H. H., & Smyth, R. (2009). Asian financial crisis, avian flu and terrorist threats: are shocks to Malaysian tourist arrivals permanent or transitory? *Asia Pacific Journal of Tourism Research*, 14(3), 301–321.
- Lee, A., Mackenzie, A., Smith, J. D., Box, P., et al. (2020). Mapping Platform Urbanism: Charting the Nuance of the Platform Pivot. *Urban Planning*, 5(1).
- Lee, D. (2016). How Airbnb short-term rentals exacerbate Los Angeles's affordable housing crisis: Analysis and policy recommendations. *Harvard Law & Policy Review*, 10, 229.
- Li, J., Moreno, A., & Zhang, D. (2016). *Pros vs joes: Agent pricing behavior in the sharing economy*. *Ross School of Business Paper*. 1298.
- Libert, B., Wind, Y., Fenley, M., et al. (2014). What Airbnb, Uber, and Alibaba have in common. *Harvard Business Review*, 11(9).
- Massey, D. (2005). *For Space*. 2005. London: Sage.
- Milano, C., Cheer, J. M., & Novelli, M. (2018). Overtourism: A growing global problem. *The conversation*, 18.
- Nhamo, G., Chikodzi, D., & Dube, K. (2020). *Counting the cost of COVID-19 on the global tourism industry*. Springer Nature.
- Nieuwland, S., & van Melik, R. (2020). Regulating Airbnb: how cities deal with perceived negative externalities of short-term rentals. *Current Issues in Tourism*, 23(7). <https://doi.org/10.1080/13683500.2018.1504899>
- Oklevik, O., Gössling, S., Hall, C. M., Steen Jacobsen, J. K., Grøtte, I. P., & McCabe, S. (2019). Overtourism, optimization, and destination performance indicators: A case study of activities in Fjord Norway. *Journal of Sustainable Tourism*, 27(12), 1804–1824. <https://doi.org/10.1080/09669582.2018.1533020>
- Oskam, J., & Boswijk, A. (2016). Airbnb: the future of networked hospitality businesses. *Journal of Tourism Futures*. <https://doi.org/10.1108/JTF-11-2015-0048>
- Osservatorio del Mercato Immobiliare. (2019). *Rapporto Immobiliare 2019, a cura di Divisione Servizi, Direzione Centrale Servizi Estimativi e Osservatorio Mercato Immobiliare, Agenzia delle Entrate*.
- Osservatorio del Mercato Immobiliare. (2020). *Rapporto Immobiliare 2020, a cura di Divisione Servizi, Direzione Centrale Servizi Estimativi e Osservatorio Mercato Immobiliare, Agenzia delle Entrate*.
- Picascia, S., Romano, A., & Teobaldi, M. (2017). The airification of cities: making sense of the impact of peer to peer short term letting on urban functions and economy. In *Proceedings of the annual congress of the Association of European Schools of Planning, Lisbon* (pp. 2212–2223), ISBN 978-989-99801-3-6.
- Pirone, M., Frapporti, M., Chicchi, F., & Marrone, M. (2020). *Covid-19 impact on platform economy. A preliminary outlook*.
- Quattrone, G., Proserpio, D., Quercia, D., Capra, L., & Musolesi, M. (2016, April). Who benefits from the "Sharing" economy of Airbnb?. In *Proceedings of the 25th international conference on world wide web* (pp. 1385–1394).
- Richards, G. (2019). Creative tourism: opportunities for smaller places? *Tourism & Management Studies*, 15(1S1), 7–10. <https://doi.org/10.18089/tms.2019.15S101>
- Roelofsen, M. (2018). Exploring the socio-spatial inequalities of Airbnb in Sofia, Bulgaria. *Erdkunde*, 72(4), 313–328. <https://doi.org/10.3112/erdkunde.2018.04.04>
- Roelofsen, M., & Minca, C. (2018). The Superhost. Biopolitics, home and community in the Airbnb dream-world of global hospitality. *Geoforum*, 91, 170–181. <https://doi.org/10.1016/j.geoforum.2018.02.021>
- Roelofsen, M., & Minca, C. (2021). Sanitized homes and healthy bodies: reflections on Airbnb's response to the pandemic. *Oikonomics [online]*, May 2021(15). <https://doi.org/10.7238/o.n15.2104>. ISSN: 2339-9546.
- Rubino, I., Coscia, C., & Curto, R. (2020). Identifying spatial relationships between built heritage resources and short-term rentals before the Covid-19 pandemic: Exploratory perspectives on sustainability issues. *Sustainability*, 12(11), 4533.
- Sadowski, J. (2020). Cyberspace and cityscapes: on the emergence of platform urbanism. *Urban Geography*. <https://doi.org/10.1080/02723638.2020.1721055>
- Schor, J. B. (2017). Does the sharing economy increase inequality within the eighty percent?: Findings from a qualitative study of platform providers. *Cambridge Journal of Regions, Economy and Society*, 10(2), 263–279.
- Semi, G., & Tonetta, M. (2020). Marginal hosts: Short-term rental suppliers in Turin, Italy. *Environment and Planning A: Economy and Space* (online first). 0308518X20912435.
- Sequera, J., & Nofre, J. (2019). Touristification, transnational gentrification and urban change in Lisbon: The neighbourhood of Alfama. *Urban Studies*, 57(15), 10.1177%2F0042098019883734.
- Seraphin, H., Sheeran, P., & Pilato, M. (2018). Over-tourism and the fall of Venice as a destination. *Journal of Destination Marketing & Management*, 9, 374–376.
- Sherwood, H. (2020). How Airbnb took over the world. *The Guardian*. <https://www.theguardian.com/technology/2019/may/05/airbnb-homelessness-renting-housing-accommodation-social-policy-cities-travel-leisure>.
- Sigala, M. (2018). Market formation in the sharing economy: Findings and implications from the sub-economies of Airbnb. In *Social dynamics in a systems perspective* (pp. 159–174). Cham: Springer.
- Smith, N. (1987). Gentrification and the Rent Gap. *Annals of the Association of American Geographers*, 77(3), 462–465. Retrieved August 16, 2021, from <http://www.jstor.org/stable/2563279>.
- Srnicek, N. (2017). *Platform capitalism*. Cambridge, UK: Polity Press.
- UNWTO. (2020). International tourist numbers down 65% in first half of 2020. <https://www.unwto.org/news/international-tourist-numbers-down-65-in-first-half-of-2020-unwto-reports>.
- Van Dijk, J. (2020). Governing digital societies: Private platforms, public values. *Computer Law and Security Review*, 36, 105377.
- Van Doorn, N. (2020). A new institution on the block: On platform urbanism and Airbnb citizenship. *New Media & Society*, 22(10), 1808–1826.
- Wachsmuth, D., & Weisler, A. (2018). Airbnb and the rent gap: Gentrification through the sharing economy. *Environment and Planning A: Economy and Space*, 50(6), 1147–1170. <https://doi.org/10.1177/0308518X18778038>
- Wortham, J. (2011, July 25). Room to rent, via the web. *The New York Times*. Retrieved from <http://www.nytimes.com/2011/07/25/technology/matching-travelers-wit-h-rooms-via-the-web.html>.
- Zervas, G., Proserpio, D., & Byers, J. W. (2017). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of Marketing Research*, 54(5), 687–705. 10.1509%2Fjmr.15.0204.