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Digital platforms and cities: a literature review for urban research

by Francesca Artioli (University Paris-Est Créteil)

Abstract – This paper presents the findings of an international and interdisciplinary review of the literature on digital platforms and cities, with a focus on sharing (peer-to-peer) and for-profit (monetary exchange) platforms. First, the paper discusses why the development of virtually mediated peer-to-peer exchanges is a significant facet of contemporary urban change. Second, it develops a literature review clustered around five main empirical questions that may be relevant to urban research (the nature and boundaries of platform-mediated exchanges; their size and socio-economic organisation; their income and spatial distributional effects; their effects on existing markets; and their regulation and governance). This reveals that virtually mediated P2P exchanges have so far been addressed as a phenomenon *sui generis*. As discussed in the concluding section, urban research now needs to consider them within their broader urban contexts and in the light of sociological and political urban theory, in order to understand the mechanisms through which they interact with ongoing processes of social, spatial, economic and political restructuring of cities.

Introduction

The “sharing economy” is a growing dimension of the contemporary economy.[1] In its narrow sense, the term “sharing economy” refers to a peer-to-peer (P2P) exchange of resources for use, mediated through a digital platform. “Sharing” entails access rather than ownership (Belk 2007) and the purpose is to activate idle and underused resources. The development of these peer-to-peer exchanges and of their supporting digital platforms is also a significant dimension of contemporary urban change. Platform-mediated relations increasingly organise the exchange of goods (from cars to electric drills to parking lots), services (food-delivery, maintenance work, etc.), but also capital and labour. Certain sectors of urban life and the urban economy, such as mobility, accommodation and logistics/delivery, have been particularly affected in recent years, as peer-to-peer exchanges constitute a new, substantial and alternative offer to the existing socio-economic arrangements. A few of these platforms, such as Uber, Airbnb or Deliveroo, have also attracted widespread public attention because of outbreaks of protest and opposition in several cities. Both community organisations and organised economic groups (taxi drivers, tourist trade organisations) have mounted political opposition. Yet these well-known platforms are the tip of the iceberg in a world of proliferating Internet-based platforms that operate in a widening range of urban sectors, such as ride-hailing and urban mobility, accommodation and real estate, within-city delivery, food production and consumption.

This paper argues that the development of virtually mediated peer-to-peer exchanges is a significant facet of contemporary urban change. Digital platforms are an urban phenomenon and there is an urgent need to shed light on their implications for urban societies, spaces and governance. There are at least six reasons why this is a significant issue.

(1) First, virtually mediated peer-to-peer exchanges benefit from the population density, spatial proximity and socio-economic specialisation of urban agglomerations. Urban markets are bigger and deeper, which makes it easier to attract, pool and ‘match’ producers and consumers within peer-to-peer exchanges (Rauch and Schleicher 2015). Proximity can contribute to the spread of innovations and new patterns of consumption and production and changing lifestyles. In their development strategies, platform providers target the preferences and behaviours of citydwellers and consumers. Urban areas are often characterised by higher income and education levels, which are two socio-demographic determinants of participation in virtually mediated exchanges (Andreotti et al. 2017). They also form a catchment of potential workers who are easily attracted into these new precarious job markets. Finally, in urban agglomerations, urban spaces, infrastructure and resources are under strain (Salice and Pais 2017), which makes the idea of joint and temporary uses of idle resources especially attractive both for individuals (e.g. who are struggling to find a parking space and would be able to access underused parking lots) and for governments (e.g. who might see this as a solution to congestion problems).

(2) Platform mediated peer-to-peer exchanges rely on, and contribute to, the digital skin of the city (Rabari and Storper 2015), namely the ongoing development of ubiquitous mobile

[1] This contribution is part of a broader comparative project carried out by three researchers – Francesca Artioli (University Paris Est-Créteil), Thomas Aguilera (Sciences Po Rennes) and Claire Colomb (University College London). The project focuses on the modes of politicisation, framing, policy debates and approaches to/instruments of regulation relating to virtually-mediated short-term rentals in European cities (Aguilera, Artioli, and Colomb 2017).

broadband technologies, social networking and other electronically mediated interactions in the urban realm. While, as underlined by many observers, sharing is not new in cities (McLaren and Agyeman 2015), this reliance on technology to support P2P exchanges is. Platform exchanges are virtually mediated social relations, and connect urban actors both with each other and with the material urban environment. They function through augmented digital maps, accessed and edited from mobile phones and other devices, where the representation of the city, its components and inhabitants is amplified and extended with new, diverse and reputational information. Platform-mediated exchanges, and their underlying algorithms, thus participate in the production of urban knowledge and social relations (including market relations) that increasingly inform the ways city users and inhabitants choose what to do, where and with whom to do it, what is exchanged, and how, where, when and on what terms choices are made.

(3) It is also acknowledged that virtually mediated exchanges affect existing urban groups and spaces, that they are materially reshaping the urban built environment, and have significant distributive effects. Indeed, these exchanges structure new patters of accumulation. Some are non-commercial, while many others bring previously un/under-used tangible assets to the market (housing, cars, food, etc.) and produce new monetised services. They also generate new revenues (for producers) and have the potential to reduce expenditure (for consumers). They can bring major shifts in both individual choices and the overall allocation of resources (for instance, from renting one's property on the long-term rental market to the short-term rental market, or from the use of public transport and the private car to ride-hailing). At the macro-level, this affects the distribution of resources between various social groups, and neighbourhoods, in the city. It can channel new resource streams to some while penalising others. These strong distributional effects, often unequal, are increasingly matters of public debate, politicised in the recurring struggles that bring into play, in various ways, incumbent economic actors, local organisations, activists, platform workers or platform providers.

(4) Fourth, urban governments are on the frontline for regulation and there is a developing urban politics of peer-to-peer exchanges. City governments play an increasing role in the development of policies for the sharing economy (Salice and Pais 2017). They set experimental regulatory frameworks through changes in regulations, bans, taxation and agreements with platform firms (Aguilera, Artioli, and Colomb 2017). This is in part because some of the sectors most affected by platform development fall within the prerogatives of local or regional government in the fields of spatial planning, economic development, mobility, culture or health and safety. With the significant exception of labour laws and social security, much of the issues raised by P2P exchanges are the responsibility of subnational governments. Here, the geography of urban policy initiatives is variegated. They differ in their content, in their scope, and in their degrees of enforcement. They are embedded in wider political agendas that are in some cases hostile to the phenomenon, in other cases enthusiastic in their expectations for its economic benefits (Aguilera, Artioli, and Colomb 2017).

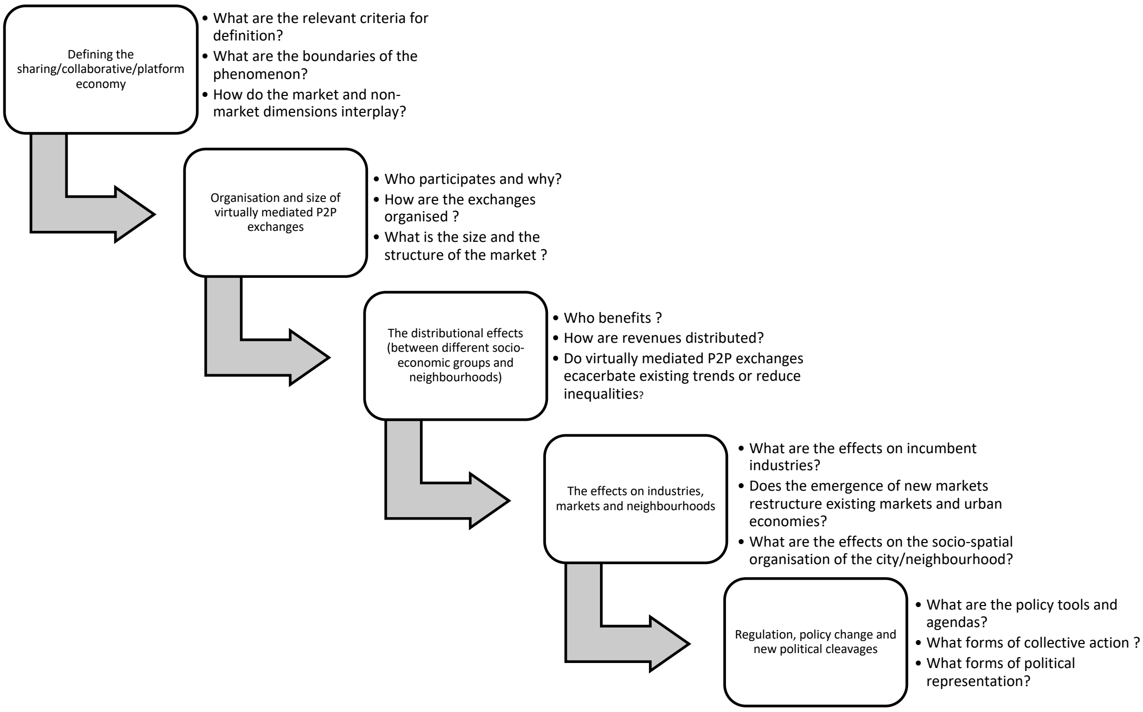
(5) The "Sharing City" (with capital letters) has also emerged as an increasingly successful new urban model. What is defined by some as the "sharing paradigm" (i.e. a worldview) promotes "ways of thinking based on sharing resources fairly rather than the ability to pay, treating the resources and the environment as the common property of humankind" (McLaren and Agyeman 2015, 9). It is a view of sharing both as a goal and as one of the fundamental means through which more just and sustainable cities and societies will be achieved. In different ways, it links the ideals of self-organisation and of the wisdom of the crowd, faith in the

benefits of technological progress with goals of social justice and environmental sustainability. It is supported by the major advocates of the sharing economy (e.g. OuiShare and Shareable) and increasingly embraced by international networks of cities. Here, it intersects with other successful models like the Smart City and the Sustainable City, with which it shares some common assumptions. Like those models, it is associated with a variety of policy recommendations for advancing the sharing paradigm, and for restructuring urban governance and public action in that direction (e.g. delivering public services through sharing platforms).

(6) Linked to the previous point is the question of the patterns of internationalisation and localism in the development of peer-to-peer and platform-mediated exchanges. On the one hand, they harvest local resources and can be mediated by platform pooling at the local level. As regulation is often the affair of subnational governments, policy tools and initiatives are also defined locally within specific agendas. On the other hand, platform development is an international process. A large number of peer-to-peer exchanges are now mediated by international corporate platforms that have acquired quasi-monopolistic positions in the markets where they operate. They develop global strategies vis-à-vis both markets and regulation, thus exploiting regulatory discrepancies and offering local governments ready-made regulatory solutions that are intended to be applicable worldwide (Aguilera, Artioli, and Colomb 2017). In addition, platform development is fuelled by the individual practices of the middle-classes, and the international standardisation of their consumption patterns and expectations in tourism and travel. Finally, as previously suggested, there is a strong international network that advocates for the advancement of the sharing economy (seen as a means of social progress), but very limited international discussion of how to deal with the corporate power of the major platforms.

This is the background to this paper's presentation of the findings of an international and interdisciplinary literature review. Academic work on platforms, virtually mediated exchanges and the sharing economy is flourishing. It covers almost the entire range of social science disciplines. The paper is an attempt to systematise the state of the art in a way that can be helpful to urban research, while identifying a number of empirical research questions, gaps and methodological issues. For this reason, the literature review has been clustered around five primary and recurrent empirical questions that might stimulate further inquiry and theorisation on the interplay between the development of digital platforms and urban socioeconomic and political change. These organise the structure of the paper, which proceeds from research with a more "internal" focus (what are 2P2 exchanges and how do they function?) to research that engages with their broader implications for societies, spaces and governance (Figure 1). The questions are: the nature and boundaries of platform-mediated exchanges (the problem of definition); the size and socio-economic organisation of the exchanges; their income and spatial distributional effects; their effects on existing markets; and their regulation and governance. This review shows that virtually mediated peer-to-peer exchanges have so far been addressed as a phenomenon *sui generis*. For future research, they should be considered both within their broader urban contexts and in the light of sociological and political urban theory, in order to understand the mechanisms through which they interact with ongoing processes of urban change. On this basis, the concluding section outlines some preliminary directions for research on digital platform exchanges relating to transformations in urban social stratification, spaces and collective action.

Figure 1 - Main topics and research questions



It should be noted that this study adopts a selective stance, which aims to provide a critical appraisal of the existing research for the attention of urban scholars. To do so, it spells out the findings in ways that make their implications for urban spaces, economies, societies and governance visible. It also points out some papers that perhaps receive less attention in the broad sharing economy/platform debate but which take a clear urban stance. Finally, the paper focuses in particular on research dealing with the accommodation sector (the short-term rental market), with insights from work on transport and on-demand professional services, as well as multisectoral research. In the recognition that almost everything could become available for peer-to-peer exchange (McLaren and Agyeman 2015), accommodation is a relevant entry-point for urban scholars. It is one of the sectors with the most obvious urban implications and on which much empirical research is available. Findings about the functioning of peer-to-peer exchanges in this field, their distributional effects and their implications for urban policies and governance, can contribute to the formation of questions and hypotheses on other sectors.

In addition, the paper deals primarily with empirically grounded scientific research. The main reason for this preference is the highly controversial character of the platform economy, which is a domain of "conflictual rhetoric and public controversies, legal disputes, and even violent protests" (Codagnone, Biagi, and Abadie 2016). This means that the topic's normative load comes with extensive materials from think-tanks, consultants, intellectuals, public regulators and platforms themselves. We find authors here who advocate for the dissemination of the sharing economy or conversely for its rejection. Some have become well-known public figures – like Rachel Botsman,[2] co-author with Roo Rogers of one of the manifestoes for the sharing economy, *What's Mine is Yours. How Collaborative Consumption*

[2] http://rachelbotsman.com/

is Changing the Way we Live (Botsman and Rogers 2011), and April Rinne[3] – and many participate in initiatives and websites such as *Shareable*[4] and *Collaborative Consumption.*[5] On the opposite side, there are materials supplied and disseminated by those whose goal is to criticise, deconstruct and denounce the operation of peer-to-peer exchanges and the folly of faith in platforms (such as, from various perspectives, Evgeny Morozov, Sebastian Olma or Nick Srnicek). Within this huge intellectual production – which is highly relevant for politics – the paper is restricted to empirically-based analysis.

Finally, given the fast pace of growth in academic production on the topic, the review is limited to published work, though it refers to some ongoing research projects in the last section dealing with directions for research.

1. The definitional spectrum between market and society: from the sharing platform to the digital marketplace

As underlined by most researchers, the topic of virtually mediated exchanges is severely lacking in common definitions and theoretical unity, which is reflected in a loose terminology that encompasses quite different phenomena ("platform economy", "sharing economy", "collaborative consumption", etc.). This reflects the difficulties of defining the boundary of the object and therefore of assigning it accepted and accurate descriptions. Some recent papers offer very comprehensive and systematic literature reviews on the broad topics of digital platforms (Coyle 2016) and the sharing economy in its various aspects (Codagnone, Biagi, and Abadie 2016; Andreotti et al. 2017; Newlands, Lutz, and Fieseler 2017). Codagnone and his colleagues have also developed a full discussion of the definitional glitches (Codagnone, Biagi, and Abadie 2016; Codagnone and Martens 2016).

Some authors take a taxonomic approach, seeking to categorise the various phenomena. For instance, Codagnone and Martens establish a two-dimensional matrix for mapping the sharing economy. This is based on the distinction between for-profit and non-profit activities, on the one hand, and peer-to-peer (P2P) or business-to-consumer (B2C) platforms, on the other (Codagnone and Martens 2016). By this method, three groups of activities are identified: P2P and non-profit (also referred as "*true sharing*"); P2P and for-profit (including most of the well-known commercial platforms such as Airbnb); and B2C for-profit activities (meaning the platforms that connect business with consumers, i.e. online shopping). The authors thus suggest that the use of the term *"sharing"* should be limited to P2P activities, both for-profit and non-for-profit. Following this taxonomy, it is the *peer-to-peer and for-profit* category that encompasses the most controversial sharing platforms (such as Uber or Airbnb), which raise major concerns about protecting both providers and consumers of informally produced goods and services, about potentially unfair competition with 'regular' businesses, and about corporate power.

Apart from taxonomies, there is a variety of definitions that, broadly speaking, range over a spectrum in which the two extremities are determined by the relevance assigned to the market or non-market dimension of these new practices. On the one hand, there are the definitions that focus on the theme of "sharing". They highlight the non-market dimensions

[3] http://www.aprilrinne.com/
[4] http://www.shareable.net
[5] http://www.collaborativeconsumption.com/

of the sharing economy, and its embeddedness in broad and sometimes new social relations (which gives sense to terms such as “collaborative economy”, “collaborative consumption” or “the mesh”). According to one of these definitions : “the defining characteristic of the sharing economy lies in the shift towards access of goods over ownership of them and can be described as comprising: (a) resource optimization: the sharing economy promotes practices focusing on reuse rather than acquisition and on access rather than ownership; (b) peer-to-peer relationship: disintermediation supports the direct relationship between supply and demand with a disappearance of boundaries between the funder, producer, consumer and provider; (c) technological platforms supporting digital relationships where social distance is more critical than geographical distance and trust is managed through digital reputation” (Mazzucotelli Salice and Pais 2017, 202).

Research built around these kinds of definitions puts emphasis on the new practices and the blurring of roles between consumers and producers. It also highlights the emergence of new relationships that are different from “pure” market relations. A purely market relation implies indifference to the identity of the contractors, the symmetry of the relationship and money as a means of exchange, whereas the sharing economy includes relationships where money is not necessarily the medium of exchange (though it may remain relevant), where the identity of the person involved in the exchange matters, where the relationship relies on a sense of membership, and hence exit is not as easy as in a regular market transaction (Mazzucotelli Salice and Pais 2017). While recognising that the most widespread sharing platforms are entirely based on almost pure market exchanges, the above-mentioned strand of research is interested in the transformative nature of many sharing experiences in respect to the market/society conundrum. In this view, the sharing economy institutes new patterns of integration between economy and society in late capitalism. This also leads some authors, especially those engaged in normative claims, to reject the term “sharing economy”, in favour of “sharing society” and then “sharing city”, in reference to a broader transformation in urban social ties and structures (Agyeman, McLaren, and Schaefer-Borrego 2013; McLaren and Agyeman 2015).

On the other hand, at the opposite end of the definitional spectrum, are those that focus on platforms as “digital marketplaces”. In fact, this strand of research is primarily interested in those platforms through which goods, services, capital or labour are exchanged *for monetary benefits*. It focuses both on the operation of peer-to-peer markets and on the firms that organise the digital matching of demand and supply. According to Telles, these “digital matching firms” exhibit the following characteristics: (a) they use information technology (IT systems), typically available via web-based platforms, such as mobile “apps” on Internet-enabled devices, to facilitate peer-to-peer transactions; (b) they rely on user-based rating systems for quality control, ensuring a level of trust between consumers and service providers who have not previously met; (c) they offer the providers flexibility in deciding their typical working hours and times of service; (d) to the extent that tools and assets are necessary to the provision of a service, digital matching firms rely on the providers using their own (Telles 2016).

By comparison with the “sharing” approach, research associated with the “digital marketplace” definition adopts a narrower focus. It builds on a clear-cut distinction between not-for-profit and for-profit exchanges, and develops in-depth discussions, analysis and sometimes very critical accounts of the operation (demand and supply matching), regulatory framework and effects of these exchanges. For-profit digital matching firms are seen as disruptive market innovations. Empirically, this “digital matching” approach directs its attention almost entirely toward the biggest platforms, their functioning and regulation (Airbnb, Uber or Lyft). By contrast, the “sharing” approach focuses on a broader range of cases and takes account of “sharing policies”, including urban policies.

This theoretical debate meets real-world controversies in its polarisation between for-profit and not-for-profit exchanges. Indeed, the general theorisation of the sharing economy does not reject the idea of profit and monetary benefits: renting and fundraising are forms of bartering and gifting. However, the corporate power assumed by the best-known platforms (vis-à-vis both their workers and the regulators) has prompted a debate around the difference between “true sharing” and the other forms of practice, and about which criteria should be used to sort the wheat from the chaff.

Given the goal of this paper, which is to discuss the implications of peer-to-peer digital platforms for cities, the sections that follow adopt a broad view and discuss pieces of empirical research that occupy various positions on this definitional spectrum.

2. The organisation and size of P2P virtually mediated exchanges

This section reviews the literature that deals with the organisation, size and structure of peer-to-peer virtually mediated exchanges. On the one hand, it sums up the findings on the *size*, *value* and *distribution* of what is exchanged (macro approach). On the other hand, it synthesises what is known about the *determinants* and the *organisation* of peer-to-peer virtually mediated exchanges from both a microeconomic and a micro-sociological perspective.

2.1 Sizing platform-mediated exchanges: volume, revenues and market concentration

A relevant line of reasoning for understanding the organisation of virtually-mediated peer-to-peer exchanges consists in the quantification of the for-profit peer-to-peer exchanges. There have been many attempts to estimate the size, value and structure of the market. This approach is fairly underdeveloped and reveals the serious lack of available data. The exact size of transactions, the value of the exchanges and the flows of money remain to be quantified. The biggest platforms are not publicly traded, which markedly restricts the amount of information available about them.

For this reason, estimates of the size and growth of virtually mediated P2P exchanges tend to come from private-sector analysis. They are based on consumer and platform surveys and focus on for-profit platforms. PricewaterhouseCooper (PwC), in particular, has released several reports. The Impulse paper for the European Commission (2016) assesses the size of the sharing economy market in Europe. The study focuses on the five largest sectors (in terms of market size), which are: peer-to-peer accommodation (households sharing access to unused space in their home or renting out a holiday home to travellers), peer-to-peer transport (individuals sharing a ride, car or parking space with others), on-demand household services (freelancer marketplaces through which households can access on-demand support with tasks such as food delivery and DIY), on-demand professional services (freelancer marketplaces through which businesses can access on-demand support with skills such as administration, consultancy and accountancy), and collaborative finance (individuals and businesses that invest, lend and borrow directly between themselves, such as crowd-funding and peer-to-peer lending).

PWC estimates that, in 2015, these five sectors generated revenues for the platforms of nearly €4bn and facilitated around €28bn of transactions within Europe (Vaughan, Daverio, and PWC UK 2016, 3). The transport and accommodation sectors were the largest, followed by on-demand household services. Interestingly, P2P transport was the largest sector by revenue (revenue €1.65 billion, value €5.1 billion), while the largest sector in terms of overall transactions was P2P accommodation (revenue €1.15 billion, value €15.1 billion) (Vaughan, Daverio, and PWC UK 2016, 7). In addition, between 2014 and 2015, the value of transactions grew by 77% and platform revenues doubled (+97%) (Vaughan, Daverio, and PWC UK 2016, 7).

There is a deficiency of research into the territorial scope of these exchanges, and especially their size and volume in cities. Evidence exists for the biggest commercial platform (Vaughan, Daverio, and PWC UK 2016; Telles 2016). For instance, there are now significant numbers of case studies that have analysed the size and volume of the Airbnb offering in various cities (see following sections). By contrast, much less is known about individual sectors, especially those sectors without a quasi-monopolistic platform. For instance, it is hard to estimate the size and volume of the food-delivery market in one city, as this has to be done by combining data from the various platforms operating in the sector. Similarly, city-based and multisector studies are virtually non-existent. They would make it possible, for instance, to assess the size and growth rate of virtually mediated peer-to-peer markets in comparison with other urban markets.

However, it is worth noting that efforts have been made to quantify size, structure and value for the short-term accommodation sector and for the Airbnb platform itself. This literature provides evidence on and investigates many claims made by the platform about who are the providers of short-term rentals, which are reflected in the structure of the rental market. Indeed, the company argues that most of the supply comes from "ordinary" people renting their homes to make ends meet. In this view, individual providers are unlikely to hold more than one or two properties. By contrast, there is increasing empirical evidence of a growing concentration and professionalisation of the supply in the hands of a limited number of homeowners, which is reflected in the existence of a market with significant numbers of multiple property holders.

Evidence in support of the platform argument comes from Coyle and Yu-Cheong Yeung. In their sample of 14 European cities, they look at the proportion of hosts listing multiple properties on the website and conclude that there are relatively few. Yet there are huge differences from one city to another, as the proportion of hosts with a single listing ranges from 90% (Paris) to 70% (Barcelona). In the United States, Schor and her colleagues come to a more nuanced conclusion (Schor 2017). Using a dataset that includes all US Metropolitan Statistical Areas with more than 500,000 inhabitants, they find that about 60% of hosts had one listing, and the proportion of hosts with the largest number of rentals (> 10 properties) was about 7.5%. This led them to argue that Airbnb is still a P2P marketplace, despite signs of an increasing tendency for renting to become a business activity. Nevertheless, these same results might also be interpreted in the opposite sense: the proportion of multiple renters is far from insignificant, even in a large dataset such as this that includes cities with limited tourist appeal.

Furthermore, the authors who have studied tourist cities and countries all point to ongoing processes of concentration. The well-known report by the Office of the New York State Attorney General, which set off massive debates in the city, showed that 94% of Airbnb hosts offered at most two single units, but the remaining 6% of hosts provided 36% of short-term accommodations (reservations), and received 37% of all host revenue (Schneiderman 2015). This last figure also raises an important methodological point. Indeed, it prompts us to look not only at how many renters offer just one unit, but also at how the supply is distributed in terms of volume, and whether or not there is significant concentration in the hands of a limited number of renters. These findings on the concentration of supply in the hands of a few owners have been confirmed by more recent and in-depth analysis (Wachsmuth et al. 2018). Others have drawn similar conclusions for the cases of Barcelona (Arias Sans and Quaglieri Domínguez 2016), Paris (Chareyron, Cousin, and Jacquot 2015) or Rome (Celata, Sanna, and De Luca 2017). For Barcelona, in their research on 300 cases of 'whole flats' rented in the city, Albert Arias Sans and Alan Quaglieri Domínguez found that only 45% of the "hosts" were listing just one unit. The average number of units listed per landlord was 5.21. In addition, only 7% of these were officially registered as professionals. All this indicates a distribution in total supply skewed towards multiple renters and the presence of a group of renters running a *de facto* illegal, unregistered business (Arias Sans and Quaglieri Domínguez 2016).

2.2 How exchange relations function and who gets to exchange with whom

Under the general question of the organisation of P2P platform-mediated exchanges, another strand of research focuses on platform-mediated peer-to-peer exchanges as an economic exchange *sui generis*. Research question and methodologies are constructed to shed light on the structure of exchange relations, on the determinants of participation and on inequalities in participation. Here, there is a fairly clear-cut division between economics and sociology, each pursuing a different line of enquiry.

Microeconomic perspectives have four main issues under empirical scrutiny: a) the efficiency of the marketplace in reducing transaction costs and in matching demand and supply (Fradkin 2015); b) price formation (Ikkala and Lampinen 2014; Wang and Nicolau 2017); c) user-generated rating systems, their operation, structure and systematic bias (Zervas, Proserpio, and Byers 2015); d) and the problems of moral hazard and oversight in peer-to-peer lending (Weber 2014). Management studies also consider how sharing practices come with user-generated content and user-generated branding, and how this differs from other types of branding. For instance, user-generated branding on Airbnb and Couchsurfing emphasises the possibility of access to the private sphere, the human dimension, the authenticity of the experience and interpersonal relations (Yannopoulou, Moufahim, and Bian 2013).

In parallel, there is a growing strand of work in sociology focusing on the various factors that determine *who* participates in the exchanges and for what motives. Unsurprisingly, *sociodemographic characteristics* help to explain individual participation in the sharing economy (for an accurate review see Andreotti et al. 2017). It is known that age (young), gender (males), education (higher) and income (higher) increase the likelihood of participating in the sharing economy. These sociodemographic factors are broadly similar for most Internet-based activities. Interestingly, urban dwelling also seems to be a relevant sociodemographic variable. Both in the US and in Europe, there seems to be a positive correlation between living in an urban area and familiarity with and participation in sharing practices (Smith 2016; Eurobarometer 2016). With regard to motivation, there is an interplay between economic and non-economic motives. It is acknowledged that there is a mix of instrumental motives (economic), normative motives (sustainability, altruism), and social-hedonic motives (enjoyment, community) in participating in sharing practices for both consumers and producers. Individual values and attitudes toward the sharing economy itself also matter (for a review see Andreotti et al. 2017). In addition, this non-economic dimension of the exchange sustains the emergence and spread of platforms themselves. Celata et al. (2017) discuss how there is an interplay between trust, reciprocity and belonging in feeding the development of peer-to-peer exchanges (which they consider as "community marketplaces"), and how this varies for different kinds of platforms.

Sociological research is also focusing increasingly on the operation of the exchange (who exchanges with whom?) and how class, education and race come into play. Schor and her colleagues observed a time bank, a food swap, a makerspace and an open-access education site, all of them interestingly much removed from the major for-profit platforms (Schor et al. 2016). They found what they called the "*paradox of openness and distinction*" in individual relationships. Indeed, all exchange platforms advocate for open access and equal opportunities, and participants heartily embrace these same arguments. Yet, interactions and exchanges are marked by distinguishing practices. This leads to exchange communities that tend to be homogeneous in terms of cultural capital, and subtle and not-so-subtle signals are deployed to exclude low-status members (for instance, in food swap, the rejection of certain highly creative meal items because they contained processed food).

Racial discrimination is also a fast-growing object of scrutiny. The original research from Edelman, Luca and Svirsky focuses on racial discrimination among accommodation providers (Airbnb hosts). Through a quasi-natural experiment on Airbnb, the authors found that applications from guests with distinctively African-American names were 16 % less likely to be accepted than those from guests with identical profiles but ethnically neutral names (Edelman, Luca, and Svirsky 2017). This confirmed their early study on New York City, where racial discrimination was tested by cross-referencing pictures of landlords with the prices they charged. They found that non-black hosts charged 12% more than black hosts for the equivalent asset (Edelman and Luca 2014). Kakar et al. found a similar result for San Francisco, where Asian and Hispanic hosts charged on average 8%-10% less than white hosts. In their view, this is due to the fact that minorities set lower prices in anticipation of on-line discrimination and try to attract a larger pool of potential customers (Kakar et al. 2017).

Recently, others have also found evidence of discrimination between platform users. Ge and colleagues studied discrimination in the domain of peer-to-peer transport, investigating whether or not passengers were treated equally. Through two control-trial experiments in Boston and Seattle, they found that African-Americans experienced longer waiting times and higher cancellation rates. In one case, they also found that female passengers experienced longer and hence more expensive rides (Ge et al. 2016). Along the same lines, Cui et al. conducted a field experiment in Boston, Chicago and Seattle, where they sent accommodation requests from fictitious guests. They found that consumers with obviously African-American names were systematically discriminated compared with people with obviously white names, and were more likely to be rejected (Cui, Li, and Zhang 2016). Nevertheless, discrimination iswhen African-American hosts receive a review, either negative or positive. This result is interesting with regard to the above-mentioned studies because it finds a *specific effect of virtually mediated P2P exchanges* on discrimination. Yet, when lacking information about guests, rent providers pass a judgement on them based on their assumptions about race.

These different works are extremely relevant to urban research, as they shed light on the determinants and operation of peer-to-peer exchanges. However, as they investigate platform-mediated peer-to-peer exchanges in isolation, these findings rarely spell out how virtually mediated exchanges differ from other types of social relations and market exchanges, and whether or not they affect them.

3 Who benefits? Distributional effects and inequalities

A further step towards understanding the development of platform-mediated peer-to-peer exchanges entails re-situating them within broader socio-economic dynamics. As emphasised by Juliet Schor (2017), it is necessary and fruitful to ask whether the sharing economy reinforces or weakens larger economic trends. The question is whether or not peer-to-peer exchanges of goods, services or capital perpetuate patterns of inequalities in the non-digital economy, exacerbate existing trends toward greater inequality, or have some mitigation effects. In response to this challenge, one strand of research has looked at the *distributional effects*, namely the effects of peer-to-peer exchanges across income distributions and (for the case of short-term accommodation) across different neighbourhoods.

3.1 On income and distributional socio-economic effects

One of the major expectations for peer-to-peer exchanges is the possibility, for both providers and consumers, of obtaining new monetary benefits (Vaughan, Daverio, and PWC UK 2016). For providers, benefits come from the possibility of monetising housing, tools, resources, time and skills to make extra money. For consumers, benefits arise both from the possibility of borrowing without buying and from the competitive prices of platform-mediated goods and services. When consumers are also providers, they can benefit from both sides of the exchange. However, these assumptions about monetary benefits are among the most controversial themes of peer-to-peer exchanges when linked with their broader distributional implications for social stratification and inequality.

First, there is a growing literature in the fields of economic sociology, the sociology of labour and industrial relations, concerning the monetary benefits for *providers* 'working' with major platforms.[6] The findings are split. On one side, major platforms actively produce reports that show the economic benefits for providers. The study authored by Hall and Krueger at the request of Uber also showed that the platform's drivers valued the flexibility of the job and earned at least the same and often more than US taxi drivers (Hall and Krueger 2015). By contrast, and besides the scepticism regarding the trustworthiness of Uber sponsored research, others authors advance exactly the opposite claim and broaden the scope of the research from monetary benefits to encompass the wider issue of working conditions (Hill 2015; Scholz 2016). On this issue, many have pointed out the huge imbalance in bargaining power between the platforms and the providers, along with their insecure working conditions and the fact that they are classified as 'third party contractors' rather than 'employees' (for a literature review on bargaining power see Newlands, Lutz, and Fieseler 2017). Recently, new qualitative, multiplatform studies have emerged. Based on interviews with providers on

[6] This point is also connected to the broader research field on the digital transformation of work, which is not discussed here. A clear picture of the debates can be found in the work by the COST Research Network "The Dynamics of Virtual Work" (http://dynamicsofvirtualwork.com/), published in an 8-volume series by Palgrave Macmillan.

Airbnb, Taskrabbit, Kitchensurfing and Uber, Ravenelle shows the vulnerability of the providers vis-à-vis the platforms, especially when facing changes in platform design, service offerings and algorithms which are entirely beyond their control (Ravenelle 2017). This research also shows that the workers do not adopt the rhetoric of the sharing economy, describing themselves simply as wanting to earn money.

Second, as suggested before, monetary benefits can be thought of in terms of their effects on income distribution across different socio-economic groups. Some claim that there is a redistributive effect. Indeed, the economists Fraiberger and Sundarajan (2015) developed a theoretical model of P2P car rental markets in which consumers also rent out their assets. They argue that consumption shifts are more pronounced for below-median income users, who also provide a majority of rental supply. This therefore suggests that populations with below-median income will enjoy a consistent fraction of gains from this kind of peer-to-peer exchange (Fraiberger and Sundararajan 2015).

However, this rests on the assumption that low-income people are more likely to engage in sharing exchanges because their marginal utility is higher, as they have more limited ownership. It therefore underestimates what sociologists have observed about participation in the sharing economy, namely that class, education and race are at play in who gets to access the sharing exchanges and hence to benefit from the sharing economy. Acknowledging this point, Dillahunt and Malone (2015) discuss the perceptions of unemployed people and how feasible it is for them to share spare resources and to find temporary employment through on-line platforms. They still conclude that it is potentially beneficial to low-income groups (the "promise of the sharing economy"), but only on condition that their capacity and opportunity to access the exchange are facilitated (Dillahunt and Malone 2015).

However, much research increasingly argues the opposite view, contending that various mechanisms at play in peer-to-peer exchanges help to reinforce inequalities. Through qualitative methods (interviews with Airbnb, RelayRides and TaskRabbit providers), Schor has addressed the broader question of how peer-to-peer exchanges are affecting the distribution of income *within* the bottom 80% of the population (Schor 2017). While it is acknowledged that the founders of platforms have achieved astronomical returns (placing them at least in the highest decile), there is less evidence about the effects of P2P exchanges within the broader middle and working classes. Schor found that most providers are highly educated (which is consistent with Hall's and Krueger's research on Uber), and have other sources of income. As these better off households move into activities that have traditionally been the province of blue and pink-collar workers (e.g. moving and cleaning for TaskRabbit), the author concludes that there is a crowding-out effect in the blue/pink collar job markets, leading to an exacerbation in inequalities within the 80%.

Recent research on 13 Italian cities has measured the Gini coefficient for the distribution of Airbnb revenues among hosts (Picascia, Romano, and Teobaldi 2017). Inequality in Airbnb revenues is high everywhere (from 0.51 to 0.70) and increased between 2015 and 2016 in all the cities, which is helpful when it comes to hypothesising trends. A limited number of renters receive about two thirds of total revenues. Interestingly, the Gini index for Airbnb revenues is much higher than the Gini index for income inequality at the national level (0.36). Though approximate, this measurement indicates that the capture of benefits is skewed in favour of the top-end hosts. The unequal revenue distribution is consistent with what has been found in many other cases, including New York (Wachsmuth et al. 2018) and Canadian cities (Wachsmuth et al. 2017).

3.2 On neighbourhood distributional effects

For urban scholars, it is also relevant to consider the spatial dimension of income distribution, which is a matter of interest for research into the localised effects of the short-term accommodation market. These authors focus on whether and how these new uses of the housing stock contribute to the production and reproduction of inequalities. The method used is to match the location of Airbnb supply with fine-grained census data about the socioeconomic conditions of the areas where the supply has developed. Interestingly, they also challenge some of the main claims made by the platform on this matter: that properties listed on Airbnb, and hence the benefits they generate, cover areas wider than those covered by hotel clusters (usually city centres); that properties are listed in low-income neighbourhoods which bring new revenue streams to these areas and their inhabitants as a result of higher rental income and local tourist spending.

What is known about the locations and neighbourhood's characteristics of short-term accommodation? For the United States, Cansoy and Shor (2016) find a complex interplay of race, income and education (Cansoy and Schor 2016). On the one hand, lower median income and non-white areas have more short-term accommodation, which seems to confirm the thesis that the Airbnb market has a distributive effect. On the other hand, however, this is heavily mitigated by the fact that better-off and white neighbourhoods (where the supply is smaller) charge higher prices and receive better ratings from users. In addition, there is a positive correlation between the educational level of hosts and the number of properties they list, the prices and the income. Given that guests too tend to be highly educated, this homophily is seen by the authors as a key to understanding the long-term effects on the built environment, including the gentrification process.

With regard to European cities, Couyle and Yu-Cheong Yeung (2016) concur with Airbnb's claim that the properties are not limited to city centres and are more diverse in their location. Yet a detailed analysis of London develops a more detailed view: there are still listings in diverse areas outside the centre, but a longitudinal assessment (2012-2015) shows that the offer developed first and foremost in the centre, and then spread (Quattrone et al. 2016). In addition, listings outside the centre tend to be in areas that are attractive and accessible by public transport, but are more sporadic in suburban areas. Quattrone and colleagues also found a difference between the locations of renters of rooms and renters of whole apartments, a difference that certainly affects the revenues they earn. Indeed, single rooms are mostly available in low-income areas with young, highly-educated and foreign-born inhabitants, while whole apartments are more likely to be found in wealthy districts, with houses at the high end of the real estate market. A longitudinal study on New York (2011-2016) found that Airbnb listings have become more geographically dispersed, and that modest neighbourhood in particular have grown in popularity (Coles et al. 2017).

By contrast, research on Barcelona and Italian cities found limited or no evidence in support of the decentralised nature of the supply (Picascia, Romano, and Teobaldi 2017). In Italian cities, the offer is heavily concentrated in the city centres (as are hotels). Milan is an exception, because of the spatial structure of the city, with attractive hubs outside the core areas, which makes it similar in some respects to London. In Barcelona, as with most of the Italian cities, there is an overlap between the supply of Airbnb properties and hotels, with two different studies showing a strong correlation in locations (Arias Sans and Quaglieri Domínguez 2016; Gutiérrez et al. 2017). The supply of short-term rental properties in peripheral areas is limited. Where they do exist, their presence is not correlated with income, but with proximity to the city centre or other tourist attractions (Arias Sans and Quaglieri Domínguez 2016). In addition, the distribution of Airbnb supply reveals that it is concentrated in middle-class areas, and very limited in the poorest neighbourhoods. This runs counter to the idea that short-term accommodation can bring resources into such areas.

Furthermore, research on Barcelona adds a significant insight – which would merit more comparative research – into the socioeconomic characteristics of the people who rent their homes, compared with the socioeconomic characteristics of the neighbourhoods they live in (Arias Sans and Quaglieri Domínguez 2016). On average, they are more educated, have fewer children and have a higher ratio of rooms to people in their apartments. This might suggest that, in a given neighbourhood, better-off households benefit more from the new market.

In sum, all the studies discussed reveal that the monetary benefits of the new accommodation markets are unequally distributed across cities, and some point to mechanisms that entrench inequalities rather than redistributing wealth. Indeed, centrality, attractiveness (proximity to tourist and other amenities), accessibility and public transport, city centre location, are the most common factors that explain location. This means that they are potentially of benefit to only some low-income areas, as those that lack these characteristics are likely to be excluded from the short-term accommodation market. In addition, even where low-income households receive some monetary benefits, there are signs that households that are better-off and more educated, and white, receive more.

The spatial distribution of the exchanges and the revenues they generate has largely been explored in relation to the short-term accommodation sector. It would be interesting, therefore to gain a better understanding of this spatial distribution for other sectors as well. In this vein, the substantial work by Thebault-Spieker, Terveen and Hecht on TaskRabbit and UberX shows that these platforms thrive in the areas of Chicago with high socioeconomic status and high density, while they struggle in poor areas. Thus better-off neighbourhoods enjoy more of the potential benefits of the platforms (Thebault-Spieker, Terveen, and Hecht 2017).

4 The effects on existing markets: taxis, hotels and housing

Another line of inquiry revolves around the question of whether or not platform-mediated peer-to-peer exchanges affect the structure of urban economies. Here, two issues have received the most scholarly attention: on the one hand, the direct effects on incumbent providers in the hospitality market (hotels) and the mobility market (taxis) and, on the other hand, the effects of short-term rentals on the housing market. This second point has also been addressed in research which, departing from purely economic accounts focused on property prices, discusses issues of gentrification and neighbourhood change.

4.1 On the effects on incumbent economic actors: hotel and taxis

It is widely assumed in public debates that the rise of peer-to-peer exchanges has created new competition in some sectors, especially hotels and taxis. In recent years, organisations in the accommodation and transport industry have reacted, sometimes very energetically, demanding regulation on the grounds of unfair competition. It is also argued that the emergence of an alternative source of supply has shifted consumers from incumbent providers (hotels, taxis) to sharing providers, putting the former's revenues in jeopardy.

The development of peer-to-peer market exchanges has been analysed as *a disruptive innovation that transforms the market, eventually to the point of overturning incumbent companies* (Guttentag 2013). From this perspective, research has been conducted on the hotel and the taxi industries, using regression models or counterfactual models (difference in differences), to search for significant effects. However, a comparison of the findings reveals the absence of a robust conclusion, partly because independent studies are limited in number. While some studies found the expected negative effects, others did not find statistically significant effects caused by platform development.

Results for the hotel industry are sparse, but point to the size of the Airbnb market having a negative impact on hotel revenues and pricing. Country and region-based studies suggest that this effect is greater in cities, and depends on the level of supply of both Airbnb properties and hotels. The much-debated research by Zervas, Proserpio and Byers on Texas concluded that, in Austin, Airbnb development has led to an 8-10% reduction in hotel revenues. Interestingly, they also show that this impact is greater on budget hotels and on hotels for non-business travellers (Zervas, Proserpio, and Byers 2015). The authors also develop an argument on consumer benefits, contending that consumers benefit from the fact that Airbnb substantially reduces the ability of hotels to raise prices during peak demand times. Research conducted across major US cities concludes that the effect is smaller: on average a 10% increase in the size of Airbnb provision reduces hotel revenues by 0.6%, but the effects are stronger in cities with limited hotel provision.

A few studies exist for European accommodation markets. Nesser (2015) replicates Zervas' model for Norway, Finland and Sweden. The author concludes that Airbnb does not on average affect hotel revenues, but nevertheless found an effect on pricing: the average price of a room fell in markets where Airbnb had penetrated the furthest (Neeser 2015). A study on the Netherlands also found that Airbnb had a small negative impact on hotel revenues (Hooijer 2016). By contrast, the paper by Coyle and Yu-Cheong Yeung (2016) finds limited statistically significant results and ambiguous effects on the hotel industry, which prompted them to qualify the widespread assumption concerning the negative consequence for hotels (Coyle and Yu-Cheong Yeung 2016). Finally, there have been a few studies dealing with Asia. A qualitative paper on the hotel industry in Singapore claims that Airbnb is not yet a competitor although it is a threat to budget hotels (Koh and King 2017). A paper on South Korea finds that Airbnb listing is not related to change in hotel revenues, except for a small effect on budget hotel revenues in Seoul, where there is a higher concentration of listings (Choi et al. 2015).

Limited research has been done on Uber and taxis. Bond (2015) has analysed San Francisco, the District of Columbia and New York, and affirms that Uber has had a negative impact on both the revenues of taxis and on the value of taxi licences (Bond 2015). In their study on US cities, Berger, Chen and Frey show that Uber's development has reduced the earnings of incumbent drivers in point-to-point transport services, but it has not reduced employment in payroll taxi services (Frey, Berger, and Chen 2017). Besides the issue of revenues, Wallsten's study of New York City and Chicago claims that Uber's development has increased the quality of taxi services, which the author interprets as being a response by cab drivers to the new competitors (Wallsten 2015). Finally, a piece of research on Californian cities advances the idea that Uber services have contributed to a reduction in alcohol-related traffic accident fatalities, which can be seen as a broader societal effect (Greenwood and Wattal 2015).

4.2 The effects on housing rental markets and gentrification

The effects of the virtually mediated short-term rental market on the "regular" housing rental market are attracting increasing scholarly attention, notably the questions of market re-segmentation and price evolution. Tourist accommodation and long-term rental accommodation requirements are generally met by different markets with limited overlap. However, the development of short-term vacation rental markets can lead to the conversion of part of the housing stock, i.e. the process whereby a proportion of the properties supplied on the "traditional" long-term market is redirected to the short-term market. The expectation is that this reduction in supply will lead to an increase in standard rent levels. While this is theoretically sound, it raises the methodological challenge of isolating a "platform" effect from the substantial number of other variables that drive rent levels up and down.

The process of conversion has been carefully documented for the case of New York. Wachsmuth and colleagues estimate that the short-term rental phenomenon has removed between 7000 and 13,000 units from the city's long-term rental market. The higher profitability of the new form of rental provides a strong incentive for conversion. According to this study, owners of frequently rented entire-home Airbnb listings earn 200% or more above the median long-term rent for the neighbourhood (Wachsmuth et al. 2018).

Regarding the effect on prices, Levendis and Dicle studied the rental market in New Orleans. For each zip code in the city, the authors investigated whether there was a correlation between an increase in rents and changes in Airbnb activities, and found none (Levendis and Dicle 2016). However, there is now more and more research showing an effect of short-term vacation rentals on both property conversion and prices. A study by Lee discussed the increase in rental prices in Los Angeles, with a focus on the neighbourhoods that have witnessed the highest increase in rents, which are also those displaying the highest concentrations of properties on Airbnb (Lee 2016). The latter now represent 3% of the total rental stock in areas with low vacancy rates. In a tight housing market, the author argues that a conversion from 'traditional' to short-term is the reason why regular rents go up. The author also raises the significant point that, in such neighbourhoods, people looking for a long-term apartment to rent are no longer contending just with the already high prices for residential properties, but also with the extra profitability of short-term accommodation. The whole US rental market has been analysed recently: Barron et al. (2017) used a statistical instrumental variable model to isolate the effects of Airbnb development on housing prices. They suggest that Airbnb growth can explain 0.27% of annual rent growth and 0.49% of annual house price growth for the years 2012-2016 (Barron, Kung, and Proserpio 2017).

For Europe, Coyle and Yu-Cheong Yeung (2016) tested the effect of Airbnb supply on rental prices for German and UK cities. While they found no effects for Germany, they did find them in the UK. They interpret the British result as attributable to the tightness of the housing market, which is so extreme that even a small variation in supply reflects on prices. This is a significant result, especially considering that, at their broad scale of analysis, the Airbnb offer is a tiny proportion of the total stock. Indeed, this relation between market tightness, conversion and prices might also be of relevance in interpreting those cases where the listing of the housing stock on Airbnb has reached unprecedented levels. This is the case for some Italian cities. In the historic city centre of Florence, Italy, 18% of the housing stock is listed on AirBnB (Picascia, Romano, and Teobaldi 2017). This impressive figure raises concerns about the effects of the "airification" of Italian cities (meaning the large-scale conversion of their housing stock into tourist provision) on the current housing crisis.

For the case of Berlin, authors have analysed the conversion from long-term to short-term through the study of the misuse (for vacation rentals) of residential housing stock, which is protected by law. They found that misused apartments represent 0.30% of the overall housing stock, but that this percentage climbs to 7% in some neighbourhood (e.g. Mitte). The correlation with housing prices reveals that areas with a large proportion of misused flats experienced higher rental growth on average than those with small proportions. While they acknowledge that the pricing of the housing market in Berlin is mainly attributable to the pressure imposed by the significant migration rate, they conclude that the vacation rental boom has exacerbated the tightness of the market, especially in the most affected neighbourhoods (Schäfer and Braun 2016).

Closely related to the debate about the location and distribution of benefits is the question of neighbourhood change and gentrification. Indeed, it is likely that the process of converting housing into short-term rentals entails various forms of displacement, on the housing market and possibly affecting the commercial offering. This is a fast growing research field, fed by studies on tourism, tourism-led gentrification and resistance to tourism (Colomb and Novy 2016). In these views, the development of a platform-mediated short-term accommodation market contributes to and is part of broader processes of tourism-driven gentrification.

Again, the "platform effect" is hard to measure. In tourist cities or neighbourhoods, processes of displacement and gentrification started before the disruptive creation of Airbnb in 2008. Yet, some correlations have been identified. Theoretically, the relationship between short-term rentals and gentrification is that the new revenue streams generated by vacation rentals have produced a new form of rent gap (in Neil Smith's terms). In other words, the revenue stream produced by technology creates a potential rent gap even in those areas where there are no ongoing processes of devaluation (Wachsmuth and Weisler 2017). For the case of Reykjavík, Mermet has shown a significant rent gap between short-term and long-term rental values. The same areas of the city – downtown districts – are an arena of competing demands from tourists and inhabitants, which can lead to permanent or temporary (peak season) displacement (Mermet 2017).

For Barcelona, which is one of the cities where the issue of vacation rentals has been most extensively studied, it has been noted that the neighbourhoods with the biggest Airbnb presence are the ones experiencing the greatest population loss (Arias Sans and Quaglieri Domínguez 2016). Cócola Gant calls vacation rentals the "new gentrification battlefront" in his study of the transformation of the Gotic neighbourhood (here, some 17% of apartments are listed on Airbnb, as against 2% for the city as a whole). Through a survey and semi-structured interviews with long-term residents, he documents three processes: the direct displacement of existing residents; exclusionary displacement (a falling housing supply and rising rents make access to housing almost impossible); and displacement pressures (problems in day-to-day coexistence and different uses of the neighbourhood between tourists and residents prompt the latter to move out) (Cocola-Gant 2016).

For Los Angeles, Lee (2016) describes an indirect mechanism of gentrification. Here, the areas where the short-term accommodation supply is concentrated are wealthy areas, whether long-gentrified or non-gentrified. As their inhabitants become priced out, they move to and gentrify poorer neighbourhoods such as Chinatown. In turn, it has also been shown that, in gentrifying neighbourhoods in Turin, Italy, Airbnb hosts market their properties using the buzzwords and values that characterise the "creative class" (multi-ethnic area, cultural offer, vibrancy…) (Caruso et al. 2015).

5 Urban policies, politics and platforms

The final research strand deals with the question of regulation, sharing city policies and the politics of peer-to-peer exchanges. It scrutinises the regulatory tools and identifies the coalitions and localised arrangements constructed between market actors, public actors and civil society. It investigates whether or not platform-mediated exchanges produce new divisions around which collective action, political representation and alliances are structured (Aguilera, Artioli, and Colomb 2017).

5.1 The regulation of peer-to-peer and virtually-mediated exchanges as a local government matter

The regulation of virtually mediated peer-to-peer exchange has attracted significant attention from scholars in law. Generally speaking, legal academics and experts have illustrated what is at stake in peer-to-peer exchanges from a legal standpoint, reviewed existing rules and discussed whether or not exchanges should be regulated and how. Major issues in this view are (i) the existence of market access requirements, (ii) consumer protection, (iii) liability, (iv) labour law and (v) taxation. In addition, virtually mediated exchanges have given a new lease of life to the old quarrel over market self-regulation, with algorithms standing in as the latest manifestation of the invisible hand (Smorto 2015; Codagnone and Martens 2016).

A strand of work by scholars in law analyses the legal framework that currently applies to peer-to-peer exchanges. Indeed, there is a growing field of legal review both of existing enforceable laws and of regulatory changes, and their consistency with existing legislation at various levels (for instance, in the US, see among others Palombo 2015; Jefferson-Jones 2015). Taken together, these assessments temper the widespread assumption that virtually mediated peer-to-peer exchanges are not regulated (among others, Quattrone et al. 2016). For the United States, Davidson and Infranca (2016) describe the American landscape as one of “distributed regulation and iterative experimentalism”. Given the key role played by local governments (because of their prerogatives in land use regulation, mobility, health and safety, etc.), both companies and local authorities are currently experimenting, iterating and adapting as they go along, producing a variety of situations across the US (Davidson and Infranca 2016). All these authors underline the point – quite trivial yet rarely stated – that different local authorities have different political and economic interests prompting them to promote or resist the development of peer-to-peer exchanges.

In Europe, the European Commission (DG GROWTH) has been promoting legal monitoring and comparison relating to the “collaborative economy” for a number of years.[7] Within the work towards a European agenda on this matter, several working papers have been commissioned to compare regulations across cities in different member states. It is worth noting that they adopt an explicitly urban perspective (comparing cities rather than member states) and focus largely on regulation covering short-term vacation rentals (Smorto 2016; Working Group on the Collaborative Economy - University of Groningen 2016; Rating Legis 2016; Ranchordás 2016; de Streel 2016). These EU sponsored papers at present constitute the most comprehensive comparative work on the regulation of virtually mediated exchanges. They show that the regulation of short-term vacation rentals comes from various fields of law, such as planning, housing, tourism and digital technology. They also reveal the various legal sources

[7] http://ec.europa.eu/growth/single-market/services/collaborative-economy_en (accessed the 18/06/17).

(local governments, regions, states and EU), which differ according to the constitutional structure of the country and the distribution of responsibilities across levels of government.

In a similar vein, some economics authors have recently reviewed the regulatory responses in various U.S. cities (Coles et al. 2017), with the goal of assessing their effectiveness in dealing with the "externalities" of the vacation rental market. By comparing the spatial organisation of vacation rentals in five US cities (Austin, Boston, Chicago, San Francisco and Washington), planners identify four principles of regulation for short-term rental: the significance of webscraping as a technique of data collection; the need for micro-geographical approaches to regulation (due to the patterns of concentration); the necessity of dedicated enforcement; and the importance of differentiating between commercial scale rental actors and 'homesharers' (Wegmann and Jiao 2017).

Apart from these reviews of existing rules, a whole strand of research is purely theoretical, and seeks to evaluate the opportunity and the tools for future regulation. Codagnone and Martens (2016) provide a full discussion of the different positions on this matter. They identify two opposing views: the "libertarian" authors (who might also be called neoliberal), who are fiercely opposed to any regulatory intervention, and on the other side those who advocate for some forms of regulation. This work in legal theory is not empirically grounded, and will not therefore be extensively discussed here. It is nevertheless worth noting that several authors stress that local governments hold major responsibilities for a significant number of issues raised by peer-to-peer exchanges (among others, Gottlieb 2013; Davidson and Infranca 2016). In the view of these authors, what is at stake in these local regulatory choices is how to strike a balance between, on the one side, supporting the development of platform-related activities and the economic benefits they generate and, on the other side, mitigating their collective costs and negative externalities (social costs, overuse of neighbourhood infrastructure…).

In the specific sector of short-term accommodation, US-based authors advance various regulatory proposals. Miller proposes a 'transferable sharing right' mechanism, which is similar to the transferable development rights regimes (Miller 2014). Similarly, Widener proposes to use land zoning in innovative new ways, through the establishment of "sharing economy districts" (Widener 2015). By contrast, Rauch and Schleicher (2015) contend that local and state governments will develop new regulatory strategies that are similar to those applicable to the 'most similar business' such as property developers or hotels (for vacation rentals) and incumbent taxi operators (for ride-hailing). Importantly, these two authors argue that, as sharing economy activities keep on growing, firms will become significant and permanent players in key urban industries (transport, hospitality and dining), which will eventually result in new policy regimes at the local level. They formulate three predictions about future city strategies for the platforms, which might serve as an interesting testable hypothesis for further research. According to them, cities will: "(1) subsidise sharing firms to get them to enter or expand certain services; (2) harness sharing firms for economic redistribution and (3) hire sharing firms as contractors to provide city services." (Rauch and Schleicher 2015, 4). These various local government strategies for the development of peer-to-peer exchanges are a core topic in the literature on "sharing cities".

Finally, two legal scholars have provided a stimulating theorisation of corporate platforms as "regulatory entrepreneurs" (Pollman and Barry 2017). They note that, from a regulatory standpoint, one of the characteristics of some of these firms is that they operate under significant regulatory risk, as the laws are unclear or even prohibit the activity (e.g. ride-hailing without licensing). Of course, legal uncertainty is nothing new. Yet for many new platforms, the legal issues potentially affect the core business of the company, which means that its very survival is tied to their resolution. In Pollman and Barry's view, "these companies understand this, and each makes changing the law a material part of its business plan". This company activity is what the authors call "regulatory entrepreneurship". In order to pursue this, alongside normal lobbying, corporate platforms engage with the law in specific ways: first, instead of seeking permission, such firms develop in real or imagined legal grey areas, take advantage of this uncertainty, and then ask for forgiveness; second, linked to this point, they seek to grow "too big to ban"; third, they mobilise platform users as a political force to demand favourable regulations. This theorisation of platform strategies – and their fundamental link with platform survival – would seem to be an interesting analytical tool for the understanding of some of the results discussed below (see 5.3).

5.2 Sharing cities and the variety of localised arrangements

Scholars interested in "sharing cities" focus on the multiplicity of the local initiatives that, in different cities, contribute to the sharing economy broadly understood. This literature seeks to provide contextualised analysis of the individual and collective actors involved in the development of sharing activities and practices in a given city. They show that, along with the major platforms that dominate the stage almost everywhere, there is great variety in the actors involved (start-ups, firms, NGOs, grassroots organisations, governmental bodies), in the objects of exchange (which goods, services…), in the forms it takes, and in the overall network of relations that these actors maintain amongst themselves. In other terms, this research helps to clarify the scope and functioning of peer-to-peer exchanges in cities through the analysis of a local "sharing milieu". These authors also develop ideas on sharing policies, i.e. the initiatives taken by urban authorities to promote and steer the sector.

The book by McLaren and Agyeman gives an account of "sharing initiatives" in consumption, production, politics, and policy – which for the authors are the means of advancing social justice and human connection. The sharing city is, in their view, a normative ideal. The cases discussed in the book – San Francisco, Seoul, Copenhagen, Medellin, Amsterdam and Bengaluru – are hence presented in terms of the variety of ways in which local actors can engage with the sharing economy (McLaren and Agyeman 2015). For each case, a specific dimension is analysed. For instance, San Francisco is discussed as a case of shared consumption practices, which points both to the proliferation of platform-mediated consumption and to the emerging tension between commercial and non-commercial models.

Drawing on similar case studies (San Francisco, Amsterdam, Seoul and Milan), Mazzucotelli Salice and Pais provide a more robust analytical framework for the conceptualisation of sharing cities and their variety. They propose a development of Polanyi's taxonomy, with five forms of economic and societal integration: market, collaboration, reciprocity, common-pool arrangements, and redistribution, which can serve as new analytical models for the comparative analysis of sharing cities (Mazzucotelli Salice and Pais 2017). Indeed, grounding the argument in the (re)discovery of the territorial dimension by socio-economic research, their aim is to analyse the various ways in which sharing economy activities play out locally, become institutionalised, and contribute to the reshaping of market/society relations at local level. While the sharing economy is usually thought of as a single phenomenon, the authors call for the empirical recognition and conceptualisation of territorial variety in sharing economies. In addition, they draw attention to the differing roles of policymakers in sharing policies. Urban policymakers can act as investors (supplying financial support or capital), regulators (setting rules) and facilitators (directly providing sharing services or providing both material and immaterial incentives for sharing activities). Styles of policy implementation (top-down or bottom-up) and broad political agendas also matter.

The authors show that San Francisco is characterised by the dynamism of its business milieu, and the city government plays the role of de-regulator, within a general agenda of facilitating new business growth. Seoul displays a strong ICT infrastructure and strong public trust, so the city government acts as a direct investor for sharing initiatives, which are seen as part of the city's policy for urban sustainability. In Amsterdam, in the context of the general goal of making Amsterdam a liveable city, the city government acts as both regulator and facilitator of sharing initiatives. Finally, Milan is characterised by a strongly organised society driven by a propensity for solidarity. The city government's agenda aims to connect innovation with social inclusion and it plays the role of facilitator for sharing initiatives, with much less inclination to regulate.

Again on Seoul and Milan, Monica Bernardi and Davide Diamantini consider how the two cities are developing sharing city policies. Their conclusions are consistent with that of Mazzucotelli and Pais. In the case of Milan, the municipality has made the choice to perform an enabling role, responding to inputs from social and economic actors and taking on the task of supporting them. In the case of Seoul, by contrast, the city government leads, organises and manages in a much more direct manner (Bernardi and Diamantini 2016).

5.3 Conflicts, resistance and power relations in urban politics and governance

The last strand of research explores how the rapid growth of peer-to-peer exchanges and their platforms has created new lines of conflict and new forms of resistance and has perhaps restructured power relations in urban politics and governance.

Filip Stabrowski (2017) analyses the spread of Airbnb throughout New York City and the rhetorical struggle over housing and individual urban entrepreneurialism. This research draws on the argument that platform-mediated P2P exchanges are an extension of the market to previously non-commodified realms. Interestingly, it connects this process with urban governance. From a micro-sociological perspective, it is argued that the fast-paced development of the short-term accommodation market has played a part in the commodification of housing. Domestic property is 'showcased' on the platform. Providers are tied into new market relations where the property is valued, compared and priced both by themselves and by the platform's 'dynamic pricing' algorithm. The author argues that the commodification of domestic property has implications for housing policies in New York. Long before the invention of the P2P rental platform, the city had a strong regulatory framework for the rental market designed to prevent illegal short-term rentals. Stabrowski argues that against the background of sharp controversy about Airbnb, the company has made New York a place for testing strategies designed to roll back regulation. It is therefore engaged directly with urban governance, through lobbying and by generating its own 'civic discourse' about community, sustainability and governance, rooted in the idea of individual entrepreneurship as a replacement for 'old' public institutions. The author argues that this governance based on "people as business" is a new form of *urban micro-entrepreneurialism,* in David Harvey's understanding (Stabrowski 2017).

The question of the reshaping of urban governance under conditions of platform capitalism has also been raised for the city of San Francisco, the birthplace of platform development

(McNeill 2016). McNeill shows how both individuals and organisations from the venture and angel capital sectors have increasingly penetrated the sphere of city politics. Through an analytical focus on individuals and firms, the author demonstrates how they actively contribute to the reshaping of political agendas, public policy and service delivery, and to the reshaping of urban space. He describes the strong support provided by individual technology investors in the 2011 and 2015 municipal elections and he documents the creation of a "tech chamber of commerce" that advocates for the interests of this industry in the city. What he calls a new "digital growth coalition" has taken over the city, and is remaking housing, labour and public services. Evidence can be found in the favourable new taxation regime, and in the political handling of the conflicts around Uber and Airbnb, especially the now famous "Proposition F". This proposal, intended to limit short-term vacation rentals, was rejected by voters in November 2015 after an intensive campaign marked by the power imbalance between the supporters of the proposition, and its opponents, funded by an 8-million dollars Airbnb campaign. The author concludes that San Francisco is now functioning as "both a testbed and a command centre for a set of firms that are likely to reconfigure how individuals consume (and produce) services and pose new regulatory challenges for particular sectors". For instance, the Proposition F vote triggered the new global strategy by Airbnb of organising providers into local advocacy groups (called "host clubs").

The story of the Airbnb battle in San Francisco has also been told from the perspective of activism and resistance to the city's tourist-driven gentrification (Opillard 2016). Opillard's paper – like those on Santa Monica and Paris presented later – is part of a broader project on the increasing politicisation of the issue of tourism across the world, and the emergence of collective local action to oppose it (Colomb and Novy 2016). Opillard describes the burgeoning tourist appeal of San Francisco, fuelled by the so-called Tech Boom 2.0, and supported by a well-established tourist industry. It is in this context that the rampant growth of short-term accommodation has been an object of struggle in the political arena, notably placed on the agenda by housing rights and tenant support movements, which claim that short-term rentals help to fuel the already serious housing crisis and lead to evictions of tenants. A similar role is played by the housing movements in Santa Monica (California) (Deike 2016). In both the Californian cases, therefore, the issue of housing shortage and affordability lies at the heart of movements' arguments in opposition to the development of short-term rental and the associated platforms.

By contrast, in the case of Paris explored by Gravari-Barbas and Jacquot, this housing issue was first and foremost raised by the deputy mayor in charge of housing, who is part of the left-wing majority running the municipality. The City of Paris introduced new measures designed to control the proliferation of such rentals, and in particular the illegal use of residential apartments for tourism. The authors found little organised opposition to tourism in general, but small-scale resistance and increasing demands for regulation of the specific issues raised by the platform-mediated short-term rental market (Gravari-Barbas and Jacquot 2016). However, in the numerous conflicts that have arisen around vacation rentals, there is an accumulation of other kinds of concern, linked with the effects on buildings and on neighbourhood life (night-time noise, changes in local retail, etc.).

The case of Sydney is analysed by Guarran and Phibbs using a different methodology. The authors study the written submissions to the inquiry launched by the New South Wales Parliament in 2015 into the adequacy of the existing regulations regarding the short-term rental sector. The inquiry provides an overview of the different stakeholders (local planners, residents, an organisation advocating for homesharing, Airbnb,…), and their contrasting views and perceptions on the effects of vacation rentals on communities and the appropriateness of existing rules (Gurran and Phibbs 2017).

The last significant point that emerges from these few available studies concerns the study of the Airbnb platform itself, its resources and strategies. Dozens of commentators have provided anecdotal yet essential evidence about the strategies deployed by corporate platforms vis-à-vis the public sector. The paper discussed above highlights at least three points about Airbnb as a company: the emergence of new rhetorical strategies that directly engage with politics and governance; the platform's strategy of organising and mobilising providers and consumers to defend the platform's interests (which are assumed to coincide with their own); and "classical" lobbying strategies and public campaigning. All these elements merit further scrutiny, especially in relation to the 'regulatory entrepreneur' thesis discussed previously.

6 Preliminary hypothesis for further research

This paper has reviewed the available academic literature on peer-to-peer platform-mediated exchanges with the goal of summarising the state of the art in urban research. Sections 1 to 5 answered five empirical questions: the nature and boundaries of platform-mediated exchanges (the problem of definition); the size and socio-economic organisation of the exchanges; their income and spatial effects; their effects on existing markets; and their regulation and governance.

This review reveals that there is no clear-cut picture of what P2P platform-mediated exchanges mean for urban societies, urban spaces and urban governance. Instead, there are strands of empirical work that are starting to produce cumulative results, while in other cases findings are contradictory and mutually inconsistent. These virtually mediated exchanges have so far been addressed as a phenomenon *sui generis,* with limited attention to its commonalities and interactions with broader social phenomena, nor to its implications for urban sociological and political theory. This is unsurprising: the novelty of the phenomenon has first and foremost prompted a substantial analytical effort to "know the beast" and hence to accumulate knowledge on the nature, scope, internal functioning and potential effects of these new exchanges. In addition, as previously emphasised, research has also faced – and still faces – problems of access to data. On the one hand, the biggest platform companies are private. They are not subject to the disclosure requirements of publicly owned companies, which limits the availability of reliable data. For the short-term rental sector, data come from activists (such as Murray Cox and Tom Slee) and researchers who have developed their own scraping code through which they harvest data from the Internet, or from companies such as Airdna (Cox 2018).[8] On the other hand, the smaller platforms are too numerous to be covered individually and are not assessed by official statistical bodies. Activity outside the major platforms is thus usually estimated from sampled surveys. Access to reliable data therefore remains one of the key challenges for researchers and citizens. This lack of data also exacerbates certain classical methodological problems, such as dealing with scale and data granularity. For instance, attempts to assess the effects of short-term accommodation on the

[8] Airdna provides data from Airbnb, on demand and for a fee (http://www.airdna.co).

hotel industry yield different results when large sectors are considered or smaller sectors with high concentrations of short-term rentals.

On this basis, the following paragraphs outline four preliminary hypotheses and subsequent directions for development in the study of digital platform exchanges in relation with changes in urban social stratification, spaces and collective action, which may form a basis for further empirical and theoretical inquiry.

6.1 The effects of structural differences

The analysis of platform mediated exchanges as a phenomenon *sui generis* has led research to overlook how these exchanges vary in different contexts, and to a lack of discussion of how economic, social, institutional and political structures affect these exchanges and the organising platforms (with the notable exception of the "sharing city literature" presented in sub-section 5.2). Empirically, the cases so far studied are small in number. Much of the above reviewed material deals with the Global North, especially the United States and to a lesser extent Europe, while the rest of the world is almost entirely absent. In addition, the cases discussed are in many ways "extreme cases", meaning the most radical manifestations of the phenomenon. San Francisco, widely investigated, is the birthplace of platform capitalism. Similarly, given their concentration of short-term rental accommodation and their tourist appeal, Barcelona and New York are extreme cases of peer-to-peer rental accommodation. In the light of the findings for these cases, there is now a need both to increase the number of case studies and to make the criteria for case selection explicit. At a global scale, one research project is currently analysing Airbnb development worldwide, which provides fundamental insights on country variations (Chareyron, Cousin, and Jacquot 2018). More generally, future research needs to take into account economic, social, institutional and political differences in order to gain a better understanding of the mechanisms through which the development of peer-to-peer market exchanges interacts with the broader processes of socio-economic and political change in cities. The structure of the local economy also matters. To take the example of the short-term rental accommodation market, factors like the tourist appeal of the city, the tightness of the housing market or the structure of housing tenure (e.g. proportion of homeownership) are crucial to making sense of the development of these exchanges, as both individual and collective strategies. In this vein, it is worth mentioning several ongoing research projects on the short-term accommodation sectors that consider a larger array of cases, for example "peripheral" Southern European cities. Here, there has been a strong interplay between the development of the short-term rental market and the 2008 financial crisis, with its effects on household incomes and real estate markets (Katsinas 2017; Yrigoy 2017). Other interesting variations are cities with a strong tradition of public housing (e.g. Vienna) (Seidl, Plank, and Kadi 2017). Institutional and political factors also require attention. The varieties of platform capitalism are also affected by the nature of welfare regimes, including labour protection, social benefits or the de-commodification of housing. Similarly, the dominant form of interest representation (e.g. pluralism or neo-corporatism) and the nature of institutionalised interest groups, are likely to have an impact on the forms of collective action and representation emerging around platform mediated exchanges.

6.2 The effects of the shift from ownership to uses/services

As discussed in the introduction, one of the defining features of the sharing economy, as a system of P2P exchanges, is the shift from the ownership to the use of resources (Belk 2007). For providers on the platform, this means that an asset they own is converted into some form of service provision, which is paid for in a for-profit exchange. This shift arising from the sharing economy can be seen as a crucial transformation in the organisation of urban capital and labour. To understand how this works, these peer-to-peer exchanges need to be related to the patrimonial and working characteristics of urban social classes. Indeed, the latter are likely to develop different strategies on participating in the exchanges, according to their different patrimonial and labour conditions. For instance, in the case of short-term rentals in Turin, Tonetta and Semi are working on the hypothesis that the use of short-term rentals as a source of additional income is a new post-crisis strategy for the Italian middle-class to maintain its intermediate position on the social ladder (Semi and Tonetta 2017). The strategies on regulation (compliance, avoidance, etc.) will also vary depending on the different positions in the new market (Richon 2018). Furthermore, the shift from ownership to use/service provision is likely to produce or exacerbate social distance between, for instance, owners and everybody else. Paradoxically, the rental economy gives additional advantages to owners. This whole line of thinking can form the basis of more research on inequality, from the empirical question on the distributional effects of the sharing economy (see section 3), toward a theorisation of its interplay both with social stratification and with class-related forms of urban space production (e.g. gentrification, see section 4). Finally, it can also be argued that this shift from ownership to use/service affects collective action, by paving the way for the emergence of new organisations representing interests that are opposed because of their different positions in the peer-to-peer markets. This might contribute to an understanding, for instance, of movements of resistance to short-term rentals, but also of the new organisations advocating for the "right to share" that have sprung up in many cities.

6.3 The effects of the shift from incumbent sectors to sharing (and vice versa)

The emergence of virtually mediated peer-to-peer exchanges has also shifted some actors and resources from incumbent economic sectors and markets into the sharing economy. In consequence, goods, resources and services that are exchanged on these platforms can be seen as belonging to both the conventional economic sector and the sharing sector. For instance, short-term rentals mediated by Airbnb are *at the same time* part of the accommodation and housing sector, and of the sharing sector. This ambivalence in the sectoral status of the new markets has consequences for the representation of interests, collective action and policymaking in cities. Indeed, how these activities are characterised is likely to produce very different regulatory and policy solutions. The process of characterisation itself will be a subject of negotiation and conflict between different groups holding opposing interests and expectations vis-à-vis the virtually-mediated exchanges (Aguilera, Artioli, and Colomb 2017). As they stand between different sectors, these exchanges may also result in the emergence of new coalitions between social and economic groups that rarely interact in urban politics, an interesting example of which is the curious alliance between housing movements and the hotel industry in struggles against Airbnb (Aguilera, Artioli, and Colomb

2017). This analysis of the combination of new sectoral (and class) divisions can therefore contribute to enquiry into how the expansion of virtually-mediated exchanges is reshaping urban politics (cf. section 5). Here, ongoing projects are developing hypotheses about the role of real estate interests in supporting the expansion of short-term rentals (Muller 2017), or the interplay between platform development and liberal reforms to the real estate market (Lestegás, Seixas, and Lois-Gonzalez 2017; Ferreri and Sanyal 2018)

6.4 The effects produced by the strategies of international corporate platforms

Finally, the development of virtually mediated peer-to-peer exchanges has been driven, among other actors, by certain major corporate platforms, active in thousands of cities across the globe. One concluding hypothesis and line of research is that the corporate strategies of these platforms are partly responsible for urban change. According to this argument, for instance, the regulatory preferences and lobbying activities of Airbnb (Aguilera, Artioli, and Colomb 2017) can contribute to the emergence of homogeneous regulations applicable to the short-term rental market across cities. Similarly, the challenges raised by the development of this new market can foster new forms of cooperation between cities in sharing emerging policy solutions.

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