The eruption of Airbnb in tourist cities: Comparing spatial patterns of hotels and peer-to-peer accommodation in Barcelona

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HIGHLIGHTS
- The spatial distribution of Airbnb listings and hotels in Barcelona is analysed.
- New geolocated data sources (Airbnb listings and photographs on Panoramio) are used.
- Airbnb accommodation offered in Barcelona tend to be concentrated in the city centre.
- Airbnb benefits more than hotels from proximity to the sightseeing spots in Barcelona.
- Airbnb expands the tourism pressure over residential areas in the centre.

ABSTRACT
In recent years, what has become known as collaborative consumption has undergone rapid expansion through peer-to-peer (P2P) platforms. In the field of tourism, a particularly notable example is that of Airbnb. This article analyses the spatial patterns of Airbnb in Barcelona and compares them with hotels and sightseeing spots. New sources of data, such as Airbnb listings and geolocated photographs are used. Analysis of bivariate spatial autocorrelation reveals a close spatial relationship between Airbnb and hotels, with a marked centre-periphery pattern, although Airbnb predominates around the city’s main hotel axis and hotels predominate in some peripheral areas of the city. Another interesting finding is that Airbnb capitalises more on the advantages of proximity to the city’s main tourist attractions than does the hotel sector. Multiple regression analysis shows that the factors explaining location are also different for hotels and Airbnb. Finally, it was possible to detect those parts of the city that have seen the greatest increase in pressure from tourism related to Airbnb’s recent expansion.

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1. Introduction

Over the last few decades urban tourism has undergone huge growth and has become an extremely important activity in many cities, which have seen themselves inundated by crowds of tourists pursuing diverse activities. It is therefore possible to talk of urban tourism, depending on the activities carried out. The plural is necessary because urban tourism is not like other adjectival tourism. The additional adjectives ‘cultural’ (including festival or art), ‘historic’ (‘gem’) and even ‘congress’, ‘sporting’, ‘gastronomic’, ‘night-life’, and ‘shopping’ could all precede ‘city tourism’ as different clusters of urban features and services are utilised in the service of an array of tourism markets (Ashworth & Page, 2011).

The relationship between tourists and the city is complex. Cities benefit from tourism. All cities stress the importance of tourism for the local economy: the tourism industry contributes to the local income and provides many people with jobs. In some cities, tourism is the main economic activity and the only current source of local economic development (van der Borg, Costa, & Gotti, 1996). However, there are cities that find themselves under enormous pressure from tourism. Mass tourism alters the relationship between tourists and residents. The growing demands from tourists, particularly in historic cities, have brought about a reactive
response to the problems of coping with increased visitation, a situation perhaps most commonly experienced in Europe (Pearce, 2001). In a growing number of cities, pressure from tourism is becoming a real source of conflict between tourism stakeholders and residents.

Tourists make very selective use of the city. Studies analysing spatial patterns of tourist mobility in cities show that they tend to be concentrated in specific areas of city centres, where they make intensive use of the facilities and services available there (Shoval & Raveh, 2004). Pressure from tourism is particularly intense in the central areas of historical cities. Such areas become overcrowded when the number of tourists exceeds a certain threshold. Crowding is specifically seen as the violation of the sociocultural carrying capacity (Neuts & Nijkamp, 2012). The first visible sign of excessive tourism growth is saturation of the central supply of facilities. Resources (land, buildings, roads, parking places) in the proximity of the central attractions are limited, but continue to be used until they become saturated (Russo, 2002).

City centres are transformed by tourism. The very nature of tourism—its intensive use of central space, its seasonal pattern, its “transversality” across industries—can greatly affect sensitive urban areas. Its pressure on the value of urban facilities and premises creates an incentive for citizens and firms to abandon central locations (Russo, 2002). These processes are known as tourism gentrification, which, in extreme cases, can be understood as the transformation of a middle-class neighbourhood into a relatively affluent and exclusive enclave marked by a proliferation of corporate entertainment and tourism venues (Gotham, 2005).

Most tourists seek hotels that are within walking distance of major attractions in the city (Arbel & Pizam, 1977). The growing demand for accommodation in the centre is reflected in the Average Room Rate (ARR) for hotels, which decreases with distance from the centre towards the periphery, making it possible to identify a hierarchy of hotels based on location, from luxury hotels (4/5-star quality located in the city centre) to budget hotels located at the edge of the city (Egan & Nield, 2000). Hotel location has a profound impact on tourist movements, with a large share of the total tourist time budget spent in the immediate vicinity of the hotel (Shoval, Mckercher, Ng, & Birenboim, 2011). Therefore, the concentration of hotels in the city centre leads to an increase in tourist pressure and is a decisive factor in the transformation of the surrounding urban area. Tourists spend more in the proximity of the hotels, and these areas adapt to satisfy their needs. As a result, the business structure of such areas is transformed, as in the case of shops and restaurants, which become increasingly geared to tourism.

Pressure from tourism is intensified in city centres by the availability of accommodation offered through the new peer-to-peer (P2P) platforms. The exchange of accommodation between private individuals has historically developed informally, but the Internet, and more specifically Web 2.0, has allowed it to grow exponentially and take on new characteristics (Russo & Quagliieri, 2014). P2P platforms in the field of accommodation do well beyond marketing and advertising the properties. They screen both parties, have access to the owners’ inventories, manage rental bookings, collect payments and provide some form of insurance coverage for damages caused by the renters (Pizam, 2014).

Airbnb is the most successful P2P platform in the field of accommodation. It connects people who have space to spare (hosts) with those who are looking for a place to stay (guests). Airbnb reaches more than 2,000,000 listings in 190 countries, mainly entire apartments and homes (57%) and private rooms (41%). Airbnb’s valuation of over $10 billion now exceeds that of well-established global hotel chains like Hyatt (Zervas, Proserpio, & Byers, 2014). As a disruptive innovation in the field of tourism accommodation, Airbnb proposed a novel business model, built around modern Internet technologies and Airbnb’s distinct appeal, centred on cost-savings, household amenities and the potential for more authentic local experiences. Most importantly, Airbnb’s relatively low costs appear to be a major draw (Guttentag, 2013).

It has been argued by Airbnb that its listings are more scattered than hotels, so Airbnb guests may be especially likely to disperse their spending in neighbourhoods that do not typically receive many tourists (see Guttentag, 2013). However, as Zervas et al. (2014) point out, Airbnb can potentially expand supply wherever houses and apartment buildings already exist, in contrast to hotels, which must be built at locations in accordance with local zoning requirements. Therefore, expanding in historic centres would be easier for Airbnb than for hotels, which not only requires whole buildings to be available but also the relevant permits from the authorities. If Airbnb shows a clear tendency towards expansion in historic centres, then this could aggravate the problems of crowding and tourism gentrification that some of these areas have to support in certain heritage cities (Neuts & Nijkamp, 2012; Russo, 2002).

Academic studies on Airbnb and its effects on the tourism sector and cities are particularly scant. Guttentag (2013) studied Airbnb as a disruptive innovation in the accommodation sector. Zebras et al. (2014) and Choi, Jung, Ryu, Do Kim, and Yoon (2015) focused their attention on competition from Airbnb with the traditional accommodation sector. Yannopoulou, Moufahim, and Bian (2013) analysed the construction of user-generated brands (UGBs), using discursive and visual analysis of UGBs’ social media material, taking Airbnb and CouchSurfing as examples. None of these studies examined the spatial distribution patterns of Airbnb listings.

Exploratory Spatial Data Analysis (ESDA) provides an appropriate framework for studying the location patterns of accommodation in cities. In general, ESDA spatial analysis is concerned with how spatial phenomena pattern themselves and interact with one another (Fischer and Getis, 2009). Spatial distributions tend to show a spatial order (spatial autocorrelation). When there is a tendency for high-value and low-value spatial clusters to form, spatial autocorrelation is positive. When high values tend to be surrounded by low values, and vice-versa, spatial autocorrelation is negative. Finally, random patterns indicate the absence of spatial autocorrelation. ESDA techniques allow analysis of the global spatial autocorrelation of a distribution, identify atypical locations or spatial outliers, and discover spatial clusters or hot spots. Among the most commonly used ESData tools are the Global Moran’s I statistic and the Anselin Local Moran’s I (LISA statistic). The first of these measures the degree of spatial autocorrelation of a set of geolocalized data and the sign of this autocorrelation (positive or negative), while the second is used to identify and map local

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1 The last few years have seen the emergence of the so-called sharing economy (also known as collaborative consumption), within the framework of a lifestyle in which more importance is attached to sharing goods than to owning them (Lessmann, Schmitt, Rohn, & Bædeker, 2013). Collaborative consumption has been driven by the development of Internet platforms that facilitate P2P relations (Belk, 2014; Botsman and Rogers, 2010). Collaborative consumption could therefore be broadly defined nowadays as P2P-based activity for obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services (Hamari, Sjöklint, & Ukkonen, 2015). One of the fields in which collaborative consumption has burst onto the scene with greater intensity is that of accommodation.

2 The disruptive innovation theory describes how products that lack in traditionally favoured attributes but offer alternative benefits can, over time, transform a market and capture mainstream consumers (Guttentag, 2013).
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