

How much is too much? - Assessing the demand, the economic impact and the perception of ‘sharing accommodation’ in tourism destinations

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1 Abstract

The impact of privately rented accommodation via digital platforms is a topic that is widely discussed in tourism policy, management and measurement. When talking about this topic we usually mainly talk about Airbnb as the biggest platform worldwide.

Based on listing data was “scraped” from the Airbnb website without knowledge of Airbnb, a methodology quite widely used for academic and commercial purposes, we will show the results of our research: How can these listing data be used to analyse volumes of capacities and demand, the geographical distribution, development over time and structure of the hosts? We think that this approach can provide an excellent basis to assess the impacts of “shared accommodation” on local economies, neighbourhoods and housing, leading to a more precise picture about the extent of use, overuse and gentrification in a city destination.

This paper will be building on our experience presented in during the last Global Forum in Venice¹. Here we had shown how we are working with capacity data scraped from the Airbnb website. In the meantime, we have been conducting a lot of more projects, based on this data, e.g. in Hamburg, Kassel, Bruges, Antwerp, Belfast, Dublin and Malta with significant new learnings regarding methodology and application. Now we would like to share our experiences in terms of 1. New methodological possibilities; 2. Embedding this method in a mix with other methods and 3. The application of the findings by NTO’s and other destination organizations.

¹ Schmücker, D., Sonntag, U. e P. Wagner (2016), “Assessing the impact of “shared accommodation” for city tourism”, http://tsf2016venice.enit.it/images/articles/Papers_Forum/6.2_Assessing%20the%20impact%20of%20shared%20accommodation%20for%20city%20tourism.pdf

2 Background: Growth in city tourism and rise of the “sharing economy”

Tourism is subject to massive growth. International tourist arrivals grew by 7% in 2017 to reach a total of 1.3 billion, according to the latest UNWTO World Tourism Barometer.² This strong momentum is expected to continue in 2018 and the coming years. For 2030 the UNWTO projects 1.8 billion international arrivals worldwide. Based on its World Tourism Monitor, IPK states that city tourism is the fastest growing market segment in tourism.³

Tourism generates income and employment for cities, and thanks to tourism the liveliness and liveability in cities is boosted because cultural offers, shops, services and facilities would not exist without that additional customer base. However, with an eye on the (social) sustainability of city tourism development one has to take into account that the direct and indirect effects of the increase in visitor numbers seem to cause an increase in annoyance among residents, which could lead to conflicts between tourists, tourism suppliers and inhabitants. The rise of the so-called sharing economy has recently added an additional facet to the discussion. Even though such conflicts and the discussion about it are neither new nor limited to large cities it is important to address this issue where a large proportion of tourists go: from and to the European cities.⁴ European Cities Marketing reported the preliminary results from their European Cities Benchmarking Report with the findings that European cities continued their growth with an 8% increase in 2017 in total bednights compared to 2016.⁵

3 Objective: Measuring the impact of “shared accommodation” in city tourism

The challenges for tourism organisations, the administration and tourism policy in city destinations are growing and the need for a better management of tourism is pertinent. One basis for good planning and management is a decent measurement of tourism volumes (demand and supply).

The tourism growth figures shown in the introduction chapter reveal only a part of the real story – namely arrivals and bednights that are covered by official statistics. The supply and demand of tourism accommodation in the “sharing economy” are not covered by the official statistics.

The emergence of new tourism products and services through digital platforms – often referred to as the sharing economy, collaborative economy or peer-to-peer (P2P) economy – has been welcomed by both visitors and the providers of these services alike. However, this development has also raised questions and growing concerns amongst traditional operators and destinations. Whilst these new business models have a significant potential to offer innovative services, often at lower prices, creating new products, employment opportunities and sources of income, as well as a more efficient use of resources, it has also raised issues of unfair competition,

² UNWTO (2018), World Tourism Barometer Vol 16,

http://cf.cdn.unwto.org/sites/all/files/pdf/unwto_barom18_01_january_excerpt_hr.pdf (15/05/18).

³ IPK INTERNATIONAL (2017), ITB World Travel Trends Report 2016/2017, https://www.itb-berlin.de/media/itb/itb_dl_all/itb_presse_all/World_Travel_Trends_Report_2016_2017.pdf (15/05/18).

⁴ POSTMA, A. e D. SCHMUECKER (2017), "Understanding and overcoming negative impacts of tourism in city destinations: conceptual model and strategic framework", Journal of Tourism Futures, Vol. 3 Issue: 2, pp.144-156, <https://doi.org/10.1108/JTF-04-2017-0022> (15/05/18).

⁵ EUROPEAN CITIES MARKETING (2018), Successful Recovery in European City Tourism in 2017: +7.7%, <https://www.europeancitiesmarketing.com/successful-recovery-european-city-tourism-2017-7-7/> (15/05/18); this preliminary data results from 65 out of 121 cities, representing a total of 456.9 million bednights.

consumer protection and the labour conditions of employees and the self-employed, as well as negative consequences on local communities.⁶

Hence, knowledge about the offer on hosting platforms is an essential first step to gain understanding of the impacts. Most cities are aware of the number of listings and the basic parameters of the offer on hosting platforms. Some studies have been published and discussed.⁷ However, city-specific questions remain as to, among others,

- the distribution over the city and its districts
- the prices asked for apartments, rooms and beds
- the number and structure of the hosts
- the (spatial and economic) relation between these offers and traditional accommodation in hotels etc.
- tourism demand (arrivals, bednights, spending)

Airbnb is the biggest sharing platform and is said to cover about half of the listings worldwide. Because hosts have an incentive to publish listings on more than one platform (listing is free and fees are either paid by the guest or only in case of a booking), it can be safely assumed that Airbnb covers the vast majority of available listings.

Airbnb claim that “74% of Airbnb are properties outside the main hotel districts”.⁸ However, what a “main-hotel district” is and how it is defined for specific cities, is not very clear and open for discussion or individual specifications. In the same contribution, Airbnb claims that 81% of hosts share the home in which they live. However, the share of listings (or turnover, come to that) provided by the other 19% of (more or less professional) hosts remains unclear. Therefore, it might be useful to look closer into this emerging type of accommodation and booking.

4 Data and methodology: Using scraped Airbnb data to measure capacities and demand in “shared accommodations”

In many projects for city destinations (e.g. Hamburg, Bruges, Antwerp, Kassel, Dublin, Belfast) and other destinations (e.g. Sylt, Malta, Schleswig-Holstein), we have analysed several of these aspects in more detail. For this purpose, we used listing data obtained from the Airbnb website.

These data are “scraped” from the website without knowledge of Airbnb.⁹ This methodology is in use for academic and commercial purposes, and many approaches are based on a Python

⁶ UNWTO (2018), New Platform Tourism Services (or the so-called Sharing Economy) – Understand, Rethink and Adapt, Madrid, UNWTO.

⁷ See e.g. ZERVAS, G., PROSERPIO, D e J.W. BYERS (2016): Estimating the Impact of Airbnb on the Hotel Industry, <http://people.bu.edu/publications/airbnb.pdf> (15/05/18) and O’NEILL, J.W. e Y. OUYANG (2016), From Air Mattresses to Unregulated Business: An Analysis of the Other Side of Airbnb, http://www.ahla.com/uploadedFiles/Common/pdf/PennState_AirBnbReport_.pdf (15/05/18). The latter study has been disputed because it was commissioned by the American Hotel & Lodging Association AHLA and therefore denoted as being not neutral.

⁸ AIRBNB (2015), Airbnb’s positive economic impact in cities around the world, <https://www.airbnb.com/economic-impact> (15/05/18).

⁹ This fact can be of some importance, because there is some evidence, that data provided by a hosting platform can be manipulated, see the New York City case on Tom Slee’s website: COX, M. e T. SLEE (2016), How Airbnb hid the facts in New York City, <http://tomslee.net/how-airbnb-hid-the-facts-in-nyc> (16/05/18)

script developed by Tom Slee¹⁰, adapted to individual needs by Murray Cox and many others around the world. Slee and Cox have also, on their websites, published a number of methodological insights into the validity and reliability of the data.

In some of our projects, we have been working with the original Tom Slee script ourselves or used the data made available under <http://tomslee.net/category/airbnb-data> or <http://insideairbnb.com/get-the-data.html>. In most cases, however, we have used the services of AirDNA to provide us with the raw data. AirDNA is a US based agency specialized upon reports and data scraped from Airbnb:

- Airbnb listings are retrieved regularly and cumulated in the AirDNA datasets.
- In our projects AirDNA data is usually retrieved from their datasets at one given point of time. Then, only properties listed online in a pre-defined timespan (e.g. from November 2016-October 2017) are accepted as listings for a specific report.
- All listing data are snapshots at a given time. Listings on the Airbnb website may vary on short intervals.
- Location data as advertised by Airbnb are off by up to 150 meters.
- Demand data, e.g. reservation days, are AirDNA estimates based upon regular analysis of published calendar information in combination with historical data. These data are being estimated based on the calendar data available on the website. To distinguish between bookings and days blocked by the host, fuzzy logic is being used¹¹. A neutral assessment of validity and reliability of these data, however, is still missing.

Obviously, data has to be checked, cleaned and, through spatial joins, assigned to spatial or administrative units in the respective city.

5 Analyses: Various approaches how to analyse the data based on different research questions

In a rather simple form, listings can be analysed by their number, types and spatial distribution and presented e.g. with a simple heat map (see Bruges example, Figure 1), so you can see at one glance where this kind of tourism is happening.

Figure 2 shows a more complex way to analyse the structure of tourism capacities. It visualises the number of all Airbnb listings online per spatial unit in classes, and also shows the locations of hotels in the City of Antwerp. The two main Airbnb agglomerations in Antwerp are the *Historisch Centrum* wijk (256 listings online) in the heart of the city centre and the *Borgerhout* district (209 listings). In both areas, more than 200 different listings were available during the reference period. The spatial distribution of hotels and Airbnb listings shows interesting differences: The *Historisch Centrum* wijk is a center of both Airbnb and hotel capacities (11 hotels/256 listings) in Antwerp, while in the *Borgerhout* district there are relatively few hotels (3) but a lot of Airbnb's (209). The *Centraal Station* wijk, on the opposite, is the most important hotel quarter in the city (16) but with relatively less Airbnb's (95) around.

The Airdna data is nowadays not only available for a given point of time, to describe the status-quo – it is also possible to go backwards in the data and thus be able to analyse developments

¹⁰ A known critic of the companies and businesses behind the “sharing” economy, see his most recent publication: SLEE, T. (2016), *What's Yours Is Mine: Against the Sharing Economy*, OR Books, New York.

¹¹ See e.g. the methodology applied by the data provider www.airdna.co

and trends (See Malta example, Figure 3). This also enables you to analyse the seasonality of this tourism segment in contrast to the official tourism offer that is covered in the official tourism statistics.

The data now also allows for estimating the demand size in the Airbnb market (which then can be easily compared to the accommodation statistics available in all destinations). Obviously, these demand figures are not exact, but existing estimation approaches seem to be reasonably accurate. The estimate follows the “San Francisco Model” (first imposed by Alex Marqusee and the San Francisco Planning Department¹²). One means to measure the demand is the number of reservation days. In practice, this is an estimate, provided by Airdna, based on a tracking of changes of the calendar dates of each listing on the Airbnb website. This on the one hand side allows you to calculate an “occupancy rate” based on the days a listing was on offer and the days it was actually reserved. Also, in combination with the Average Daily Rates (ADR) of each listing and the continuous tracking of calendar date changes, it is possible to calculate the revenues by Airbnb hosts for a city (see Antwerp example in Figures 4 and 5). The monthly data can then also be used as a basis to forecast the future developments (see example in Figure 6).

Also, an analysis of the host structure can be added (see the example of Copenhagen, Barcelona and Dublin, 7). Because every listing is connected to a unique host ID, the number of listings per host and their distribution can be seen. Furthermore, it can be inferred where (in which districts) there is a high density of shared vs. professionally rented apartments. This is an important step of the analysis, as the different host structures seem to be one the most crucial differences when comparing cities where the issue is perceived as a problem/no problem: E.g. Barcelona, one of the cities where it is most controversially discussed, has a much lesser “Airbnb pressure” than Copenhagen (see Figure 9), but a much higher share of listings by hosts with more than three listings.

One central point in the discussion of the Airbnb phenomenon is the question how the increase of Airbnb offers in a destination is contributing to overtourism and to increasingly negative attitudes of the residents towards tourism. Even if there might not be a perceived negative effect on the city level, yet¹³, it might be different in these neighbourhoods. Using the Airbnb capacity data, we have been able to identify the hotspots of Airbnb density in a destination. With the implementation of a special resident survey in the hotspot neighbourhoods plus reference neighbourhoods with a comparatively low Airbnb density, we were able to discover the tipping-point – at which density of Airbnb offers it just becomes too much and the resident attitude drifts into the negative (see example in Figure 8).

¹² MARQUSEE, A. (2015), Airbnb and San Francisco: Descriptive Statistics and Academic Research, Exhibit B of the “Amendments Relating to Short-Term Rentals”, <http://commissions.sfplanning.org/cpcpackets/2014-001033PCA.pdf> (16/05/18).

¹³ E.g. in Bruges, where only 5% of the residents state that Airbnb tourist are creating more nuisance than others; see NIJS, V. (2017): Resident Attitudes Towards Tourism in Bruges, https://www.toerismevlaanderen.be/sites/toerismevlaanderen.be/files/assets/documents_KENNIS/onderzoeken/2017-01-25_Resident-survey-Bruges-2016_global-Report.pdf (15/05/18).

6 Implications and outlook: How are the results being used in reality? Benefits and limitations of the proposed methodology

Obviously, complex and challenging issues like dealing with visitor pressure or discussing use limitation of housing space for tourist apartments cannot be answered solely based upon these data. Certainly, however, these data deliver an indispensable factual basis for these discussions.

Undoubtedly, the data gain a lot more value when being compared to either cross-sectional data from other cities (as a starting point, we noted some key facts on selected cities in Figure 7) or longitudinal data over time. Here are some examples how these data and analyses are presently used in the cities and beyond:

- Benchmarking how the own city is doing compared with other cities – in volumes, but also in terms of “Airbnb pressure”. Be able to assess how big is the problem of multiple listing owners?
- Be able to assess what are the real volumes compared to the perceived relevance of this activity, also to be able to react to “fake facts” in the media.
- Have a basis to talk with the Airbnb hosts in a city e.g. regarding quality issues and cooperation.
- Use the data in the process of developing new regulations and legislation, on the local, regional, national and EU level.¹⁴

For the future, it would be quite interesting to discuss and implement options to analyse these data in more detail, to meaningfully compare different cities and monitor over time the development of this facet of urban tourism.

Of course, there are also shortcomings of the presented data and methodology, one of the most crucial being the overlap between the known official suppliers and the Airbnb supply (e.g. small hotels using Airbnb as a sales platform) and the multiple listing of the same accommodation (e.g. the same room is listed as a shared room as well as being part of a whole apartment). Due to the fuzziness of the Airbnb geolocation data, this problem can only be solved at present (if at all) in a very time consuming manual cleaning of the data.

Nevertheless, we ultimately think that these data can provide an excellent basis to assess implications of hosting platforms on local economies, neighbourhoods and housing, leading to a more precise picture about the extent of use, overuse and gentrification in a city destination. Furthermore, it can provide a factual basis for the discussion of control mechanisms, be it in terms of administrative regulation, destination marketing or involving locals.

¹⁴ E.g. NECSTOUR (2017), Declaration: Tourism and Collaborative Economy: Opportunities for growth and jobs in Europe, <http://necstour.eu/sites/default/files/Barcelona%20Declaration.pdf> (16/05/18).

7 Sample Maps and Figures

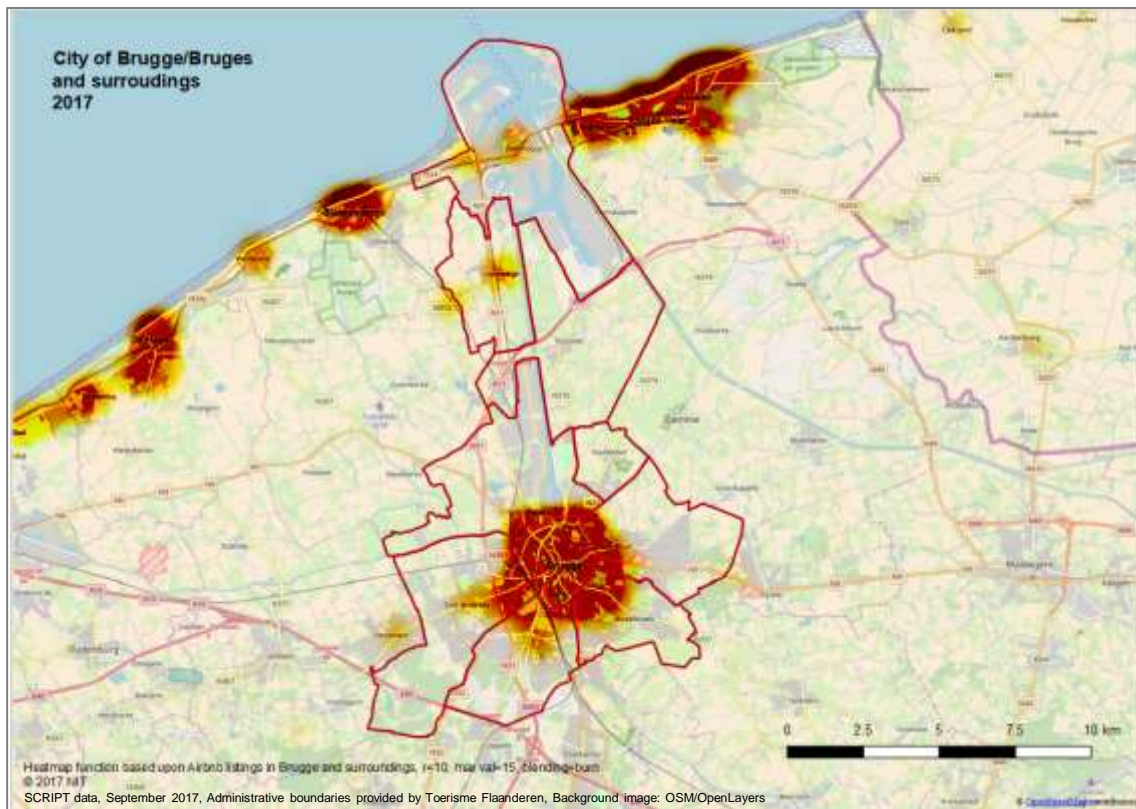


Figure 1: Bruges: Density heatmap of Airbnb listings, Sept. 2017

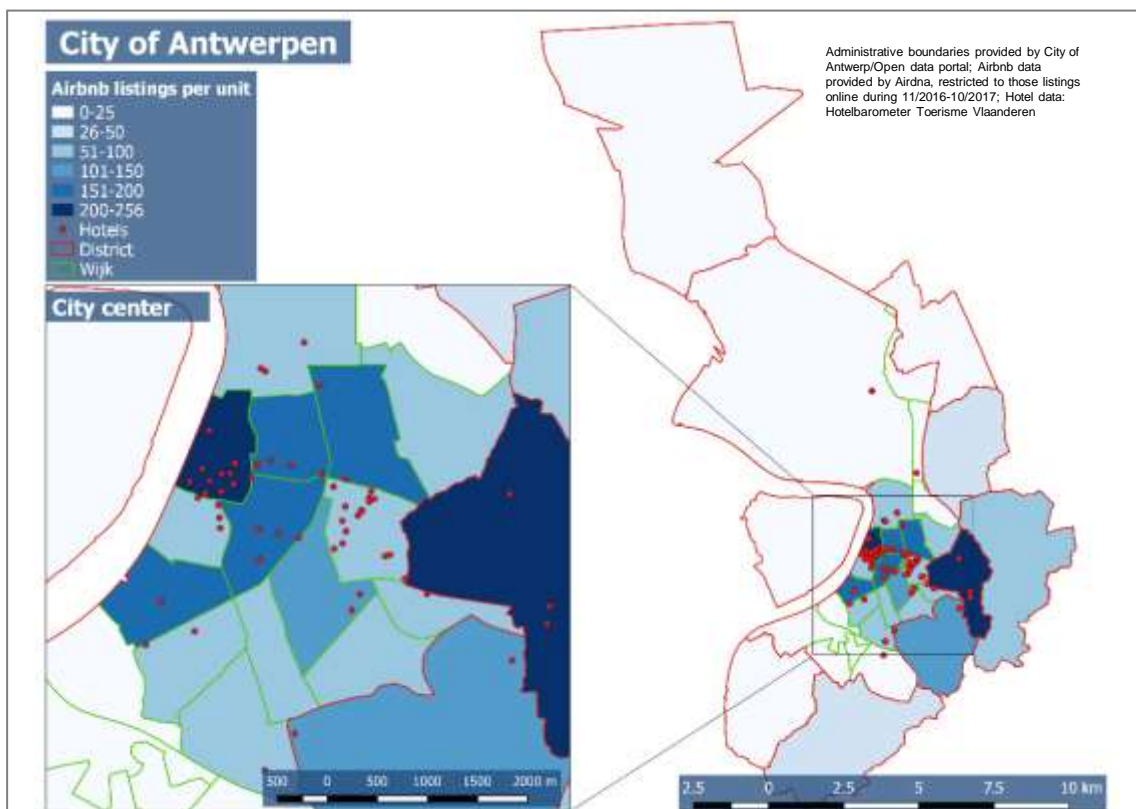


Figure 2: Antwerp: Concentration of different kinds of tourism capacities within the city, Sept. 2017

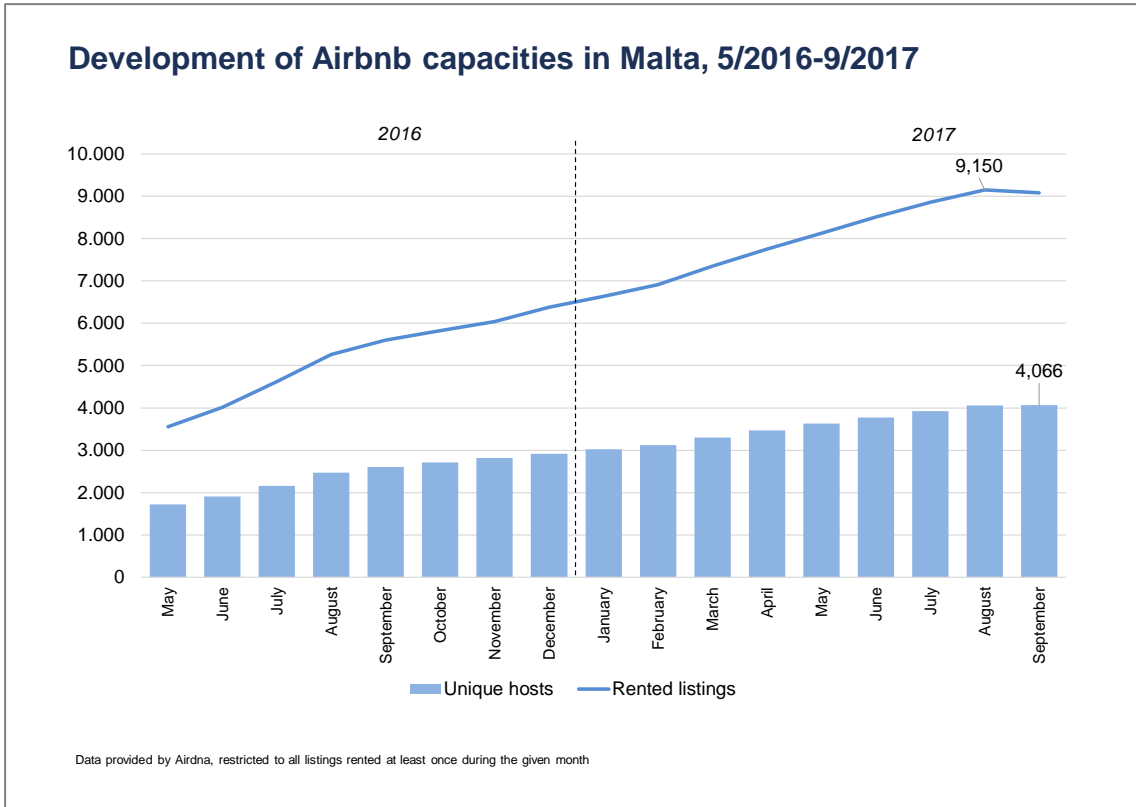


Figure 3: Malta: Development of Airbnb capacities 2016-2017

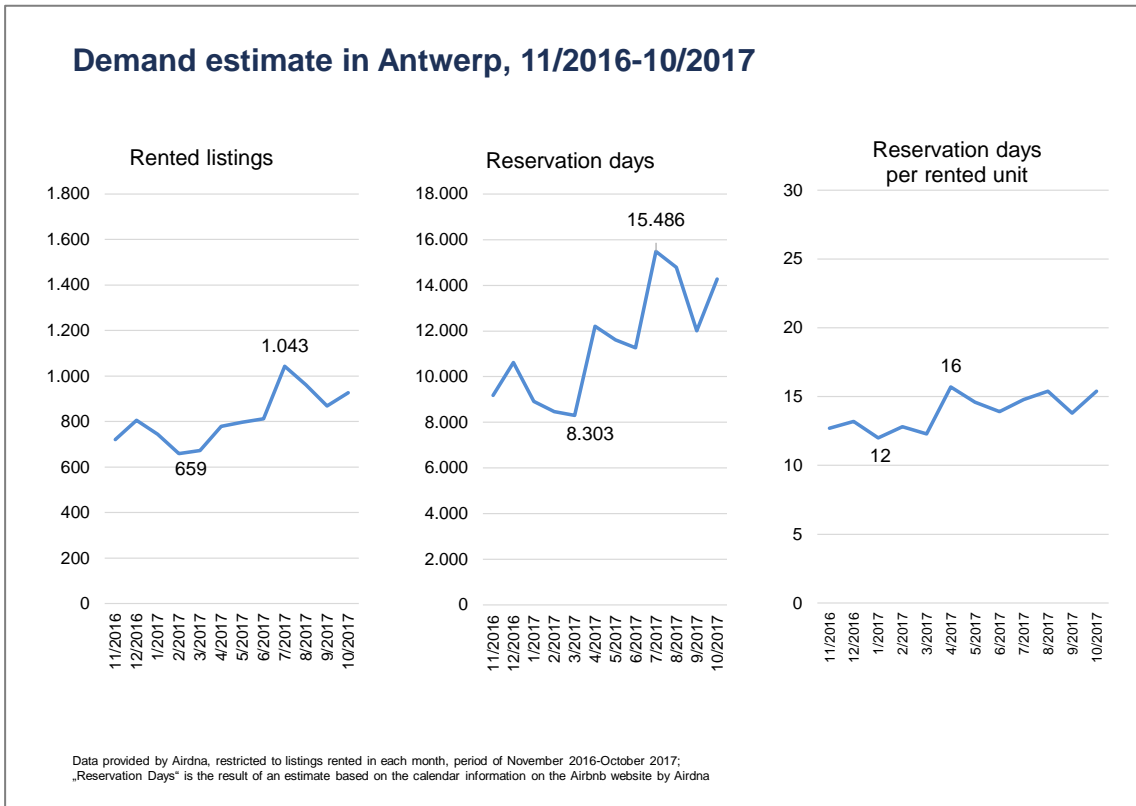
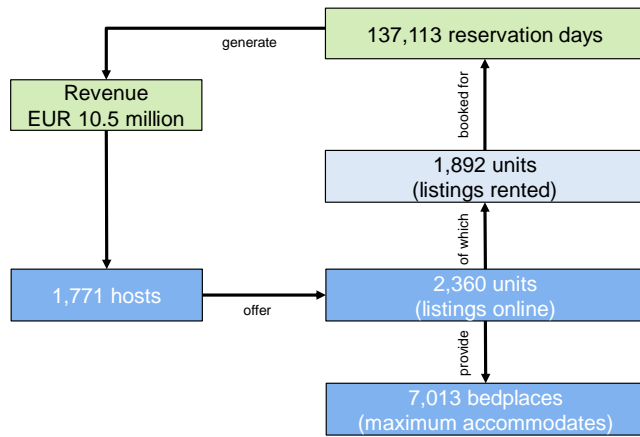


Figure 4: Antwerp: Demand estimates 11/2016-10/2017 based on Airdna data

Airbnb in Antwerp, Key data, November 2016 through October 2017



Host: A host is a person who advertises a listing on the Airbnb website.

Listing: A listing is a unit advertised on the Airbnb website

Listings online: All listings online (advertised on the website)

Listings rented: All listings online which were actually rented at least once

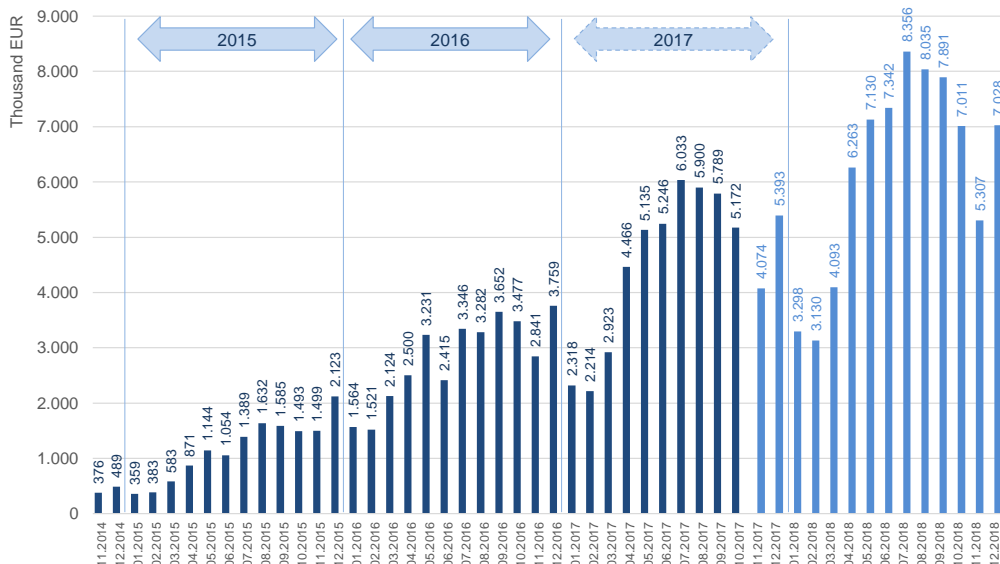
Reservation days: Number of reservation, estimated form calendar information

Maximum accommodates: The maximum number of bedplaces in the advertised unit.

Data provided by Airdna, reference period: 11/2016-10/2017

Figure 5: Airbnb in Antwerp: Key data 11/2016-10/2017

Time series and projection: Revenue (thousand EUR)



Data provided by Airdna; Projection: NIT

Figure 6: Example of time series and projection of monthly revenues

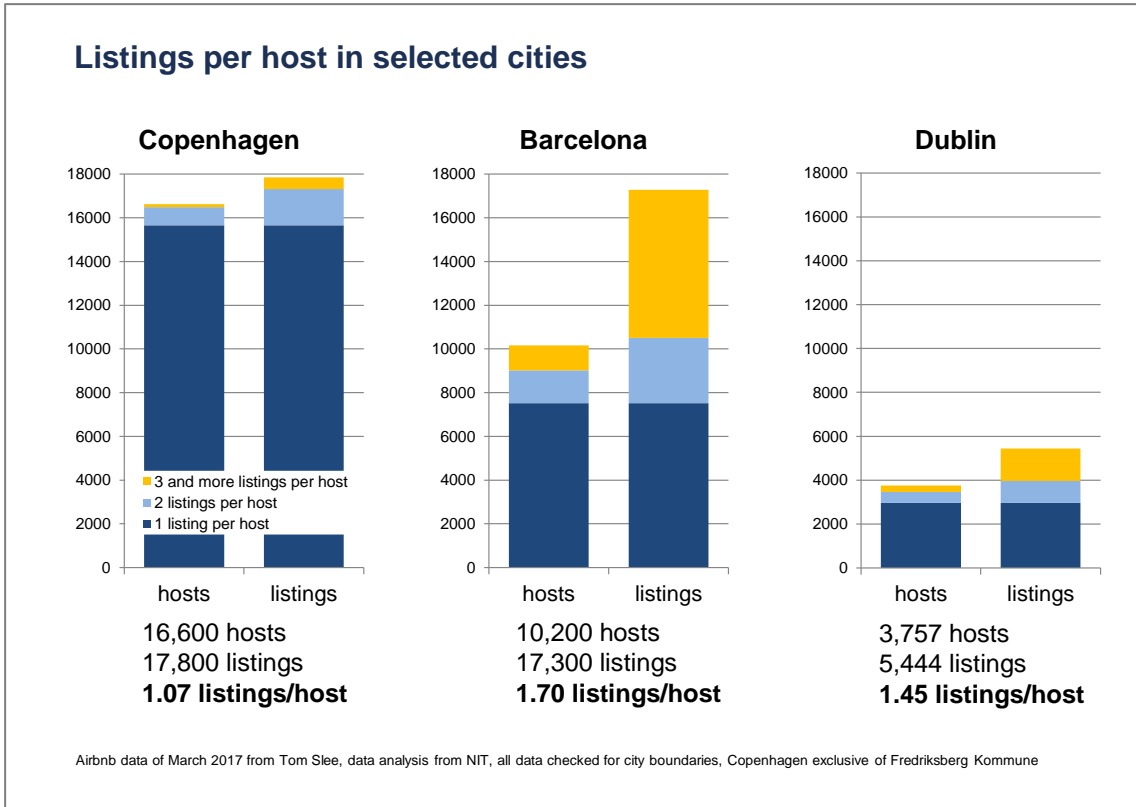


Figure 7: Listings per host in Copenhagen, Barcelona, Dublin; 2017

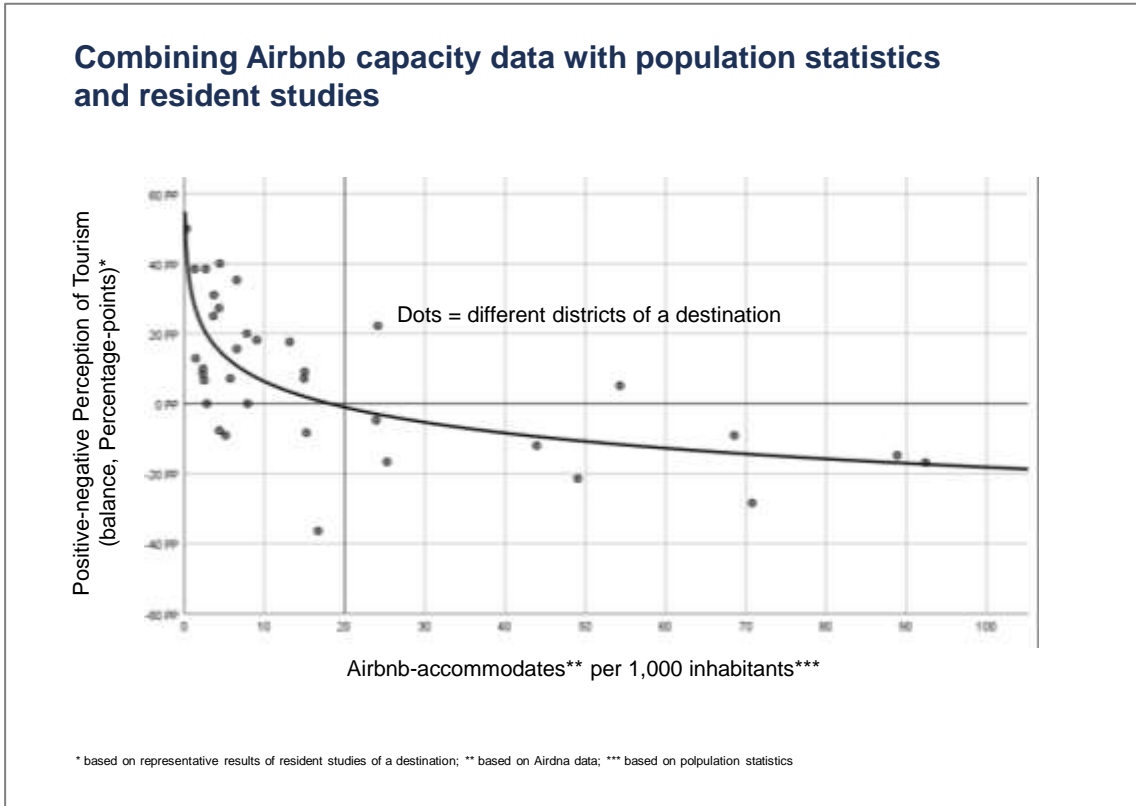


Figure 8: Example of identifying the “tipping point” of “too much” Airbnb capacities in a destination by combining Airbnb capacity data with population statistics and resident studies

8 Some key facts about selected cities

Figure 7 shows a comparison of different cities regarding key parameters (inhabitants and geographical size) in relation to the Airbnb capacities.

City	Airbnb Data	Inhabitants (thousands)	km ²	Airbnb Listings	Airbnb Listings per 1,000 inhabitants	Airbnb Listings per km ²	Airbnb Accommodates	Airbnb Accommodates per 1,000 inhabitants	Airbnb Accommodates per km ²
Brugge	09/2017	118	138	715	6.1	5.2	2,596	22.0	18.8
Kassel	10/2017	198	107	1,130	5.7	10.6	3,097	15.6	28.9
Geneva	07/2017	202	16	1,954	9.7	122.1	5,366	26.8	335.4
Aarhus	07/2017	269	91	3,142	11.7	34.5	10,329	38.4	113.5
Nantes	07/2017	298	65	2,648	8.9	40.7	8,426	28.3	129.6
Edinburgh	02/2017	493	262	7,129	14.5	27.2	24,617	49.9	94.0
Antwerp	10/2017	521	205	1,571	3.0	7.7	4,878	9.4	23.8
Lisbon	02/2017	545	85	11,792	21.6	138.7	46,174	84.7	543.0
Dublin (City)	07/2017	553	115	7,929	14.3	68.9	25,131	45.4	218.5
Copenhagen	02/2017	591	86	21,301	36.0	247.7	70,402	119.1	1,955.6
Frankfurt/Main	02/2017	733	248	1,995	2.7	8.0	4,516	6.2	18.2
Amsterdam	07/2017	851	219	18,723	22.0	85.5	54,709	64.3	249.8
Brussels (Capital region)	07/2017	1,192	161	6,742	5.7	60.5	20,528	17.2	127.5
Barcelona	07/2017	1,609	101	18,838	11.7	186.5	62,505	38.8	618.9
Vienna	07/2017	1,841	415	9,252	5.0	22.3	30,374	16.5	73.2
Berlin	07/2017	3,520	892	21,864	6.2	24.5	58,648	16.7	65.7

Figure 9: Airbnb key data for selected European cities

The Airbnb data are from different sources and from various points in time (reflecting differences between cities, but also seasonal variation and market growth) and are therefore not completely comparable. In a comparison (benchmarking) project, data would be needed to be drawn at the same time and rectified by identical procedures.

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