The Impact of the Sharing Economy on Heritage Neighborhoods in Granada

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ABSTRACT

The objective of this chapter is to provide reliable information from online platforms that quantifies the impact of tourist accommodation in Granada in relation to commercial activities, hotels, and residential homes. To do so, the authors take into consideration economic and population variables. Particularly, they focus on offering evidence on the tourist pressure in the most touristic neighborhoods of the city, mainly Albaicín-Sacromonte, Centro 1, and Realejo. This type of research has been widely demanded by residents, local government, and stakeholders in general in order to take action on this field.

INTRODUCTION

The impact of the sharing economy on tourism is one of the most important challenges in the life of cities today (Schor & Charles, 2017). The incorporation of new types of accommodation to the tourist marketplace of cities has placed heavy pressure on historical neighborhoods, jeopardizing the living conditions of residents. Phenomena such as touristification or gentrification respond, among other factors, to the emergence of digital sharing economy platforms (e.g. Airbnb).

Residents have reacted to these changes in different ways, although negative responses are common and highlight negative externalities (Bakker & Twining-Ward, 2018). These include a fall in the number of houses available for permanent or long-term residence; higher rental and house prices; the transformation of local commercial activity and the loss of businesses that sustain everyday neighborhood life; the displacement of residents because of rising house prices; inconveniences generated by tourist flow; and unfair competition with hotels and other regulated sectors. Moreover, the problem is especially complex as residents themselves often benefit from these sharing economy platforms to obtain additional income.

To assess the impact of these new tourist practices on heritage cities, we need to map and quantify the current situation through data provided by the sharing economy platforms themselves. We believe this to be the optimal starting point for a comprehensive analysis of the situation in any given city in order to take informed decisions with regard to regulations and tourism management. In Granada, the lack of objective data on this topic is an issue residents, local government and other stakeholders frequently cite when seeking to take action and design policies. The aim of the present chapter is to

provide reliable information gathered from a number of online platforms in order to quantify the impact of tourist accommodation on the city—one of the most frequently visited destinations in Spain—in relation to commercial activities, hotels and residential homes.

The background to this chapter includes a literature review of the most significant topics related to our research. Later, we focus specifically on the case of Granada, presenting data about the city and its neighborhood structure, the distribution of tourist flows, and local tourism management processes. The specific objectives and methodology of our study are detailed below. These are followed by our results, and a discussion on our research questions. Finally, we outline the limitations of the present study, future lines of research, and our conclusions.

BACKGROUND

The sharing economy phenomenon has attracted a growing amount of tourism-based research in recent years due to the popularization of services such as Uber or Airbnb, among others (Cheng, 2016; Juul, 2015; Heo, 2016; Leung, Xue, & Wen, 2019). Moreover, hospitality in particular has undergone a significant change given the new accommodation supply provided by Airbnb and similar platforms. As it has developed, the sharing economy has generated new sources of income for owners by exploiting their excess capacity (Heo, 2016), and offered tourists rental prices for apartments or rooms that are more competitive than traditional hotel prices (Fang, Ye, & Law, 2016). This has led to the redefining of concepts such as ownership and employment, and of tourist practices (Ferrell, Ferrell, & Huggins, 2017). Other positive effects include the environmental impact and social benefits (Gonzalez-Padron, 2017; Schor, 2016). However, these changes have generated negative impacts: the creation of a new class of worker insecurity, the concentration of supply in the hands of large corporations, and the lack of appropriate regulation of conditions for providing the service, among others. One highly significant factor, closely related to our research, is the fact that the increase in supply could negatively affect tourist destinations due to the lack of sustainability and growing massification (Guttentag, 2015; Oskam & Boswijk, 2016; Moreno-Izquierdo, Ramón-Rodríguez, Such-Devesa, & Perles-Ribes 2019), and the consequent negative impact on the residential market, leading to a progressive decline in population (Cócola Gant, 2016; Kesar, Dezeljin, & Bienenfeld, 2015).

In heritage cities in particular, the increase in tourism has generated phenomena such as touristification and gentrification. The term touristification refers to the impact of mass tourism on the commercial and social fabric of neighborhoods. It leads to services, facilities and shops being oriented towards and conceived of by reference to the tourist rather than the resident (Brauckmann, 2017). Gentrification entails the displacement of residents from neighborhoods that are revalued by the injection of public or private capital (Cócola Gant, 2016; Gravari-Barbas & Guinand, 2017; Lees, Shin, & López-Morales, 2016). Brauckmann (2017) considers touristification to be a kind of gentrification.

Amongst other factors, tourist pressure is determined by the volume of visitors a tourist destination receives, causing residents and tourists themselves difficulties in performing their daily activities. The main problem caused by massive tourism in cities is the loss of virtually all resources and basic services required by local residents (e.g. the closure of craft industries, local stores, small businesses,

public services, etc.), which are replaced by hotels, tourist apartments, restaurants, souvenir shops and the like. Everything is dedicated to servicing the tourist in order to enhance economic performance.

The growing mass of tourism makes neighborhoods and/or cities uninhabitable for residents as escalating prices force them to move to districts they can afford. Brauckmann (2017) identifies Airbnb as a possible trigger to the displacement of inhabitants from the most attractive neighborhoods—mainly city center and heritage neighborhoods. Similarly, Edelman and Geradin (2015) indicate that Airbnb could be considered a threat to the safety and affordability of residential communities, causing an exodus of long-term tenants from specific neighborhoods and generating housing shortages. All of this has affected house purchase prices and rents, particularly in tourist cities. Studies such as that by Barron, Kung and Proserpio (2018) in the US have analyzed how residential sale and rental prices rise as the tourist apartment supply grows.

In the tourism industry, one of the most important debates centers on the substitute nature of the hosting offer of tourist apartments through sharing economy platforms such as Airbnb versus the traditional hotel sector. However, worldwide, research has found only limited evidence of this. Zervas et al. (2017) analyzed Airbnb's impact on the hotel industry in Texas and found that a 10% increase in Airbnb accommodation resulted in a 0.37% fall in hotel revenues. This was more than 1% lower than the 1.5% fall in revenue associated with a 10% increase in available hotel accommodation. These authors suggested that Airbnb's role as a substitute for hotels was marginal. Similar conclusions have been reached with regard to Nordic countries (Neeser, Peitz, & Stuhler, 2015). Heo, Blal and Choi (2019) indicated that P2P rentals and hotels in Paris are not in direct competition, as had previously been thought. The customer segments using each alternative appear to differ: holiday tourists have a positive approach to the Airbnb supply, whereas business tourists prefer hotels (Tussyadiah & Zach, 2015; Zervas et al., 2017).

Both the impact on residential housing and on the hotel sector justifies the need to measure tourist pressure and the impact of tourist apartments rented through online platforms (i.e. Airbnb). Several studies have pointed to specific problems (Owyand, Tran, & Silva, 2013; Belk, 2014; EU Innovation Observatory, 2014) that include conflict with the traditional tourist industry; uncertain regulation of sharing economy businesses (in relation to tax, competence, insurance); and resident opposition to this type of hosting activity.

Analysis of tourist accommodation impact has generally received more attention in large cities—e.g. Barcelona (Gutierrez, García-Palomares, Romanillos, & Salas-Olmedo, 2017) and Budapest (Dudás, Boros, Kovalcsik, & Kovalcsik, 2017; Boros, Dudás, Kovalcsik, Papp, & Vida, 2018)—and medium-large European cities (Coyle & Yeung, 2016). However, in small and medium-sized cities the phenomenon remains limited and research has focused on highly attractive tourist destinations like Venice (Seraphin, Sheeran, & Pilato, 2018), which have specific characteristics. Airbnb's own research on cities such as Madrid (Airbnb, 2015) has followed a similar pattern. Adamiak (2018) analyzed the distribution and characteristics of Airbnb activity across Europe, mapping and comparing some basic descriptive indicators for 432 European cities with at least 100 000 inhabitants.

Most of these studies have also focused on the city-wide distribution of Airbnb accommodation, finding that it is distributed unequally but significantly over the whole destination. Nevertheless, this requires close examination in every case. For example, in Barcelona Gutierrez et al. (2017) found that

Airbnb accommodation is tightly concentrated in the historic city center, with a center-periphery pattern, whereas hotels show more complex patterns. In addition these authors concluded that Airbnb had been able to penetrate the city in closer proximity to tourist attractions than traditional hotels have. In Paris, Heo et al. (2019) explored the geographical distribution of Airbnb apartments across the Parisian districts and found that P2P rentals and hotels follow different patterns.

In the public sector, the sharing economy has raised a wide range of issues (Ganapati & Reddick, 2018). An uneasy balance exists between fostering innovative tourism and regulating practices that have created a hosting system that parallels the traditional hotel industry. Some of the most important issues relate to the fact that sharing economy companies bypass government regulations and their overheads have an impact on consumer rights, safety and quality, and disability compliance standards too (Juul, 2015; Rauch & Schleicher, 2015).

According to Acevedo (2016) and Ganapati and Reddick (2018), regulators have taken three main policy approaches to the sharing economy:

- Regulate: this approach ranges from treating the sharing economy like traditional services to banning these activities (e.g. Palma de Mallorca).
- Don't regulate: this leads to self-regulation practices with the sharing economy platforms striving to balance the interests of both providers and customers, although generally leaving the interests of residents aside.
- Wait and see: this approach favors regulating sharing economy activities but argues that the time to do so has not yet come.

This third approach highlights the relevance of our research aim: to quantify the impact of sharing economy platforms on the city of Granada in order to help monitor the impact of short-term renting on communities. As Ganapati and Reddick (2018) state, local governments could set rules requiring platforms to participate, for example, by establishing home-sharing licenses. Mody, Suess and Dogru (2019) reject a one-size-fits-all approach to regulate Airbnb, given that the impact of its activity differs across and within destinations due to the diverse geographic distribution of supply.

TOURISM IN GRANADA

Granada in Spain and Europe

The city of Granada is located in southern Spain. It has approximately 232 000 inhabitants and is the center of an urban area with a population approaching 530 000. The 2018 INE[1] hotel occupancy survey ranked Granada sixth in Spain with 1 867 251 visitors, behind Madrid, Barcelona, Seville, Palma de Mallorca, and Benidorm. Granada's relatively low population and the fact that is not a beach destination (in contrast to Benidorm and Palma) highlight the importance of tourism, and its economic and social impact on the city are clear. In this context, the problems derived from the pressure exerted

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[1] http://www.ine.es/dynt3/inebase/es/index.htm?padre=238&dh=1 (consulted on 25/3/2019)

by tourism acquire particular interest, especially in those locations that concentrate the major tourist flow.

The Urbantur report (Exceltur, 2016)—which ranks Spanish cities in terms of their relevance as tourist attractions—placed Granada in 16th position. It asserted that the city's strengths lie in the range of leisure activities on offer, with special emphasis on cultural or Spanish language-oriented tourism, accommodation, and catering services. However, the report also revealed weaknesses in areas such as mobility, accessibility, governance, and strategic management of tourism.

In 2017, the European Commission published "The Cultural and Creative Cities Monitor"[2] as a "tool to monitor and assess the performance of 'Cultural and Creative Cities' in Europe vis-à-vis their peers using both quantitative and qualitative data". The quantitative information, combining official statistics and experimental data from sharing economy platforms, is gathered into 29 indicators and 9 dimensions reflecting three major facets of the cultural, social and economic vitality of cities: Cultural Vibrancy, Creative Economy, and Enabling Environment. The first edition of the Cultural and Creative Cities Monitor covers 168 cities in 30 European countries (the EU-28 plus Norway and Switzerland). Granada—included in the Monitor as one of the UNESCO Creative Cities—ranks third in Spain, scoring 28.1 on their index. It is only surpassed by a very small margin by Madrid (28.6), and Barcelona (33.2), and stands well ahead of the fourth-ranking city, Santiago (23.7). At the European level it ranks slightly above cities such as Bruges (28.1), Cologne (28), and Porto (27.9), and surpasses capital cities such as Bucharest (27.7) and Rome (26.8). In global terms, Granada occupies 13th place in the European ranking of cities with between 100 000 and 250 000 inhabitants.

Granada is, therefore, a historic city with a valuable heritage and cultural life, the home of two large World Heritage attractions: the Alhambra and the Generalife gardens, and the Albaicín neighborhood (granted World Heritage status in 1984 and 1994, respectively).

Administrative neighborhood structure

The city of Granada is organized around 15 large neighborhoods or districts (identifiable by their postal codes), as shown in Table 1. The present study focuses on the three neighborhoods with historical heritage characteristics that concentrate the greater number of tourist attractions. These are: Albaicín-Sacromonte, Center 1, and Realejo.

In order to understand the different neighborhoods better, the authors have examined both income and population data. In terms of income, (Table 1), Center 1 is the neighborhood with the highest average income (€26 909 per year); Realejo stands in fourth place (€25 871) and Albaicín-Sacromonte in 11th (€22 685). If we estimate total population in absolute terms, none of these neighborhoods is among the most populous: Center 1 (11th: 11 741 residents), Albaicín-Sacromonte (12th: 9607) and Realejo (13th: 9466). In terms of population density, Center 1 is second with 22 250 inhabitants per square kilometer, whereas Realejo (2802.2) and Albaicín (285.2) have very low figures, which are explained by their urban structures. Although the space that corresponds to Center 1 is completely urbanized,

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[2] https://composite-indicators.jrc.ec.europa.eu/cultural-creative-cities-monitor/

this is not the case in either of the other two, with core populations that border the city center but territories that extend to the outskirts of the city into spaces protected for their historical and natural value. The Realejo, for example, includes the Alhambra, Generalife and the periburban park of the Dehesa del Generalife—one of the city's main green spaces.

Table 1. Descriptive data on the neighborhoods of Granada

Neighborhood	Average income	Registered voters	Estimated total population	Area in square kilometers	Estimated total population per square kilometer	Number of monuments	Total monument visitors in 2018
Center 1 [18001]	26 909	9347	11 741	0.53	22 250.1	5	1 052 581
Center 2 [18002]	25 378	3767	4732	0.37	12 924.4	0	0
Ronda [18003]	23 813	9736	12 230	16.26	752.2	0	0
Ronda-Arabial [18004]	24 753	13 436	16 878	8.07	2090.8	1	12 202
San Antón [18005]	26 027	6435	8083	0.27	29 951.1	0	0
Fígares-Ciudad Jardín [18006]	23 004	17 126	21 513	1.63	13 186.9	2	904 370
Zaidín-Vergeles [18007]	17 616	17 187	21 589	3.21	6734.2	0	0
Carretera de la Sierra-Bola de Oro-Genil [18008]	23 990	25 186	31 637	8.10	3906.4	0	0
Realejo [18009]	25 871	7536	9466	3.38	2802.2	7	3 199 891
Albaicín-Sacromonte [18010]	22 685	7648	9607	33.69	285.2	7	354 819
Beiro-Norte [18011]	17 029	17 745	22 290	5.18	4301.3	1	44 494
Plaza de Toros [18012]	26 113	6464	8120	0.58	14 083.1	0	0
Polígono de Almanjayar [18013]	18 667	11 709	14 708	1.59	9248.6	0	0
Barrio de los Periodistas [18014]	24 767	17 770	22 322	3.45	6468.5	0	0
Chana [18015]	19 321	13 765	17 291	1.98	8723.0	0	0
Total		184 857	232 208	88.28	2630.4	23	5 568 357

Within the urban structure of Granada, tourist attractions are closely concentrated in historical and heritage neighborhoods which present highly specific challenges for mobility, accommodation, and services. For example, mobility in the three neighborhoods under study is affected by restrictions to road traffic—mainly in Albaicín-Sacromonte—where access and exit routes are scarce and become congested several times a day. The difficulties of access are principally due to the orography of the neighborhood. The Albaicín is located on a hill facing the Alhambra and has an urban network of streets best-suited to pedestrians. The location of the Realejo, makes it a point of exit from the city to the east from the center or as an access to the Alhambra.

Reference to Map 1 will help understand the city described in the coming sections. The map shows
outlines of the neighborhoods and the main tourist attractions with information on the volume of
visitors each receives.

Map 1. Neighborhoods of Granada and main tourist attractions

The distribution of the tourist flow

The hotel occupancy survey for 2018—published by the INE (Instituto Nacional de Estadistica, Spain's national statistics office)—reported that a total of 1 867 251 travelers (1 005 544 non-Spanish and 861 707 Spanish nationals) visited the city during the year. The INE[3] defines travelers as "all those who make one or more overnight stay in the same accommodation" (translated from Spanish by the authors). In total, this corresponds to 3 363 539 overnight stays (each night a traveler stays at an establishment), of which 1 574 511 were Spanish and 1 789 028 were overseas visitors. The average stay was 1.80 nights per tourist. In 2018, the city had an average of 177 open hotel establishments on its records. These are defined as "establishments that provide collective accommodation services at a price with or without other complementary services (hotel, hotel-apartment or aparthotel, motel, hostel, pension, etc.)", and are also registered with the corresponding tourism councils of Spain's autonomous regions. This amounts to an average of 7431 rooms and 14 921 beds. In 2018, the average occupancy of available places was 60.79%, rising to 74.49% on weekends. The average occupancy rate per room was 67.38%. The average total of staff employed was 1764.17 people per month. From these data we determine that the total number of available overnight stays in hotel establishments was 5 433 047 (calculated from the percentage average occupancy by places).

The INE also conducts a survey of occupancy in tourist apartments[4] (*Encuesta de Ocupación en Apartamentos Turísticos*). These are defined as a "property the use of which is to be rented habitually for occasional lodging". The 2018 survey records 135 549 overnight stays (72 774 non-Spanish and 62 775 Spanish national travelers) with a total of 267 370 (142 778 non-Spanish and 124 592 Spanish). It also reports the number of available apartments—472 on average—increasing throughout the year and ending December 2018 on 514. This corresponds to an average total of 1576.3 places available per day throughout the year; amounting to 575 362 possible overnight stays. The average occupancy rate per place throughout the year equals 44.83% of the existing places with an average stay of 2 nights.

In contrast, data provided by the City Council tourism office indicates that, since the application of the most recent regional regulation change (Decree 28/2016, dated February 2 2016, on housing for tourism purposes), a total of 1250 homes of this type have been registered in the city.

Table 2 ranks data on visits to the city's main tourist resources in 2018, according to the city of Granada tourism office. The Alhambra-Generalife sites received 46.8% of the total visits computed in the year (2 610 549 people). If we add to the visits to the Alhambra museum (5.2%, 291 016) and the Museum of Fine Arts (2.4%, 134 076) located within the Palace of Carlos V, part of the aforementioned sites, we find that 54.4% of visitors are concentrated in this area of the city. The orography of the hill where these monumental sites are located presents difficulties of mobility and in its connection with the city center. The impact of the Alhambra on the city and the type of tourism the city receives are frequently the topic of political and social debate.

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[3] https://www.ine.es/daco/daco42/ocuphotel/notaeoh.htm
[4] https://www.ine.es/dynt3/inebase/index.htm?padre=231&capsel=231

The second most visited attraction in the city is the Parque de las Ciencias, a science and technology museum that receives 13.6% of all visits (759 211). Recently built, it is located outside of the main tourist neighborhoods.

In third and fourth position are the two main attractions in Center 1: the Cathedral (8.7%, 485 478) and the Royal Chapel (Capilla Real) (7.9%, 442 693). The highest tourist flow concentration is found in Albaicín-Sacromonte, Realejo and Center 1, with 7, 7 and 5 outstanding tourist attractions, respectively (Tables 2 and 3). The numbers of visitors received by these attractions are: Albaicín-Sacromonte 354 819 (6.4% of the total), Realejo—which includes the Alhambra complex—3 199 891 (57.4%) and Center 1, 1 052 581 (18.9%). The only other neighborhood of relevance is Fígares-Ciudad Jardín with 904 370 visits which correspond to two contemporary attractions: the Parque de las Ciencias and the CajaGranada Museum.

Table 2. Main tourist attractions per number of visits

Id	Tourist attractions	Visitors in 2018	% of total	Neighborhood
1	Alhambra-Generalife	2 610 549	46.8%	Realejo
2	Parque de las Ciencias	759 211	13.6%	Fígares-Ciudad Jardín
3	Catedral	485 478	8.7%	Centro 1
4	Capilla Real	442 693	7.9%	Centro 1
5	Museo de la Alhambra	291 016	5.2%	Realejo
6	Museo CajaGranada	145 159	2.6%	Fígares-Ciudad Jardín
7	Museo de Bellas Artes	134 076	2.4%	Realejo
8	El Bañuelo	90 756	1.6%	Albaicín-Sacromonte
9	Cuarto Real de Santo Domingo	86 128	1.5%	Realejo
10	Casa de Zafra	67 072	1.2%	Albaicín-Sacromonte
11	Museo Arqueológico	65 484	1.2%	Albaicín-Sacromonte
12	Casa de los Tiros	59 302	1.1%	Realejo
13	Palacio Dar al-Horra	53 126	1.0%	Albaicín-Sacromonte
14	Centro Lorca	49 039	0.9%	Centro 1
15	Centro José Guerrero	47 090	0.8%	Centro 1
16	Monasterio de Cartuja	44 494	0.8%	Beiro-Norte
17	Abadía de Sacromonte	41 207	0.7%	Albaicín-Sacromonte
18	Basílica de San Juan de Dios	34 281	0.6%	Centro 1

19	Museo Cuevas de Sacromonte	31 483	0.6%	Albaicín-Sacromonte
20	Huerta de San Vicente	12 202	0.2%	Ronda-Arabial
21	Fundación Rodríguez Acosta	11 434	0.2%	Realejo
22	Aljibe del Rey	7386	0.1%	Realejo
23	Casa Museo Manuel de Falla	5691	0.1%	Albaicín-Sacromonte

Recent initiatives, organized by the city council and the University of Granada, and coordinated through Medialab UGR[5], have strived to address the challenges posed by tourism in heritage neighborhoods—particularly the Albaicín-Sacromonte[6]—through the organization of participatory processes to promote socially and environmentally sustainable practices (Midgett et al., 2017; Romero Frías, 2018a, 2018b). Residents and local associations coincide in their concern over an impoverished quality of life and the need for reliable data about tourist flows and tourist apartments in order for public institutions to make informed decisions. It is precisely this shared diagnosis that, together with the literature review, gives rise to the main objective of the present study and the research questions we seek to answer.

OBJECTIVES OF THE CHAPTER

The objective of the present chapter is to provide reliable information drawn from many sharing economy and other web platforms that will quantify the impact of tourist accommodation on the city in relation to commercial activities, hotels and residential homes. To do so, we will also consider economic and population variables. Particularly, we will focus on offering evidence of the tourist pressure in those neighborhoods that attract most tourists: Albaicín-Sacromonte, Center 1 and Realejo. Research of this type has been widely demanded by residents, local government and other stakeholders in order to take action.

The main research questions are:

- **RQ1:** How are Airbnb tourist apartments distributed across the city in relation to neighborhood population density?

- **RQ2:** How are Airbnb tourist apartments distributed in relation to traditional hotel activity in the neighborhoods?

- **RQ3:** How are Airbnb tourist apartments distributed in relation to the real estate market in the neighborhoods?

- **RQ4:** How are commercial services articulated in the neighborhoods?

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[5] https://medialab.ugr.es/
[6] https://labingranada.org/foroalbaicinsacromonte/

METHODOLOGY

The project uses both quantitative analysis and georeferenced data visualization techniques, drawing on sources of information, such us: Airbnb, as a reference platform for tourist apartments; Booking.com, for the hotel offer; idealista.com, for the housing sales and rental market; and TripAdvisor, for restaurant services. Additionally, we draw on Google Maps for data on establishments closely related to residents' activities, such as supermarkets. Finally, population data from the electoral census have been taken into account, as well as data on average resident income by postal code.

Data collection and description

This study has used a wide variety of data from varied sources, involving a complex process of data gathering, processing and visualization. The following sections summarize these topics for each information source and describe the variables obtained for each element.

Airbnb - tourist apartment data

On 14 January 2019, we obtained information relating to tourist apartments in Granada from the datahippo.org database. This information had previously been updated on 22 September 2018; the database contained a total of 3748 entries added since 2017. Given that some data had actually been deleted from the platform, a python script was implemented to verify those links that were functional. Final data parsing gave a total of 1833 records.
The information obtained for each hosting was as follows:

- geographical location (longitude and latitude of the listing),
- registration link,
- accommodation type (Single Room, Shared Room, Entire Home),
- number of bedrooms,
- number of guests (maximum number),
- host ID (an identification number of the host offering the listing, in order to determine whether a few people were, in fact, managing a large number of apartments),
- review count (number of reviews by guests), and
- minimum number of nights.

Booking - hotel marketplace

On 4 December 2018, information was extracted from booking.com using a python script that scraped the site; 982 entries were recorded. Only 120 of them corresponded to hotels, hostels or pensions. The rest were mainly tourist apartments. Given that the volume of tourist apartments provided by Airbnb was greater, booking.com was only considered a source of professional hosting. For each of these records we gathered the name and geolocalization.

We also determined the volume of information available on other platforms, such as HomeAway (580 entries), Housetrip (212) and Only Apartments (175). However, this was discarded as they cover a much smaller volume than Airbnb.

TripAdvisor – restaurants and other catering services

Data from TripAdvisor was obtained on 18 January 2019 using the Google Chrome Web Scraper extension and a python script to gathered geolocalization data. In total, we obtained 1553 records of which 917 were restaurants, 253 cafés, 96 bars, 13 delicatessens and 274 establishments with no assigned category.

The information available for each establishment was:

- link,
- establishment type (restaurant, café, bar, etc.),
- price range,
- geographical location, and
- number of reviews

Idealista - properties for rent or sale

Idealista.com is one of the most important real estate web services in Spain. The data was collected on 24 January 2019 using the Google Chrome Web Scraper extension. Geolocalization was accomplished by using a python script, accessing the Google Maps API. In total there were 6510 records; 2863 considered rental offers and the remaining 3647 were properties for sale. Amongst the properties listed, 2396 were homes for sale, 1575 were homes for rent, and 440 individual rooms for rent. The remaining 2099 were other types of property, such as parking spaces, buildings, or land. For each of the records we obtained the following variables:

- offer type (for sale or to rent),
- property type (in those to rent, the types included buildings, garages, rooms, commercial properties, offices and homes. In those for sale, the types included: buildings, garages, commercial properties, offices, land, storage rooms or homes.),
- geographical location,
- accuracy of geolocalization,
- link,
- price,
- square meters,
- number of rooms,
- floor,
- condition (new development, good condition or in need of renovation), and
- garage (included or not).

Information about permission to smoke was also accessible and, in the case of rooms for rent, the number of people sharing was indicated. In the case of some properties for sale, an indication was given as to whether or not the property was still inhibited by the current owner.

Google Maps - activities relating to residence

Google Maps was used as a geolocalization service to identify some activities related to permanent residence in a determined area: supermarkets and food supply stores (250 entries) and hairdresser's (225).

Electoral registers - population information

The population data set corresponds to information provided by the electoral registers for Andalucía's regional elections, held on 2 December 2018. The population data per district and electoral section was taken from the carto.com database account of granadaimedia[7], a local digital journal.

The total population on the electoral registers was 184 857 persons—lower than the current population—since not all citizens are necessarily eligible to vote, e.g. those aged under–18 years. According to recent INE[8] data (updated at 1 January 2018), the city of Granada has a population of 232 208. This is 25.6% higher than that of the electoral registers. To estimate the population of each district and electoral section of the city, the available data was multiplied by 1.256.
The following information is available for each electoral section:

- geolocalization,
- electoral register,
- corresponding neighborhood (by postal code), and
- area in square meters

Tax agency - average income

The data for average income correspond to 2016 and were obtained from the webpage of Spain`s national tax agency[9], following their publication in January 2019. The database contains personal income tax returns for towns with over 200 000 inhabitants, grouped by postal codes.

Table 3 summarizes the aforementioned information, including data types, origin, number of records collected, number of variables for each record, date of extraction and method of collection.

Table 3: Description of data

Data	Source	Quantity	Variables	Date	Method of collection
Tourist apartments	Airbnb	1833	9	14/01/2019	Information available on datahippo.org. Validation of existing records with python script.

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[7] https://granadaimedia.carto.com/me

[8] http://www.ine.es/jaxiT3/Datos.htm?t=2871

[9] https://www.agenciatributaria.es/AEAT.internet/datosabiertos/catalogo/hacienda/Estadistica_del_IRPF_por_codigo_postal.shtml

Hotels	Booking	120	3	04/12/2018	Scraping with python script.
Restaurants and other food services	TripAdvisor	1553	5	19/01/2019	Using Google Chrome Web Scraper extension. Geolocalization with python script.
Supermarkets	Google Maps	250	2	17/01/2019	Manual geolocalization on Google MyMaps.
Hairdresser's	Google Maps	225	2	17/01/2019	Manual geolocalization on Google MyMaps.
Homes and commercial properties for rent or sale	Idealista	6510	11	24/01/2019	Using Google Chrome Web Scraper extension. Geolocalization with python script.
Population of each district	Registered voters	184	4	02/12/2018	List of voters registered for the elections held on 02/12/2018.
Average income	Tax Agency	15	2	19/01/2019	Article published in *El País* on 19/01/2019

Data visualization

To provide a clear understanding of the issues involving tourism, visualization techniques are often used to portray the main variables relating to both tourism and residential activities.

The enormous growth in the volume of data generated through digital platforms and in the variety of information sources means we must explore new ways of managing, processing and visualizing information. Through data visualization, the present study aims to detect and analyze patterns hidden behind the mass of information, show the results, and make these data sets understandable. Several projects have sought to map the effects of tourism on cities or the flows generated by transport, tourists, and so on. Those which mainly focus on tourism include initiatives like the "Atlas of touristification in Madrid" (http://turistificacion.300000kms.net/), a project which displays data from major tourism-centered internet platforms (TripAdvisor, Airbnb or Flickr amongst others), as well as other official sources. Other examples of flow visualizations include: Sense and the city (http://senseable.mit.edu/guggenheim/), which uses cameras to register pedestrian traffic, automatically recording individual routes and group dynamics; "Bostonography" (http://bostonography.com/bus/), which presents data on the positions and speeds of buses in Boston (USA), and Placemeter (http://www.placemeter.com/), which uses cameras to measure pedestrian traffic in cities.

In this chapter, data visualization was performed using CARTO builder (carto.com) to create maps. Carto is an SaaS cloud computing platform providing GIS and Web mapping tools for display in a web browser. CARTO builder also provides access to an SQL web interface that facilitates data manipulation.

One important goal was to use visualization to identify patterns relating different datasets in order to gain insights in relation to our research objectives. To facilitate the interpretation of maps, we tried to avoid information overload by creating several maps of the same size and using the same color codes, if possible, for comparative purposes. We used the same sized dots but changed the colors for each variable. In each map, we combined a maximum of four variables so as to make it easy to visually decompose it into its individual elements.

RESULTS

Our analysis focused on the construction of different visualizations of geolocated data on the city map and on a descriptive data analysis (Tables 4 and 5). Map 1 shows the city neighborhoods and principal tourist attractions. Given that our analysis concerns the impact of Airbnb's tourist apartment marketplace on the city and, in particular, on the historic districts, Map 2 relates this to traditional hotel establishments. Map 3 shows the Airbnb marketplace in relation to residential housing for rent or sale. Finally, Map 4 contrasts tourist- and resident-related services and local commercial stores in the city. In relation to the other maps, Map 4 provides a global picture of the situation in Granada and, particularly, in its historic neighborhoods.

Map 2 represents the different types of hosting in the city in relation to the population density of the fifteen neighborhoods. Population density is represented by shades of green, with the more intense green corresponding to higher population density. To provide more accurate data, information has been broken down to the level of electoral districts and each neighborhood has been outlined in black. The tourist accommodation depicted in these maps is: tourist apartments only (Airbnb; represented by black dots), rooms for tourist use (Airbnb; yellow dots) and hotel establishments (Booking; purple dots). This map allows us to respond to RQ1 and RQ2. In this study, we have assumed that both types of accommodation—that offered by Airbnb and that included on Booking.com—generally represent two different types, both of which are subject to different regulations that allow them to function properly as alternative or complementary services.

Table 4 shows that the city has a total of 1489 Airbnb apartments which could host up to 7072 people, plus 340 rooms with a capacity of 812 people. Consequently, if we consider the maximum daily occupation over 365 days, the city would have an annual accommodation capacity of 2 877 660 thanks to Airbnb.

The three historic neighborhoods concentrate 63.7% of the tourist apartment marketplace and 54.1% of Airbnb rooms. If Center 2 and San Antón—which occupy the more central part of Granada—are also added, these figures rise to 84% of apartments and 63% of rooms.

Albaicín-Sacromonte accounts for 489 apartments which, based on Airbnb data, amounts to a total capacity of 2193 people. Here, rooms for rent leads the rank order with 88; i.e. a potential capacity of 191 people. In second position lies the Realejo with 300 apartments and a total of 1334 people, and 59 rooms with a capacity of 147 people. These are followed by Center 2 and Center 1. In peripheral neighborhoods the supply is much more scarce, reducing the percentage difference between apartments and rooms or even inverting the relationship. Note that this accommodation is concentrated in the three historic neighborhoods of Granada—plus Center 2 and San Antón—which constitute the heart of the city: 84% of apartments and 63% of rooms.

Booking.com data records 119 establishments in the city, including hotels, hostels and pensions. The neighborhoods with most establishments are: Realejo (30), Albaicín-Sacromonte (25) and Center 1 (21). This contrasts with official data that indicate the existence of 177 such establishments in 2018. This suggests that Booking.com may have underestimated the real number, perhaps because not all of these establishments use this platform to commercialize their services. The difference may also be due to the fact that some establishments which were officially registered at that time were not actively advertising their services at the time of our study.

The Booking.com data available enable us to confirm the same geographical distribution pattern as for Airbnb accommodation. In those neighborhoods with no hotels, Airbnb does offer some accommodation, although very little.

Population density figures show that in Albaicín-Sacromonte and Realejo, where density is lower than in other central zones, the presence of Airbnb accommodation is striking.

If we focus on the number of residents per tourist apartment in the electoral districts, we find that among the 10 with the lowest numbers of people (and therefore greatest tourist pressure), are five districts in Albaicín-Sacromonte (8, 9, 9.5, 19.8 and 22 persons per apartment) and 3 in Realejo (12.3, 14.1 and 14.1). If we consider rooms for tourist rental, the data is similar: amongst the first 10 we find 4 districts in Albaicín-Sacromonte (33.4, 57.9, 80.6 and 141.2 people per room) and 3 in Realejo (79.1, 91.2 and 108.4).

Map 2. Tourist accommodation in the city in relation to population density
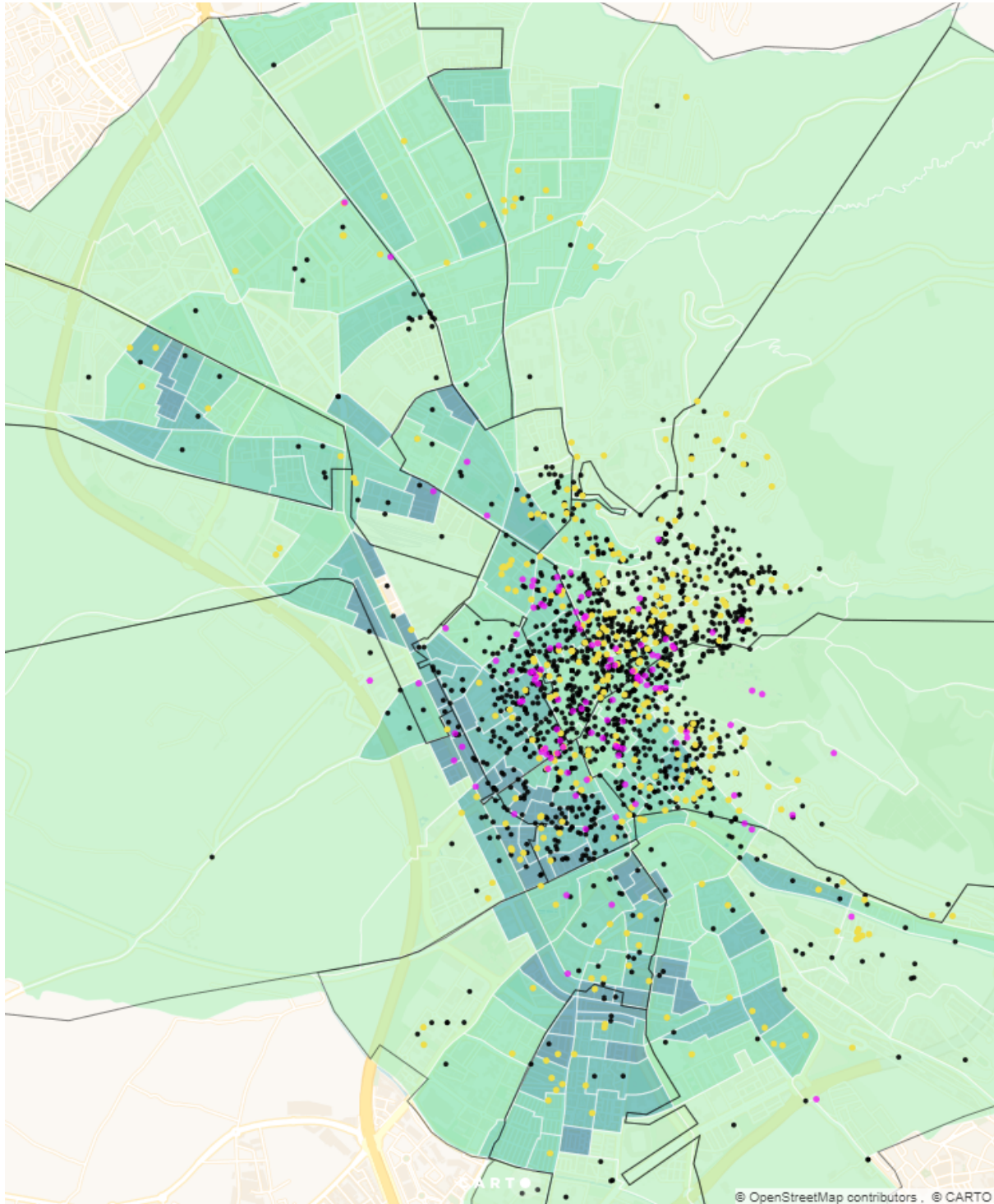
Electoral districts in green indicating the higher (more intense green) or lower population density per square kilometer; tourist apartments (black dots), tourist rooms (yellow dots) and hotel establishments (purple dots)

Map 3 represents tourist accommodation in the city and residential homes for rent or sale in relation to the average income in each neighborhood. This map is related to RQ3. Data on residential homes for sale show that Center 1 has the most with 276 homes for sale (in good condition or in need of renovation), followed by C. Sierra-Bola de Oro-Genil (225) and Realejo (222)—third here, but in second place in terms of number of tourist apartments. Albaicín-Sacromonte (141) lies in ninth position but is first in terms of tourist apartments.

The average house price in Realejo and Albaicín-Sacromonte is clearly the highest. In the list of homes in good condition for sale, Realejo is first with 158 at an average price of €585 276, followed by Albaicín-Sacromonte with 106 homes at an average price of €330 928. In the list of homes in need of renovation for sale, Albaicín-Sacromonte has 35 at an average price of €454 685.7: the highest in the city. In third position, we find Realejo with 64 homes at an average price of €314 801.6.

In terms of the average price per square meter of homes in good condition for sale, Center 2 is in first place (€2492.3), followed by the central neighborhood of San Antón (€2392.3), Center 1 (€2382.1), Realejo (€2281.1) and, in sixth place, Albaicín-Sacromonte (€2197.5).

On the residential rental market, we find 1575 homes and 440 rooms for rent. Center 1 leads the list with 193 homes, followed by Realejo with 186. Albaicín-Sacromonte lies in seventh place with 110. In the rooms for rent list, Center 1 is first with 65 and Albaicín-Sacromonte third with 46. Again, the highest average price is found in Albaicín at €284, compared to an overall average for the city of €238.25. Center 1 is in fourth place (€257.6) and Realejo, fifth (€254.7).

The average rent for homes is €670.2 and Albaicín is one of the lowest at €546.6. The price of rental housing per square meter is €8.5 in Fígares-Ciudad Jardín, the most expensive neighborhood, followed by Center 1 (€8.4), Center 2 (€8.2), Realejo (€8.1) and, in sixth position, Albaicín-Sacromonte (€7.8). Given the historical nature of the neighborhoods under study, the average size of homes for rent in square meters is the smallest in the city: Albaicín-Sacromonte ($70.21m^2$, the smallest), Realejo ($78.68m^2$) and Center 1 ($83.78m^2$); far from the $117.13m^2$ of Barrio de los Pajaritos, which has the largest homes.

Map 3. Tourist accommodation in the city and residential homes for rent or sale in relation to average income
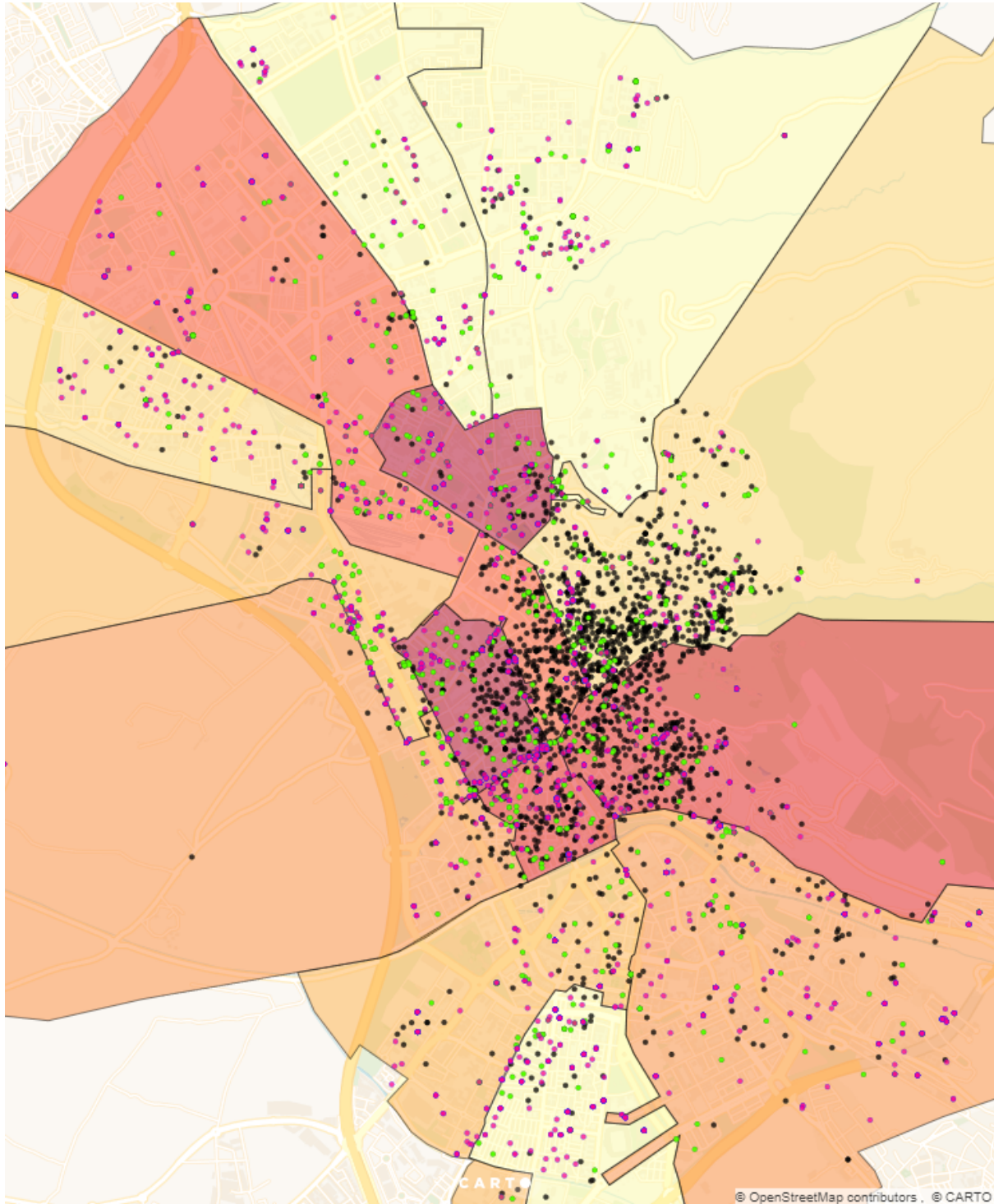
The city neighborhoods, indicating the highest (red) or lowest (yellow) average income; tourist apartments, both homes and individual rooms (black dots), homes for sale (purple dots) and homes and rooms for rent (green dots)

Map 4 shows some of the most important basic services for both tourists and residents. It allows us to respond to RQ4. Restaurants (TripAdvisor, yellow spots) are seen to be closely related to tourism, whereas two commercial activities are directly related to residents' interests: hairdresser's (purple spots) and supermarkets (red spots). Both were identified through Google Maps.

Map 4. Services and their relationship to population density
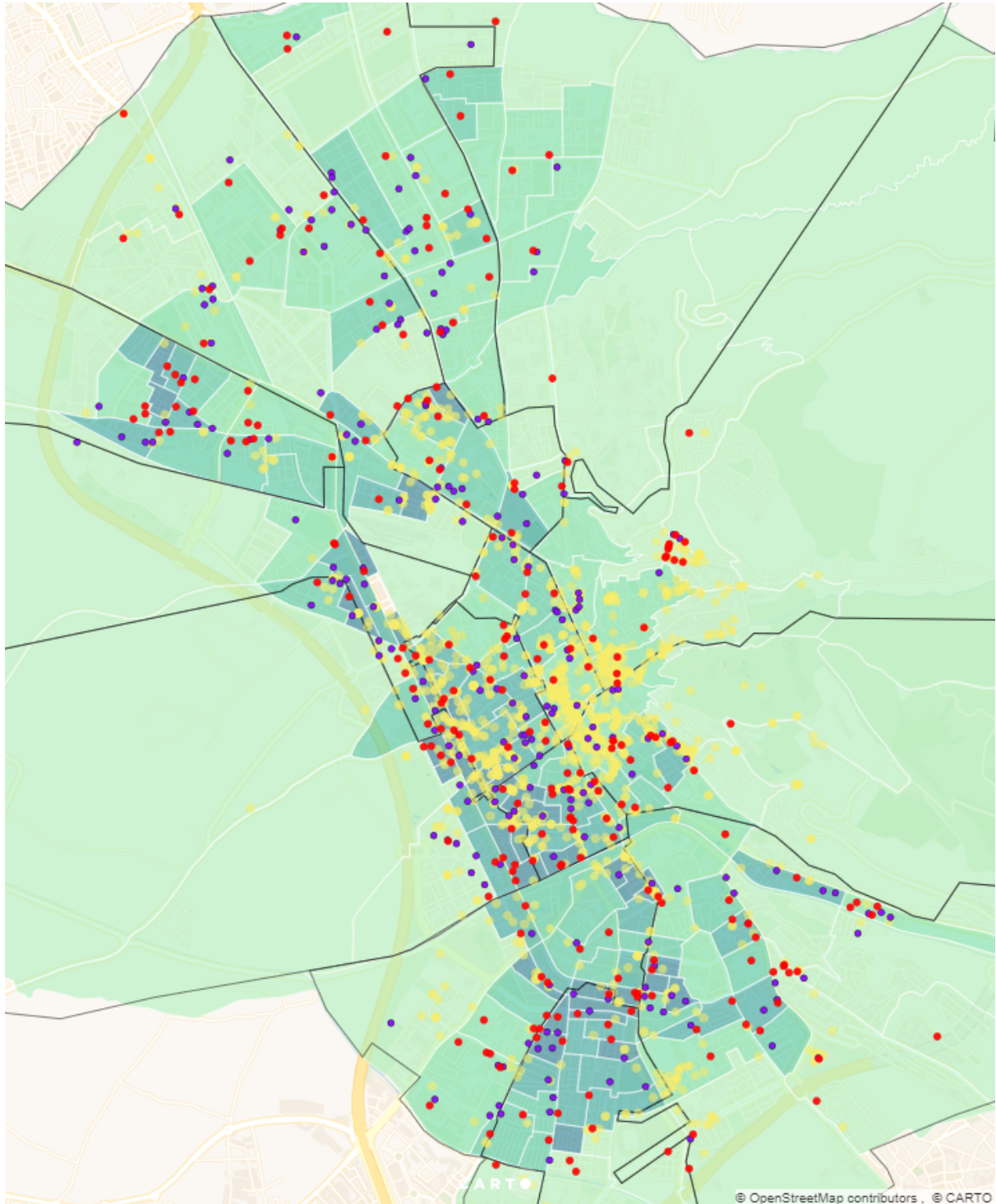
The electoral districts are shown in green indicating the highest (most intense green) or lowest population density per square kilometer; restaurants (yellow dots), hairdresser's (purple dots) and supermarkets (red dots)

Restaurants are located mainly in Realejo (153), Albaicín-Sacromonte (131), Center 2 (116) and Center 1 (104). Consumer use of restaurants is indicated by the average number of reviews received for each neighborhood (Table 5). Albaicín-Sacromonte ranks first with an average of 238.3 reviews, while Realejo has an average of 173.6, compared to an average 89 per restaurant for all neighborhoods. The present study includes no qualitative analysis of the comments received. The situation of bars, cafés and other catering establishments is similar with the three historic districts having the highest numbers: Albaicín-Sacromonte (86), Realejo (84) and Center 1 (83); they also receive the most attention in reviews.

In relation to residential activity, the average number of supermarkets in the city is 16.4; in the neighborhoods under study we find Realejo (17), Albaicín-Sacromonte (14) and Center 1 (12). Note that this variable can be confusing because Google Maps includes under the same label small neighborhood stores often selling products destined to satisfy the needs of tourists passing by or staying in nearby apartments; these stores do not offer a range of products or prices to meet residents' needs. This is especially evident in Albaicín-Sacromonte where 6 of the 14 supermarkets are outside of the neighborhood's historic center, which further reduces the offer. Hairdresser's are also considered a resident-oriented service. The average per neighborhood is 14.9. Center 1 is just such an average neighborhood with 15 establishments, whereas Realejo is below average with 13 and Albaicín-Sacromonte (7) is the district with the fewest.

Finally, Table 5 includes information on commercial premises for sale or rent. The average number of stores for sale stands at 41.2. Center 1 is in third place with 58 whereas Realejo is below average with 23 and Albaicín-Sacromonte (6) is the district with the fewest. The average number of premises for rent stands at 67.9. Center 1 is in first place with 78 whereas Albaicín-Sacromonte (13) and Realejo (11) have the fewest properties for rent in the city.

DISCUSSION

The above data corroborates the view that the historic districts of Albaicín-Sacromonte, Center 1 and Realejo are those that receive the greatest volume of tourist pressure as described by a variety of indicators—principally the Airbnb marketplace (63.7% of the tourist apartment offer in the city and 54.1% of individual rooms for rent). The geographical concentration of Airbnb supply has also been reported in other Spanish cities, such as Barcelona, Madrid and Palma de Mallorca (Gutierrez et al., 2017; Garcia-Ayllon, 2018).

By calculating at electoral district level the number of residents for each tourist apartment, we found that amongst the first 10 with the lowest numbers of people and, therefore, the highest tourist pressure, there are 5 districts in Albaicín-Sacromonte (8, 9, 9.5, 19.8 and 22 people per apartment) and 3 in Realejo (12.3, 14.1 and 14.1). Furthermore, if we look at rooms for tourist rental, the data is similar: amongst the first 10 we find 4 districts in Albaicín-Sacromonte (33.4, 57.9, 80.6 and 141.2 people per room) and 3 in Realejo (79.1, 91.2 and 108.4).

Clearly the concentration of individual rooms for rent is below that of apartments. Renting individual rooms is considered to be related to residents earning additional income, whereas renting homes is often an economic activity owners dedicate their home to permanently or on a seasonal basis to generate income. During 2018 Forum meetings on Sustainable Tourism in Albaicín and Sacromonte, the opinions of local residents were gathered. Findings indicated families resident in the neighborhood often rented out a second home in order to earn additional income. This issue should be explored via a more qualitative approach in future research.

In the historic districts, the proportion of apartments versus individual rooms is much greater than in more peripheral neighborhoods: Center 1 (9.4:1), Albaicín-Sacromonte (5.6:1), Realejo (5.1:1); downtown, in neighborhoods such as San Antón (7.3:1) or Center 2 (5.3:1), compared to neighborhoods such as Fígares-Ciudad Jardín (1.5:1), Zaidín-Vergeles (1.62:1), and Carretera de la Sierra-Bola de Oro-Genil (2:1). In two neighborhoods, more individual rooms are on offer than apartments: Beiro-Norte (0.9:1) and Polígono de Almanjáyar (0.5:1). These two are amongst the three neighborhoods with the lowest incomes so we would suggest that at the lower end of the income scale the incentive is to obtain additional income by renting individual rooms in homes. Adamiak (2018) indicated that the supply of entire properties (as opposed to rooms and shared rooms) is an indicator of the professionalization of Airbnb activity. This is particularly high in eastern and southern European countries. We need to investigate the extent to which owners are renting out more than one property in order to better understanding this professionalization in Granada.

Given the concentration of tourist apartments in the city center, we could question the dispersion of accommodation produced by Airbnb. However, we cannot give a conclusive answer to this question since Granada is surrounded by many smaller towns which add up to a population greater than that of the city itself and, therefore, the decentralization of tourist apartments may occur in other towns bordering the city. Similarly, we would need to contextualize other tourism resources, such as the Sierra Nevada ski resort which has a powerful seasonal component. How we define the units of analysis can generate different results. For instance, Adamiak (2018) in a comparison of European cities used various units: from municipal borders to urban regions or metropolitan areas.

Notwithstanding, data for neighborhoods with no or few hotel establishments shows Airbnb does have a presence there, albeit small. Differences in the distribution of hotel and Airbnb supply have also been reported in cities such as Paris (Heo et al., 2019).

Overall, the Airbnb accommodation capacity for apartments totals space for up to 7072 people (in 1489 apartments) plus 812 people in individual rented rooms (340). This amounts to 7884 overnight places, which means 2 877 660 places in a year. This contrasts with the INE survey of occupancy of tourist apartments data, which estimates an approximate annual total of 575 362 stays in tourist apartments. This is also lower than the 1250 homes registered for tourist use reported by Granada city council.

Since not all Airbnb apartments are registered in official records, the platform marketplace data is taken as a reference. Adding the 2 877 660 Airbnb stays to the estimated annual 5 433 047 hotel stays would increase the total offer by 53% above the capacity offered in hotels.

Despite this substantial Airbnb tourist apartment offer, the INE data on the evolution of the number of overnight stays in hotel establishments indicate an overall increase between 2013 and 2018 (with the exception of 2017). At the same time, the growth in the number of Airbnb apartments (Valdivia, 2017) since they first became available in 2010, has been very high. For example, in 2016 the offer grew by 105.42% in comparison with 2015.

The fact that the number of hotel establishments offering tourist accommodation has been maintained and, indeed grown in terms of overnight stays together with the new Airbnb marketplace implies that recent years have seen a significant increase in tourism in the city. Therefore, we cannot confirm that the demand for hotel accommodation is being replaced by the Airbnb supply, unlike the situation reported elsewhere (Zervas et al., 2017; Neeser et al., 2015; Heo et al., 2019).

Visitor numbers cannot be accurately measured by institutional instruments (Ganapati & Reddick, 2018). Hence, we need to improve measuring systems by including and regularizing, when this has not yet happened, the online tourist apartment marketplace.

The tourist pressure suffered by the city is confirmed through reports such as Urbantur (2016), which states that Granada ranks second after Santiago de Compostela in the tourist pressure index for accommodation, with 124.52 tourist places for each 1000 inhabitants.

In relation to the offer of homes for sale, data from the Idealista website shows that Center 1 and Realejo are two of the neighborhoods with the greatest numbers of properties available. The average prices of homes—both in need of renovation and in good condition—show Albaicín and Realejo are the most expensive. Similar results can be observed in terms of housing for rent. A key indicator, from the authors' point of view, is the ratio of homes offered for tourist rental compared to those offered for residential rental. The data shows that there are only 4 neighborhoods in which tourist rental exceeds residential rental. Two of them are: Albaicín, first, with a ratio of 4.4, and Realejo, with 1.6. Brauckmann (2017) analyzed the potential effects of sharing economy marketplaces on urban property markets and pointed out that increases in property prices due to growing city tourism may lead to the displacement of residents and businesses.

All this contributes as much to the touristification of city centers as to gentrification, which entails the expulsion of the population from neighborhoods that are revalued by an injection of public or private capital (Gravari-Barbas & Guinand, 2017; Grier, & Perry, 2018). In the historic districts, we find a greater volume of houses are only available to tourists and that prices are higher than those for residential rental. At the same time houses for sale also reach very high prices.

The touristification of downtown districts is also decisive because the total number of tourists in apartments and in hotels generates high flows that end up transforming the commercial nature of the city. We find a limited supply of basic services (e.g. supermarkets) which, together with the difficulties of access and mobility in historic neighborhoods, particularly Albaicín, discourages potential residents. Albaicín also has a lower average income than the overall average for the city and a smaller population.

LIMITATIONS, FUTURE INVESTIGATION AND CONCLUSIONS

The present study involves a descriptive and quantitative exploration of current-day tourism in the city of Granada, taking the Airbnb supply as the main disruptive sharing economy factor.

The wide range of information sources used has introduced several limitations to our study: e.g. our capacity to update the data used; data quality; and the coverage different services have provided as approximations to the real situation, among others. Official data is currently obtained through procedures that clearly continue to exclude many of the phenomena relating to tourist apartments and therefore underestimate the real volume of tourist flows in cities.

Our results and their implications lead the discussion to the sustainability of tourism in historic and heritage cities. The concept of the "sharing city" has emerged to define the ways in which the sharing economy is implemented in urban areas (Agyeman, McLaren, & Schaefer-Borrego, 2013; McClaren & Agyeman, 2015). It is closely linked to achieving sustainability in cities by using digital technologies to activate underutilized resources in the face of growing resource constraints and environmental challenges. Cohen and Muñoz (2016) designed the Sharing Cities-SCP Plot, which seeks to provide a framework for understanding the emergence of sharing activity and its contribution to the generation of more sustainable urban economies. Sharing cities should definitely promote tourist practices that are both environmentally and socially sustainable. Currently, debates on sustainable tourism (Edgell, 2016) and the social responsibility of participants in tourist destinations are fundamental to the creation of interrelationships that satisfy the expectations of both tourists and local communities. This is a highly relevant approach for future research.

Additional lines of research in the context of sustainable tourism would involve the need to learn more about the nature of Airbnb tourist apartments: Are they registered with the public authorities? Who are the tenants? What are the profiles of the tourists that visit them? How well-satisfied are they? and so on. And the need to improve our understanding of the phenomenon of touristification in historic centers by making longitudinal studies that teach us about the evolution of shops and of neighborhood life. In cities with substantial metropolitan areas, as is the case of Granada, we need to incorporate these adjoining municipalities to gain a view of the city as a whole. The authors believe that it would also be appropriate to evaluate the development of explanatory models that allow us to integrate the variables in order to better understand the factors that determine tourist pressure and its effects on neighborhoods. Finally, comparisons of similar cities can help us understand the impact of the sharing economy on tourism at the national and European levels.

This would open up many opportunities to extend our work through different channels that might ultimately lead to better local management of tourism flows and a more adequate regulation of the reality of current problems.

The present study shows how the traditional accommodation marketplace together with the new alternatives on offer—which are much more flexible but difficult to quantify—increase the pressure that tourism exerts on urban centers. In Granada, this is mainly evident in the neighborhoods of Albaicín-Sacromonte, Realejo and Center 1. This represents a great challenge for our present and our future: namely, that of developing the awareness of residents and tourists in order to establish policies regarding the quality of the city's tourism sector so as to preserve the very nature of the neighborhoods and the lives of their people.

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Table 4: Main data on tourist and residential accommodation in the neighborhoods of Granada (the three neighborhoods with the highest indicators are highlighted by different intensities of red, from the highest to the lowest)

| | Tourist accommodation | | | | | Residential accommodation | | | |
| | Hotels | Entire homes | | Rooms | | Housing for sale | | Housing for rent | |
Neighborhoods		Quantity	Total capacity	Quantity	Total capacity	In good condition	In need of renovation	Entire homes	Rooms
Center 1 [18001]	21	160	786	17	47	187	89	193	65
Center 2 [18002]	20	197	912	37	94	49	39	111	37
Ronda [18003]	4	20	100	4	8	75	42	85	18
Ronda-Arabial [18004]	4	25	158	11	24	112	96	51	34
San Antón [18005]	5	102	558	14	56	96	48	85	33
Fígares-C. Jardín [18006]	3	27	149	18	35	91	11	90	4
Zaidín-Vergeles [18007]	0	21	119	13	24	125	69	131	20
C. Sierra-Bola de Oro-Genil [18008]	2	52	329	26	67	183	42	61	11
Realejo [18009]	30	300	1334	59	147	158	64	186	36
Albaicín-Sacromonte [18010]	25	489	2193	88	191	106	35	110	46
Beiro-Norte [18011]	0	16	78	17	36	94	30	37	50
Plaza de Toros [18012]	2	45	193	20	41	99	56	154	35
Polígono de Almanjayar [18013]	0	2	12	4	10	52	10	22	13
Barrio de los Periodistas [18014]	3	22	97	7	15	125	44	173	31
Chana [18015]	0	11	54	5	17	77	38	86	7
Total	119	1489	7072	340	812	1683	713	1575	440

Table 5: Main data on tourist and residential accommodation in the neighborhoods of Granada (the three neighborhoods with the highest indicators are highlighted by different intensities of red, from the highest to the lowest)

Neighborhoods	Restaurants		Bars, cafés and others		Super-markets	Hairdresser's	Commercial premises	
	Quantity	Average number of reviews received	Quantity	Average number of reviews received			For sale	For rent
Center 1 [18001]	104	114.46	83	107.3	12	15	58	78
Center 2 [18002]	116	167.10	72	90.2	12	14	23	49
Ronda [18003]	57	59.63	36	22.7	12	12	20	27
Ronda-Arabial [18004]	49	66.22	31	14.1	18	21	58	44
San Antón [18005]	45	85.49	41	89.8	18	11	58	69
Fígares-C. Jardín [18006]	42	41.38	43	18.2	22	14	51	32
Zaidín-Vergeles [18007]	21	66.19	15	6.7	17	14	72	38
C. Sierra-Bola de Oro-Genil [18008]	53	94.96	40	19.9	32	26	61	27
Realejo [18009]	153	173.60	84	131.5	17	13	23	11
Albaicín-Sacromonte [18010]	131	238.32	86	186.3	14	7	6	13
Beiro-Norte [18011]	1	59	5	3.8	10	10	29	8
Plaza de Toros [18012]	40	57.93	24	45.1	11	11	31	31
Polígono de Almanjayar [18013]	12	22.92	10	4.2	14	16	21	17
Barrio de los Periodistas [18014]	40	61.48	25	57.2	19	27	53	34
Chana [18015]	11	25.55	10	3.7	18	12	54	27
Total	875		605		246	223	618	1019