Chapter 16
In Search of Overtourism Indicators in Urban Centres

Manuel De la Calle-Vaquero
Complutense University of Madrid, Spain

María García-Hernández
https://orcid.org/0000-0002-8469-6150
Complutense University of Madrid, Spain

Sofía Mendoza de Miguel
Complutense University of Madrid, Spain

Elena Ferreiro-Calzada
Complutense University of Madrid, Spain

ABSTRACT

Urban tourism is in constant growth. The increase in the number of tourists has a special impact on historic centres. Some problems related to overcrowding arise in these spaces, which represent important challenges for urban management. This chapter reflects on the need to define overtourism indicators that allow dimensioning the phenomenon and its impacts. But it also involves a deep reflection on the limits of application of these indicators. These limits derive from the absence of reference values and the operational difficulties to obtain data. First of all, the state of the art regarding the indicators is made. Secondly, based on a review of the existing bibliography, the next section raises some indicators of activity and tourism specialization. The focus is on European cities and the application of these indicators is shown in the historic centre of Madrid. Another section also looks at the perception of the phenomenon by different local stakeholders due to the absence of commonly accepted overtourism values, referring to these perceptions as valuation criteria.

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INTRODUCTION

Tourism is in constant growth. Many cities, and especially those European towns with rich historical-cultural heritage and good airport connections, are experiencing very high rates of tourism growth. Growth is not only affecting large capitals and traditional historic cities, but is extending to cities that until a few years ago were not part of the international map of urban tourism destinations. In addition, the increase in the number of tourists has a special impact on historic centres, places of high heritage and/or symbolic value that make up the majority of tourist activity. Some problems related to overcrowding arise in these spaces, which represent important challenges for urban management.

For some time now, attention has been drawn to the problems of tourist pressure on the resources and most popular urban destinations, in general spaces linked to historical heritage (Borg, 1998; García Hernández, 2003; Russo, 2002). However, in recent times these problems have worsened and we talk about overtourism. A new scenario appears in which the tourist pressure acquires a new dimension. Firstly, because of its intensity, associated with the accelerated growth of tourist flows. Secondly, due to its effect on urban spaces that until now have not been affected by the arrival of massive flows of visitors. Thirdly, the proliferation of housing for tourist use in city centres, a factor that threatens the very residential condition of these spaces. And finally due to its notoriety from, among other things, the popularization of the term overtourism in the media and the incorporation of the problem in the agenda of social movements and political parties. It was in 2017 and 2018 that the first documents promoted by international institutions (WTTC & McKinsey&Company, 2017; ECM, 2018; Peetrs et al., 2018; WTO, 2018; WTO, 2019) were disseminated and academic papers began to be published (Koens et al, 2018; Milano, 2018; Milano et al, 2018). Broadly speaking however, the lack of conceptual precision of the term overtourism, which often appears as a counterpart to the term 'Tourism-phobia' to describe residents' discomfort or indignation in response to the excessive growth of tourism (Huete & Mantecón, 2018; Milano, 2018; Colomb & Novy, 2016), is striking.

The World Tourism Organization defines overtourism as "the impact of tourism on a destination, or parts thereof, that excessively influences the perceived quality of life of citizens and/or the quality of visitor experiences in a negative way" (WTO, 2018). In this sense, some authors point out the similarities with research topics and approaches already raised years ago in the academic field. Diana Dredge (2017) has come to metaphorically qualify the phenomenon as "*old wine in new bottles*" and Koens et al (2018) link it to the tradition of tourism impact studies and previous conceptual developments related to tourist carrying capacity or limits of acceptable change. In fact, the terms overcrowding and overtourism are closely related to the concept of carrying capacity, since this implies defining thresholds or maximum limits for tourist use. In this sense, one would think that the phenomena of overcrowding and/or overtourism appear normally when those limits are exceeded (Peetrs et al, 2018). But how do you measure this phenomenon of tourist congestion? How much is too much? At what point does a destination go from having many visitors to defining states/situations as one of overcrowding or overtourism? The *a priori* deployment of indicators could help to detect such overtourism situations. From a theoretical point of view, the use of indicators would make it possible to know the situation and dynamics of tourist activity with respect to the optimal or maximum carrying capacity limits or thresholds pre-defined for each destination; giving continuity to a line of work with a long trajectory such as the analysis and proposal of sustainable tourism indicators.

As well as many existing works on tourism indicators, there are also a number of studies dedicated to identifying, typifying and/or analysing the effects of tourism on reception spaces (Mathieson & Wall,

1982). These effects may be positive or negative and have different dimensions; there are environmental, social, economic and functional impacts, etc. The extent and magnitude of these impacts varies over time and is determined by variables linked to the characteristics of both the tourist affluence and the reception spaces.

In the case of urban tourism, there has traditionally been a very positive view of the effects of tourism. Its contribution to the local economy and employment has been highlighted. It has also been used as a vector for the physical regeneration of degraded spaces. Since the 1990s, however, there have been some initial reflections on the negative effects associated with the high influx of tourists in some urban destinations, such as historic cities (Glasson et al, 1995). In the current context, the negative effects identified a long time ago are intensifying and extending to other types of urban destinations. Among other aspects, references to processes such as the following are common:

- Changes in commerce and hospitality, with a general reorientation towards the foreign public;
- Decline in residential function, due to the expansion of hotels and the transformation of housing into housing for tourist use;
- Road mobility congestion;
- Congestion of public space;
- Trivialisation and standardisation of the urban landscape, with a growth of the tourist iconography;
- Problems of coexistence between residents and visitors, leading to a deterioration in the quality of life of local communities;
- Local irritation towards tourism resulting in tourism activity rejection movements (tourism-phobia).

The interpretation of these phenomena and their relationship to overtourism is complex. On some occasions, we talk about tourist gentrification, which implies a displacement of the popular classes of the neighbourhoods of the historical centres towards peripheral neighbourhoods due to an excess of tourist pressure (Arias-Sans, 2018; Cocola, 2018; Gotham, 2005; Gravari-Barbas & Guinand, 2017; Hiernaux & González, 2014). In others, tourism is referred to as a general process of functional change that implies a reorientation towards leisure and tourism activities (Freytag & Bauder, 2018; Romero, 2018; Sequera & Nofre, 2018). In any case, the existence of overtourism situations is recognized, that is to say, an excess of tourism that implies an increasing deterioration of the urban quality of life and even implies a possible loss of competitiveness of certain cities as tourist destinations. Addressing the study of these processes raises the need to define tourism overload indicators that allow dimensioning the phenomenon and its implications in urban spaces. But it also involves a deep reflection on the limits of application of these indicators. These limits derive from the absence of reference values and the operational difficulties to obtain data.

To meet these objectives, this chapter is organized into five sections. The first serves as an introduction to the topic. The second presents the state of art regarding the indicators, with special reference to indicators of tourism sustainability and overtourism. Based on a review of the existing bibliography, the third section raises a series of indicators of activity and tourism specialisation. The focus is on European cities and the application of these indicators is shown in the historic centre of Madrid. The fourth section looks at the perception of the phenomenon by different local stakeholders due to the absence of commonly accepted overtourism values, referring to these perceptions as valuation criteria. Finally, a final section of conclusions is drawn up.

INDICATORS OF SUSTAINABILITY AND TOURISM. THE STATE OF THE ART

There is a wide range of literature on indicators, applied or applicable to both tourism development and urban management. In its most basic definition, an indicator is an element that offers qualitative or quantitative information about a phenomenon and can be made up of one or more data referring to numbers, perceptions, facts, opinions or measures. In theory, the indicators make it possible to specify the magnitude, intensity, evolution and prognosis of a phenomenon or process, as well as to carry out their evaluation. They must comply with the fundamental premises of generating information, being methodologically consistent, scientifically valid, and easy to apply and communicate (López Palomeque et al, 2018).

Depending on the information they provide (level of elaboration and combination of data) there are two basic types of indicators: simple and complex or synthetic indicators (Sánchez Rivero & Pulido Fernández, 2008). The former provides information with a low level of treatment from secondary sources (published statistics) or from their own compilation (surveys e.g.). Whereas synthetic or index indicators arise from combining several simple indicators by means of a weighting system that places the components in a hierarchy. Some authors also differentiate the so-called "indicator systems" as a compilation of simple indicators whose result is interpreted jointly (López Palomeque et al, 2018; Torres-Delgado & López Palomeque, 2014; Torres-Delgado & Saarinen, 2013).

There are different classifications of indicators according to the purpose of what they measure or indicate. There are indicators of compliance, effect, impact, pressure, etc. In this sense, the typology proposed by the Organisation for Economic Co-operation and Development (OECD) in 1993, in its system of environmental indicators according to a Pressure-State-Response model, had a great projection. It was disseminated internationally and was re-adapted and reused in terms of sustainable tourism development. The model includes three types of indicators: a) Pressure indicators (reflecting direct and indirect pressures on the environment); b) State indicators (which describe the environmental conditions at a given time, that is, the quantity and quality of natural resources); and c) Response indicators (which correspond to the degree to which society responds to environmental changes and integrates the policies of the different territorial and sector administrations, as well as the actions of companies and social agents in the face of certain problems).

However, for these pressure, state and response indicators to be able for example to indicate levels of sustainability of tourism activity, their application requires the establishment of reference values. These values would describe the sustainability threshold for the different variables that make up the indicator system by comparing the state of the conditions of a given tourist destination at a given time (environmental, economic and social conditions resulting from anthropogenic pressures and natural processes) with the desirable state. However, it is almost impossible to find documents and practical cases in which the reference values that make up this desirable state are delimited, as this is a complex task, subject to value judgements and difficult to objectify for some dimensions of the development of tourism activity (perception of social impacts for example) or even overtourism as a global phenomenon.

Indicators of Sustainable Tourism Development

Indicators are attributed a key role in tourism planning and management processes. The World Tourism Organization itself has been working since the early 1990s on the development and application of indicators for sustainable tourism development at the destination level (WTO, 1995; WTO, 2004). It

defines an indicator as "that quantitative and synthetic instrument that facilitates the analysis and evaluation of information so that, together with any other type of instrument, the decision-makers reduce the probability of inadvertently making unfortunate decisions" (WTO, 1995). It also raises the need to use different types (WTO, 2004; 14):

- Early warning indicators (e.g. decrease in the number of tourists intending to return);
- Indicators of pressure on the system (e.g. water scarcity or evidence of crime);
- Measures of the situation of the sector (e.g. occupancy rate, satisfaction of tourists);
- Measures of the impact of tourism development on biophysical and socio-economic environments (e.g. deforestation rates, changes in consumption patterns and income levels of local communities);
- Measures of management activities (e.g. cost of cleaning up coastal pollution);
- Measures of the effect, the results or performance of the management or response indicators (for example, change in pollution levels, greater number of returning tourists, etc.).

Although the development of indicators included in its documents is very complex, by way of summary it proposes 29 indicators referring to 12 basic issues (WTO, 2014; 244): satisfaction of residents with tourism, effects of tourism on the community, satisfaction of tourists, seasonality of the activity, economic benefits, energy management, management and quality of drinking water, and wastewater treatment, solid waste management, control of development and control of the intensity of tourist use.

With the motivation to improve tourism statistics in the area of sustainability, in 2015 UNWTO commenced, jointly with the United Nations Statistics Division, the initiative Statistical Framework for Measuring the Sustainability of Tourism (SF-MST). In its initial design, it was conceived as an organizing structure for integrating statistics on the economic, environmental and social dimensions of sustainable tourism, framed in Sustainable Development Goals (SDGs) y the 2030 Development Agenda. This is a long-term work, with the contribution of a large number of entities and experts. The system, which is still being developed, will allow a homogeneous recording of data on the economic, environmental and social dimensions, and applicable at different scales. (global, supra-national, national, regional, municipal or city-region, and local). The final objective is to establish indicators that can measure the sustainability of tourism and the contribution of tourism to the fulfilment of the SDGs.

The European Commission has also launched a *European System of Tourism Indicators (ETIS*) (European Commission, 2013 and 2016). This is a voluntary management tool designed to work with a common approach comparable at European level. Monitoring results are based on self-evaluation, observations, data collection and analysis by the destinations themselves. However, it does not set minimum values to be attained nor does it provide any type of certification. The system of indicators is intended only as an information tool that would allow destinations to monitor sustainability and, consequently, manage tourism activity more effectively. To this end, the European Commission's documents propose the use of 27 core indicators covering four areas: a) destination management (indicators related to public policy and visitor satisfaction), b) economic value (indicators of tourist flow, performance of tourism enterprises, employment and the functioning of the tourism supply chain), d) social and cultural impact (health and safety, gender equality, inclusion and accessibility, protection of cultural heritage and identity); and d) environmental impact (use of transport, climate change, solid waste management, wastewater treatment, water management, energy consumption and protection of diversity and landscape).

In addition to institutional initiatives, scientific publications have long reflected on the type and scope of sustainable tourism development indicators and the need to propose synthetic or aggregated

indicators with empirical applications in different types of tourist spaces. Vera et al. (2001) elaborates a proposal for sustainable tourism development indicators adapting the PSR models of the OECD (Pressures, States, Responses) and the DPSIR of the Environment Agency of the European Union (Driving forces, Pressures, States, Impacts, Responses). They work with a structure that proposes four types of indicators: indicators related to the territorial or urban model, pressure indicators, state (quality) indicators and indicators of political and social response. López Palomeque et al. (2018) adapt the model of the European ETIS system and apply it to the municipalities of the province of Barcelona (Spain) proposing a synthetic index called the *Tourism Sustainability Index (ISOST)*, based on the aggregation of simple indicators, comparable at inter-municipal level and using diachronic logic (historical evolution). Navarro Jurado et al. (2012) develop for the Costa del Sol (Spain) a methodology to evaluate the growth limits of tourist destinations through a mathematical formulation (multi-criteria analysis) that takes as reference synthetic indicators applied to two scenarios: one of weak sustainability and the other of strong sustainability. And Schianetz & Kavanagh (2008) also develop a systemic indicator system and test it using as a case study a holiday eco-village project near Lamington National Park in Queensland, Australia. The list of bibliographical references on the subject is extensive, both in relation to different types of destinations, different forms of tourism and to the methodologies used to define the indicators (Miller, 2001; Choi & Sirakaya, 2006; Bossel, 1999, among others). However, the underlying question continues to address the gap between theoretical demands for knowledge and practical achievements (Céron & Dubois, 2003).

Overtourism Indicators

Although in recent years there has been a remarkable production of documents relating to overtourism, the absence of specific references to the measurement of the phenomenon and, therefore, to the subject of indicators is striking. In addition, the greatest efforts in this area correspond to the work of different types of public and private entities. In some cases, these entities use the most renowned research centres and authors in the study of this subject. In others, these are documents produced by some of Europe's leading tourism consultancies. In general, the use of long-established indicators is used, although efforts to apply them to urban spaces are particularly noteworthy. These are the spaces in which the problems of excessive tourist pressure and social response to tourism have been most recently recognised.

One of the first documents is *Coping with success: Managing overcrowding in tourism destinations*, conducted by the World Travel & Tourism Council in 2017. It seeks to understand the nature of the problem of tourism congestion and to identify specific solutions for its management. For this reason, it develops a series of indicators by which to understand the situation of the destinations. Specifically, it develops nine indicators: two related to the importance of tourism for the destination (average contribution of direct tourism to GDP and employment; and average annual growth rate of international and national arrivals) and seven related to the main challenges caused by congestion (tourist density -number of visitors per square km-, tourist intensity -number of visitors per resident-, negative TripAdvisor reviews, seasonality of arrivals, concentration of attractions, air pollution and predominance of historical sites). It applies these indicators to 68 tourist cities and organizes the results by quintiles for each indicator. Each group of indicators is associated with one of the manifestations of overtourism (threats to heritage, degraded tourism experience, etc.), although this association has many limitations. When a city's results are in the top quintile, it is considered to be at risk of overcrowding in that manifestation.

More recently, the European Parliament's Committee on Transport and Tourism has launched a report entitled *Overtourism: impact and possible policy responses* (Peeters et al, 2018). This is work carried out at European level using two areas of analysis: 1. Regions at NUTS level 2, where work is mainly done with available statistics; and 2. Specific destinations using statistics and surveys of members of the European Travel Commission. The report analyses management approaches in different locations and assesses policy responses. It also examines a series of quantitative indicators to establish whether they provide thresholds for overtourism. Some of the indicators considered were already mentioned in the previous report, such as tourist density, tourist intensity, seasonality or the contribution of tourism to GDP. However, it also raises other indicators such as the intensity of air transport, position of destinations with respect to airports, the growth of annual air transport, the intensity of cruises, the positioning of the destination with respect to a cruise port and the positioning of the destination with respect to World Heritage. The main contribution is the use of indicators aimed at measuring the effects of certain collaborative economy activities in the destination (Airbnb's share of the combined bed capacity of Airbnb and booking.com; Airbnb average shortest distance to booking.com; Airbnb's growth rate; and Google searches on 'Name of a city+Airbnb' averaged per month). The conclusion is very relevant: it is considered that a common set of indicators cannot be defined for the diagnosis of overtourism due to the complexity of the phenomenon.

In addition, European Cities Marketing, an association of European Destination Marketing / Management Organizations (DMOs), and the destination marketing agency Toposhophy produced the *Managing Tourism Growth in Europe* report in 2018. *The ECM Toolbox* (ECM, 2018). As in previous documents, a list of indicators for the measurement and monitoring of overtourism is proposed. However, it does not delve into the conceptual description of these indicators. In addition to the indicators mentioned above, others are proposed such as local population increase or decrease in specific areas; number of hotel and short term private accommodation rentals beds; property prices per square metre; local resident sentiment; visitor satisfaction analysis; etc. Although this is a battery of interesting indicators, its application is limited by the lack of data. It is also questionable whether these indicators are strictly linked to tourism (e.g. the price of real estate).

Also in 2018 the Austrian Hotel Association and the consultancy Roland Berger published the report *Protecting your city from overtourism. European city tourism study 2018*. They place 52 European cities in relation to two indicators: income per available room (RevPAR) in hotels and tourist intensity (in this report they refer to this indicator as tourist density). The two indicators give rise to a matrix, where cities are grouped into six clusters: 1. "Peak performance": cities with high RevPAR and tourist intensity; 2. "Under pressure", cities that have a high and increasing tourist intensity but a reduced RevPAR; 3. "Sustainable quality", cities with a comparatively low tourist intensity but with a high RevPAR; 4. "Unused potential", cities where both parameters are below European average levels; 5. "Shining stars" includes cities with sustainable levels of tourism, right in the middle of the matrix; and 6. "Mass Trap", those cities with high tourist intensity and low RevPAR.

Although the quality of the contributions is variable, the profusion of documents in such a short time is particularly striking. It is also necessary to consider the work of the WTO mentioned above (WTO, 2018 and 2019) and some contributions of a more academic nature that include more or less partial references to the subject of indicators (Muler et al, 2018; Weber et al, 2017).

INDICATORS OF TOURIST ACTIVITY AND SPECIALISATION

A basic conclusion can be drawn from the review of the scientific and institutional literature on indicators of tourism overload: there is a great deal of theoretical reflection that contrasts with its problems of practical application. The greatest difficulties derive from the absence of data that can be fed into the indicators, data that allow situations to be compared over time and in different places. And if the data exist, there are no commonly accepted values that mark the moments of tourist overload.

The theoretical models for the development of indicators for application in urban spaces state that these indicators should be associated with the different factors or dimensions of the central concept to be evaluated, in this case, overtourism. Based on studies of tourist carrying capacity, the literature on the subject proposes a broad set of common management dimensions. On the other hand, most of the work carried out to date uses very general indicators that refer to the initial idea of a tourist impact whose scope and meaning is determined by two vectors: firstly the volume and characteristics of the influx of visitors; and secondly the conditions specific to the destinations, in this case the cities and more specifically the urban centres.

As a work proposal, "indicators of tourist activity" are those that focus on the first impact vector and basically include magnitudes related to the influx of visitors. In addition, the "specialisation indicators" aim to establish the scope and meaning of tourism at the local level. The simplest are basic indices that handle a single magnitude relative to the influx of visitors. Complex indices are more sophisticated, as they relate two different magnitudes: one related to visitors and the other related to the city. As noted above, there are no commonly accepted values about the moment when overtourism situations occur. Therefore, the values resulting from these indicators have only a comparative value. In one place, the dynamics of the values are compared over a year and at a year-on-year level, establishing trends. Values are also compared between different spaces, at the level of cities or in relation to different areas of the city. As has been pointed out repeatedly, tourist activity tends to concentrate on certain sectors of urban space.

Indicators of Tourist Activity

These are the simplest and least expressive indicators, as they only reflect magnitudes related to the influx of visitors. Although in some cities estimates have been made of this influx, in most cases the number of travellers staying in tourist establishments and overnight stays is used. Comparisons between countries are difficult because each national statistical system uses classifications of different facilities and collects information from one or another type of facility. The territorial unit referring to the destination also varies, even more so when it comes to urban centres.

The tourist activity figures provided by TourMIS, drawn up on the basis of contributions from local DMOs, reflect these difficulties well. Within what the system considers to be the best available option, the categories used vary significantly: NGS = Bednights in hotels and similar establishments in greater city area; NAS = Bednights in all forms of paid accommodation in greater city area; NG = Bednights in hotels and similar establishments in city area only; NA = Bednights in all forms of paid accommodation in city area only.

On other occasions, more partial activity indicators are used, reflecting a single facet of visitor influx. For business tourism, data from the International Congress and Convention Association (ICCA) on the number of meetings are used. For cruises, the Cruise Lines International Association (CLIA) provides data on the number of vessels and passengers per port. In general, this information comes from official

sources in each country. The International Air Transport Association (IATA) provides information on air traffic (flights, passengers, connections, etc.), although data for each city and airport are published by national statistical authorities.

The ability of these indicators to show overload situations is limited. However, their interest increases if the data are analysed from two perspectives. Firstly, the growth dynamics shown by the variable used: number of tourists, cruisers, dwellings for tourist use and others. According to TourMIS data, in 2018 the number of overnight stays in the 15 most visited cities in Europe amounted to 373.6 million. With respect to 2011, the year Paris is incorporated into the system, more than 73 million overnight stays have been earned, 25.42%. Moreover, this figure has been surpassed in a large number of cities: Amsterdam (71.05%), Berlin (47%), Budapest (57.15%), Hamburg (52.46%), Istanbul (73.95%) or Lisbon (67.62%), among others.

The second perspective corresponds to the temporal distribution of the variable. Seasonal concentration implies an unequal distribution of pressure throughout the year, with moments that concentrate tourist activity and potentially overtourism situations. As before, it can be applied to the number of tourists, overnight stays, cruise passengers, etc. In general, the difference between the months with the highest and lowest values of each variable is taken into account. The distribution of overnight stays collected by TourMIS points to a high seasonality in the large capitals of Central Europe, while in cities such as Madrid the tourist inflow is quite stable throughout the year. At a general level, the increase in tourist influx and seasonality favour situations of overtourism. When both processes come together the risk of these problems increases. Therefore, it is especially necessary to analyse whether the current growth of urban tourism maintains or changes the patterns of temporal distribution of the influx in each city.

Until recently, most indicators were based on data from official statistics. Today, big data are also captured and processed using data mining techniques and complex statistical operations. In many cases, these data are geolocated, which allows an approximation with a high level of detail to the real areas of tourist concentration, the places where overtourism situations appear. It is very common to capture data from different social networks, especially those that allow sharing comments and photos. Based on previous work (Kádár & Gede, 2013), Kádár (2014) uses the photographs available on Flickr.com to record the distribution of tourist activity in three Central-Eastern European capital cities: Vienna, Prague and Budapest. From a broader perspective, Salas Olmedo et al (2018) compare the digital fingerprint left by tourists in Panoramio (as an approximation to the spaces of the visit), Foursquare (spaces of consumption) and Twitter (interactions with enough association to the spaces of the accommodation). In addition to identifying the main tourist areas in the city of Madrid, they establish areas of tourist specialisation such as destinations, shopping and hospitality consumption or accommodation.

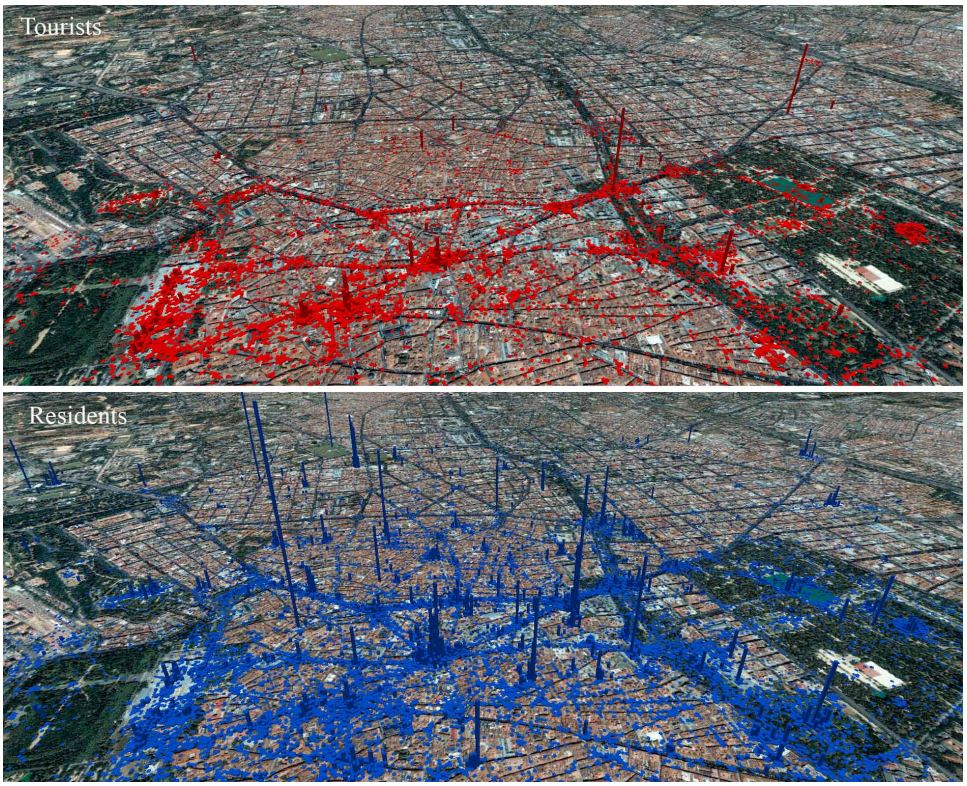
Data mining is also used to quantify and characterize the supply of tourist housing. The influx of visitors to a city has always been greater than tourists staying in commercial tourist establishments, mainly hotels. This situation has been aggravated by the recent expansion of the houses for tourist use, with very large amounts both of an illegal or non-legal nature. This expansion implies a very notable change in urban tourism, in the growing process of "Airbnbization" (Richards, 2017). It puts direct pressure on the residential market, turning housing into a tourist commodity to the detriment of the local population. Given that the large shared hosting platforms do not provide information on supply and demand at the level of each city, different groups are using web scraping techniques, with downloads of large volumes of data repeated from time to time, to which data mining is applied to obtain structured information with the data that support the public denunciation of the evolution of the phenomenon. For example, Inside Airbnb extracts information from Airbnb advertisements, which allows the offer

of dwellings for tourism purposes to be quantified and analysed on the basis of variables such as room type, activity or availability. On its website, it provides an approximate location of the dwellings and a grouping of data at the level of areas of the city that uses the administrative boundaries in force in each country. The work that uses this and similar sources is substantial (among others, see Freytag & Bauder, 2018; Gutierrez et al, 2017), in many cases from very critical perspectives of the phenomenon (among others: Cócola, 2016; Lee, 2016).

The availability of georeferenced data for different dates allows a wide range of analysis from different methods of cartographic representation. These methods may have different levels of sophistication in data processing. At the most basic level, the location of the elements to be represented on a point map is simply shown. These elements can also be added according to a superimposed grid and represented in three dimensions so that the height provides information about the number of elements in each cell, as can be seen in Figure 1. Other methods involve the use of spatial analysis tools such as kernel density, which allow the visualization of heat maps. This technique has been used, for example, to represent the expansion of tourist housing in the historic centre of Palma de Mallorca (Yrigoy, 2017), and is shown in Figure 2 for the city of Madrid.

These images have been generated following the methodology used by Kadar and Gede (2013) for the analysis of the distrubtion patterns of photos uploaded to Flickr by tourists and resident. In this case the georeferenced photos taken between 2015 and 2018 in the historic centre of Madrid have been downloade generating a layer of points. Tourist have been classified as those users who have taken photos

Figure 1. 3D model of Flickr photos taken by tourists and residents in Madrid

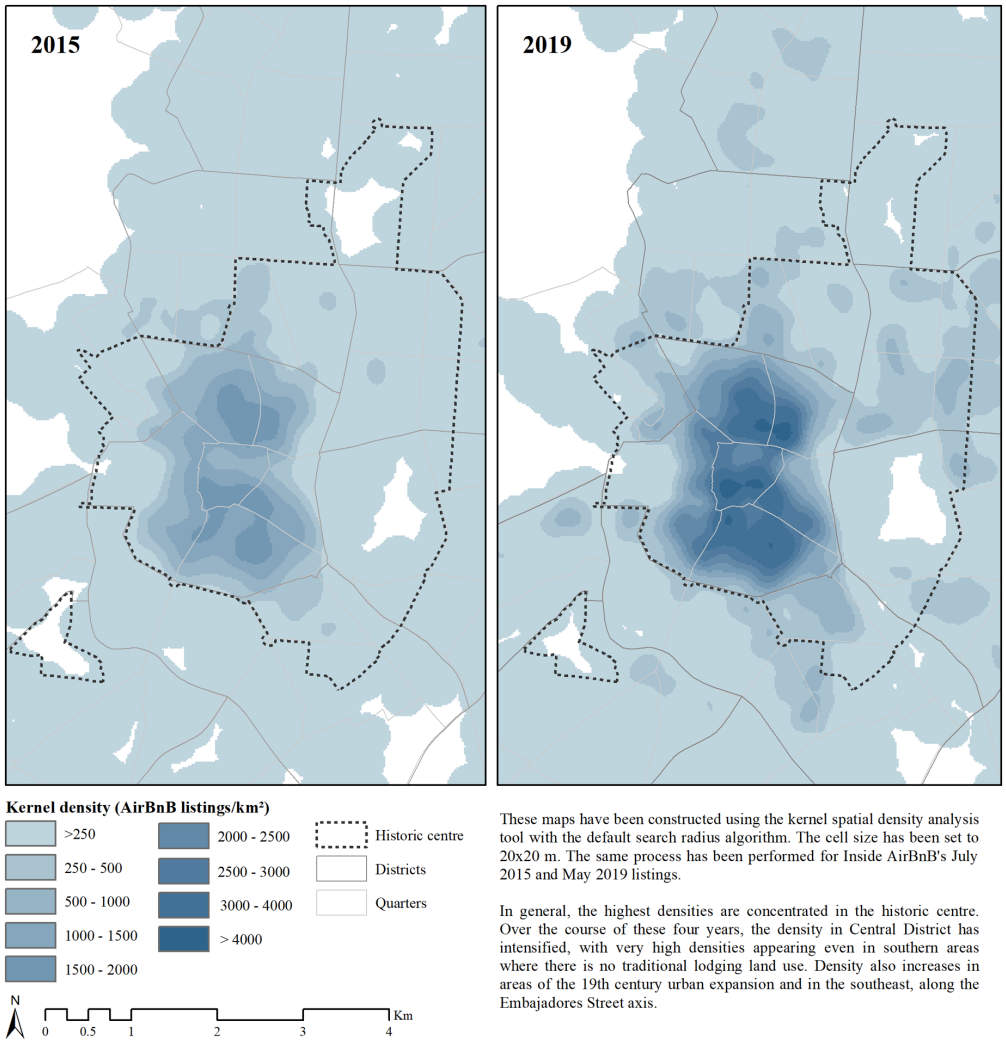


for a maximum of three consecutive days. The point layer has been regrouped according to a 100 m2 hexagonal tessellation that has been afterwards extruded in ArcGlobe according to the number of photos. The comparison of the two images shows how the tourist use of the city is much more concentrated around a few landmarks while resients make more extensive use and show interest in local elements that do not appear in the tourist pattern.

Tourism Specialisation Indicators

This type of indicator establishes a relationship between a variable related to tourism and another that has to do with an aspect of the local reality. In their simplest formulation they correspond to simple indices that work with a single magnitude. For example, the weight of tourism in the GDP and/or employment of the city, usually expressed as a percentage. Although estimates of this weight are common in national

Figure 2. Evolution of AirBnB listings density in Madrid



and regional studies, they are less frequent at the urban level as there are usually no statistics with this degree of territorial disaggregation. Given the growing importance of tourist accommodation and its association with some discomfort in urban centres, indicators are also beginning to be used which measure the proportion of accommodation capacity in tourist accommodation over total accommodation capacity, or the number of tourist accommodation over the total number of dwellings or the number of homes.

Complex indices are more sophisticated, as they relate two different magnitudes. As a result, the difficulties in obtaining data are even greater. Indicators of tourist intensity are usually based on the resident population. Variables related to tourism include the number of travellers, overnight stays or, failing this, accommodation capacity. At the European level, TourMIS relates the number of overnight stays and inhabitants. As indicated above, the territorial units of statistical reference and the types of accommodation considered vary according to destination. In addition, the population calculation year also differs. Taking these caveats into account and taking as a reference the overnight stays recorded in 2018, the European cities with the highest tourist intensity were Venice (31.4 overnight stays per inhabitant), Lisbon (25.6), Salzburg (24.4), Amsterdam (19.7) and Bruges (18.5). For Rome, the figure is 9.9, above Berlin (9.1), Vienna (8.7), London (6.6), Budapest (5.9) and Paris (4.1). In Spain, Barcelona and Madrid register a similar number of overnight stays: 19.2 million and 19.8 million, respectively. On the other hand, the tourist intensity of Barcelona amounts to 11.9 while in Madrid it is only 6.2 overnight stays per inhabitant, as it is a municipality with a much larger resident population.

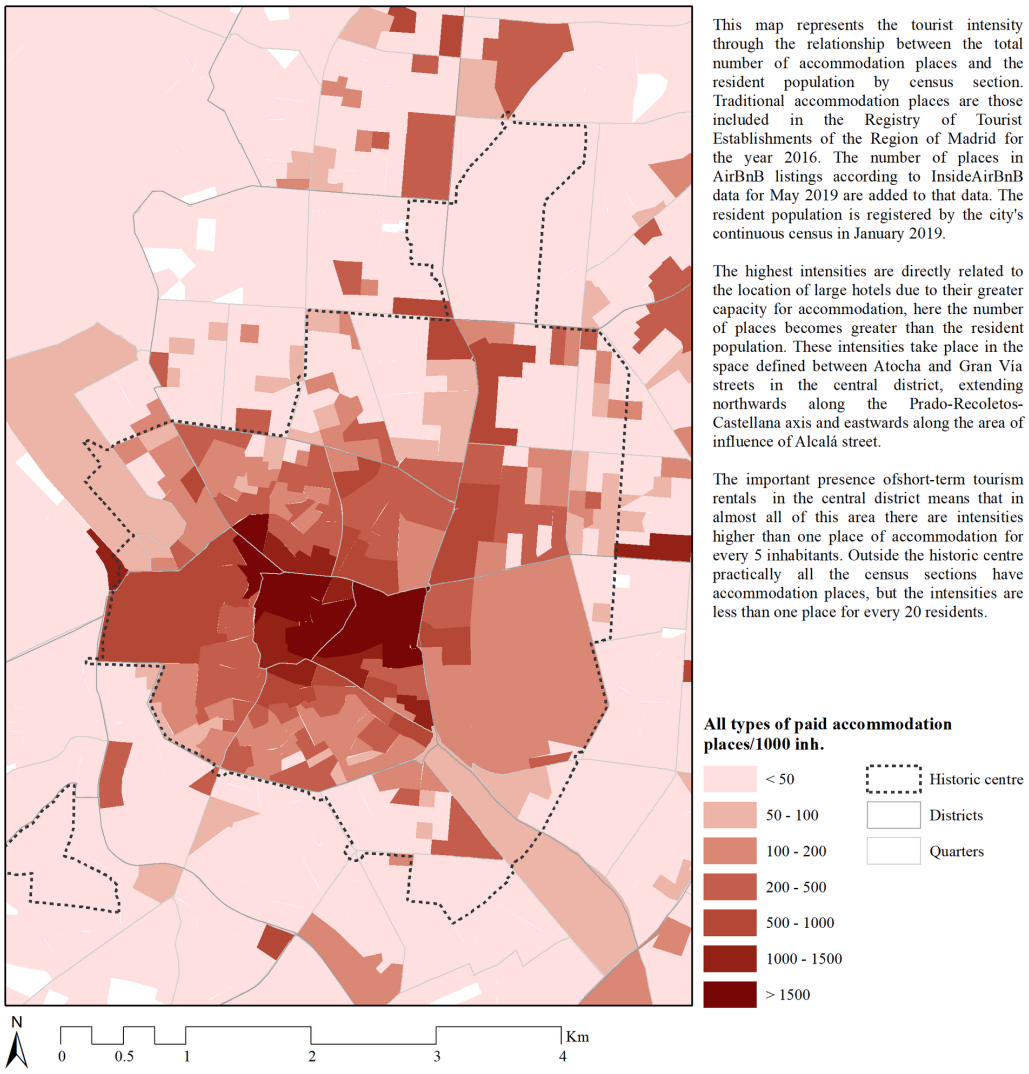
Approximations at more detailed scales tend to use the number of accommodation places, as data on tourists and overnight stays are generated at a municipal level. The level of disaggregation of data on resident population varies from country to country. For example, in Spain there is free access to the number of inhabitants at the level of districts, neighbourhoods and census sections. There is also this information on the number of dwellings and households, so it is common to establish indicators that attempt to measure the pressure of the tourist dwelling on the housing stock. Figures 3 and 4 show the application of tourist intensity indicators by census section in Madrid.

Within the complex indices, indicators of tourist density are also widely used. These indicators refer to the surface area. At the city level, values are managed on the number of tourists, overnight stays or lodging locations per unit area (hectare, km2). Since visitors tend to concentrate on the central spaces of each city, the values obtained barely reflect tourist pressure. Alternatively, WTTC & McKinsey&Company (2017) work uses a density indicator calculated as 2016 arrivals divided by the number of square kilometres in the area encompassing TripAdvisor's top 20 attractions for the destination.

If information on the exact location of the accommodation floor is available, it is possible to carry out analyses at a higher level of detail. Administrative divisions and conventional statistics are sometimes used. In their work on Madrid, Sorando & Ardura (2018) use an indicator of the number of Airbnb listings per hectare at the census section level. A simple comparison between the 2015 and 2017 results reflects an increase in density in the central areas and an expansion of this accommodation formula in neighbouring neighbourhoods that until now did not have a commercial tourist accommodation offer. Since administrative boundaries sometimes present problems of adjustment to the distribution patterns of tourist activity over the city, one can resort to the use of geometric figures that result from superimposing a mesh on the urban space, as shown in Figure 5.

The use of tourist intensity and density indicators based on the number of tourists or overnight stays implies some distortion. Unlike population figures, which reflect the number of residents at any given time, tourist influx figures are the sum of tourists or overnight stays recorded over a period of time, usually a year. In order to minimise this distortion, Weber et al (2017) introduce a time component in

Figure 3. Madrid. Tourist intensity: total places of accommodation/1000 inhabitants

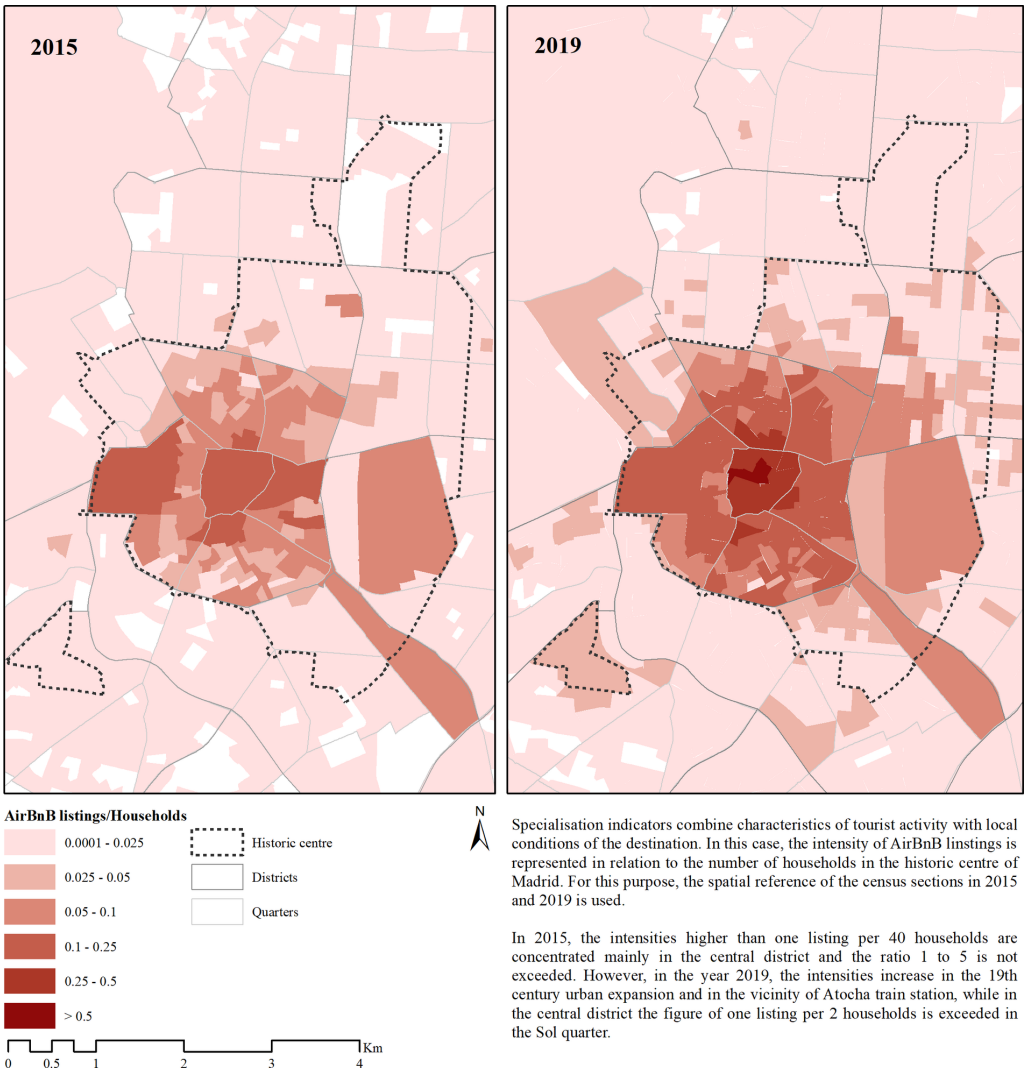


two of their pressure indicators: 1) Tourist Penetration Rate (TPR) - the number of tourists in the city per day and per 100 inhabitants on average; and 2) Tourist Density Rate (TDR) - the number of tourists in the city per day and per 1 km^2.

STAKEHOLDERS AND PERCEPTION OF OVERTOURISM SITUATIONS

The indicators set out in the previous sections allow situations to be compared at a temporal level as well as between places. However, at the present time, we are not able to set limits to determine thresholds for overtourism situations. These thresholds have a strong value component: it implies being able to answer the question of when many tourists are too many. And there is no single answer to this question. Contemporary urban societies are intrinsically heterogeneous, made up of different stakeholders who

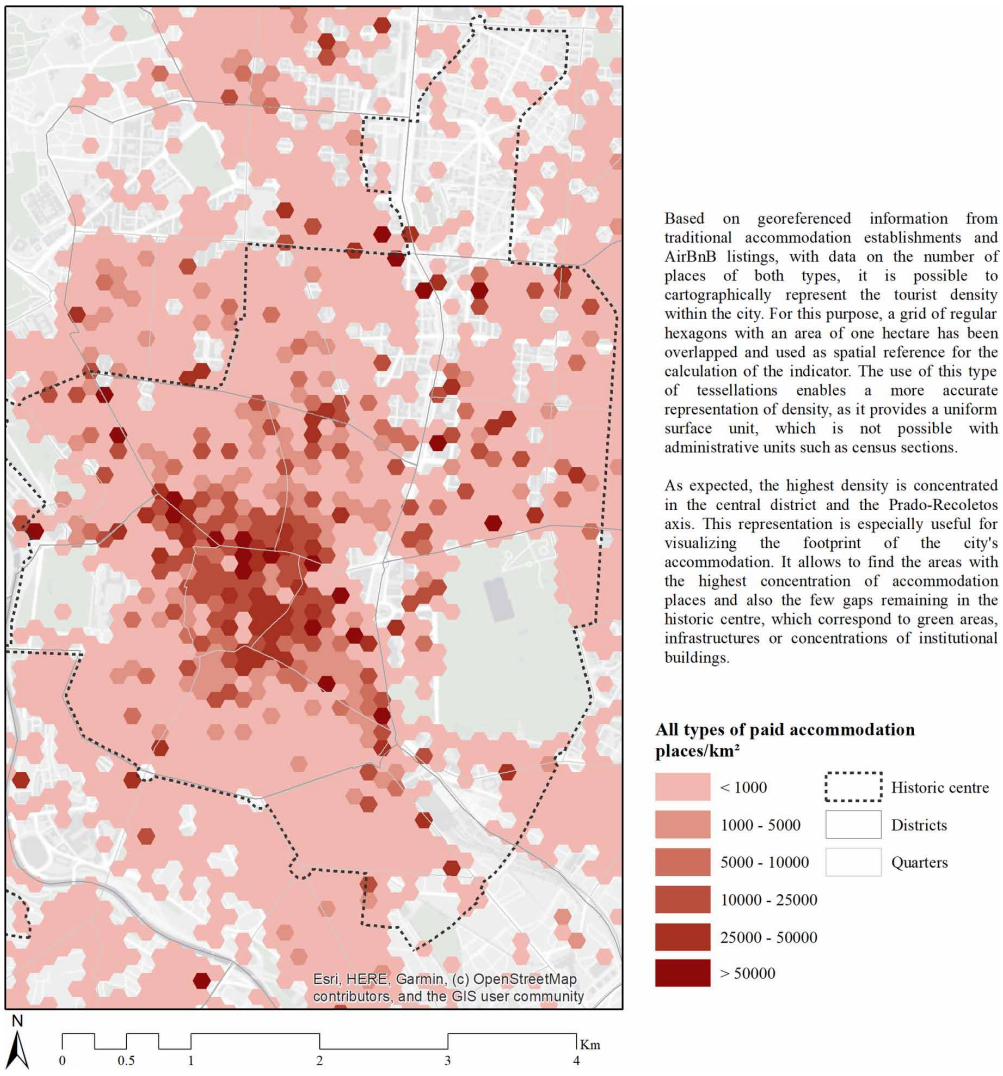
Figure 4. Madrid. Evolution of tourist intensity: AirBnB listings/households



will respond differently according to their interests (Becken & Simmons, 2019). In the recent WTO (2018) work on overtourism, Koens identifies five stakeholders whose interests and positions need to be considered: 1. Residents and other local users of the city (temporary residents and commuters); 2. Domestic and international visitors; 3. Tourist industry players; 4. Tourism policy-makers and DMOs; and 5. Wider city context stakeholders (policy departments outside of tourism, non-tourism businesses, representative organizations/unions of residents, representative organizations of natural environment/ cultural heritage protection, etc.).

Local government entities play a key role. If those responsible for these entities identify situations of overtourism, it is more likely that an explicit policy will be adopted to combat the negative effects of tourism growth. In the case of Spain, the authors of this text are currently working on an on-going investigation into the perception of the technical levels of the town councils of the main Spanish tourist cities of the problems generated by tourism in urban centres. In the first phase, an online questionnaire is

Figure 5. Madrid. Density of accommodation places from hexagonal grid



used to gather as many responses as possible. Among other questions, it is asked whether they have the perception that there is excessive tourist pressure in the city or, as the case may be, in the urban centre or in one of the main tourist spaces. Additionally, some of the problems that usually affect the centres of the Spanish tourist cities are pointed out and the respondent is asked to indicate the degree of responsibility that they place on tourism regarding the development of this problem. Preliminary results indicate that 70% of those interviewed indicated the existence of excessive tourist pressure in their city. At a second level, the spatial areas affected by this pressure are researched. Of the total responses obtained, 10% considered that the pressure was limited to some very emblematic buildings, 34% to certain streets and squares in the centre, 21% to the entire urban centre and 5% to the city as a whole. Once this first phase of the research is completed, a series of face-to-face interviews will be conducted to contextualize the results obtained in the general survey.

Business associations have also begun to incorporate the topic of overtourism into their institutional discourses. There is notable concern about the expansion of a negative view of tourism that is spreading in many mass media. This view contrasts with the traditional image of urban tourism, which was generally considered to be a very beneficial activity for cities. The institutional positions of the tourist associations allude to the need to sustainably manage the tourism success story, a management in which their participation is necessary. Problems associated with overtourism are recognized, but these problems do not derive from the simple growth of urban tourism but from its deficient management. Their argument thus appears to be aligned with the official approaches of UNWTO and many DMOs. Specifically, the consolidated tourism sector blames overtourism on the recent expansion of holiday homes driven by platform companies such as Airbnb. Thus, in a recent report of the Asociación Empresarial Hotelera de Madrid (2018), two major challenges of tourism in the city are pointed out: 1. The disproportionate growth in the supply of unregulated accommodation; and 2. Overcrowding of destination and problems of coexistence. And they consider both problems to be fully related.

Business organizations accuse social movements of encouraging local rejection of tourism, a phenomenon known as "tourism-phobia. As part of a general approach to the defence of the "right to the city", these movements have recently incorporated a very negative view of tourism as a manifestation of the commercialisation of the city favoured by the public authorities. Gentrification and touristification appear as parallel phenomena. The reaction to these phenomena is widespread in many European cities, as reflected in the compendium of Colomb & Novy (2016). Within critical studies, it is common to map urban conflicts, often in a participatory manner. This technique can be used to develop an indicator of tourism-related conflicts, indicating their weight in relation to the total and their specific nature. In this sense, Romero's work (2018) shows the recent growth of conflicts linked to the implementation of sharing economies, both in terms of accommodation (Airbnb) and transport (Uber, Cabify). Also in Madrid most of the protests are directed against the expansion of housing for tourist use (Gil & Sequera, 2018), with those central residential neighbourhoods which, until recently, have been off the beaten track, being especially virulent.

Social movements tend to present themselves as the voice of the citizenry, but their representativeness is very limited. In general, the attitude of the resident population towards tourism development is considered to be one of the critical dimensions of a territory's social carrying capacity. This attitude, which will never be homogeneous, is determined by a multiplicity of aspects (Almeida et al, 2015). Among other things, it is common to cite the level of economic dependence on tourism, the sense of attachment to the place and the degree of direct contact with tourists and travellers. The majority use surveys, in which the interviewee is asked to take a position on certain issues.

In general, this form of work is maintained in the most recent research on the local perception of overtourism. In their work for WTO (2018), Postma & Papp analyse residents' perceptions of tourism growth in eight major European cities. The results indicate that the local population recognizes positive and negative effects both at the personal level and in relation to the community as a whole. The majority of respondents consider that there is still room for further tourism growth, although there is a significant minority, for whom tourism growth is an issue. However, this group is not unified on where the emphasis of tourism growth or lack thereof should lie. Perhaps this minority nurtures local anti-tourism movements and encourages a certain media environment of tourism-phobia. Perceptions also vary widely between cities. In Barcelona, municipal surveys have long placed tourism as one of the main problems of the city in the opinion of its inhabitants.

The deterioration in tourist satisfaction can also be considered an indicator of overtourism. The growth of the tourist influx also has disadvantages for the following: increased waiting time to access museums and monuments, difficulties in finding space in bars and restaurants, increases in the prices of goods and services, crowded streets and squares, etc. and even the feeling of loss of authenticity of the places visited, a particularly sensitive aspect in urban heritage sites. The current wave of tourism deteriorates the objective conditions in which the visit takes place. However, it is not clear whether this affects the global competitiveness of the destination. The studies carried out in Florence by Popp (2012) reflect the complexity of the subject. Using a qualitative methodology, it captures the moments and places where tourists perceive congestion. In these occasions, the congestion by an excessive tourist density does deteriorate the experience of the place. But it also identifies situations of positive agglomeration: visitors understand that a certain bustle is part of a living city and the very presence of other tourists creates a sense of security for the less experienced traveller. In any case, it remains to be determined how the perception of agglomeration affects the selection of the destination, the subsequent travel recommendations or the possibility of repeating the visit.

Most of the work on stakeholders' perception of tourism is based on surveys. In addition, semi-structured interviews and analysis of documents generated by the more formal organisation groups are carried out. These techniques are more expensive. In addition, the studies carried out are very focused on detecting problems in each city, so the results are difficult to compare. As a recent alternative, it is possible to use the capture of massive data from social networks and other platforms that collect comments from different stakeholders. Semantic analysis of messages posted on Twitter, for example, can help identify certain states of opinion about tourism in a city. These opinions reflect the perceptions and positions of organized groups such as social movements, business organizations and political parties, but also of citizens and Twitter visitors. The geolocation of the messages itself makes it possible to identify the places and moments where dissatisfaction with tourism is highest. In the case of TripAdvisor, it only collects ratings and comments from tourists, although the analysis of the most negative ratings can help identify a number of negative aspects commonly associated with overtourism situations.

CONCLUSION

For some time now, problems related to tourist overload have been identified in different types of places, in many cases spaces with important heritage values. There is already a remarkable academic tradition of carrying capacity studies and an important doctrinal corpus from international bodies such as ICOMOS, UNESCO's World Heritage Centre, UNEP and UN-Habitat. In 2005 the WTO published a manual entitled *Tourism Congestion Management at Natural and Cultural Sites*, with a strong orientation towards planning and management. Within this framework, a large number of tourism sustainability indicators were designed, to be applied to different types of resources and destinations.

Tourist pressure is currently increasing, especially in city centres. This increase stems from two factors. Firstly, the growth in the influx of visitors, especially in cities with very good air accessibility and cruise ports. And secondly, the expansion of holiday homes in the residential neighbourhoods of urban centres, a circumstance which threatens the residential status of these places. The preservation of this condition has been a central objective of the urban management of many European cities over the last forty years. As a reaction to the increase in tourism pressure, social movements have incorporated the denunciation of the most negative effects of tourism on the city into their discourse.

In this context, the need arises again to establish indicators that allow measuring the magnitudes and dynamics of the phenomenon. A considerable effort has been made by different public and private entities to identify these indicators in order to achieve a more sustainable management of tourism growth. The list of proposed indicators is very extensive, although it is difficult to attach them to specific dimensions of a site's carrying capacity and, in most cases, there are no homogeneous spatial and temporal data with which to feed these indicators. As has been pointed out repeatedly, it contrasts the efforts of theoretical reflection with the possibilities of practical application.

Based on the review of documents and the search for data, it is possible to identify a series of indicators of common application to urban destinations. These indicators are grouped into the following types:

- Indicators of tourist magnitude, which only indicate the tourist importance of a city in relation to others. The number of visitors, tourists staying in hotel establishments, cruise passengers, airline passengers or, otherwise, accommodation location is used.
- Indicators of tourism dynamics, which reflect the dynamics of tourism over a series of time. The capacity of a place to assimilate tourism is much greater when it comes to gradual growth. Whereas currently it is a matter of accelerated growth, especially regarding the expansion of housing for tourist use.
- Indicators of seasonality in tourism, alluding to the temporary distribution of the influx in a year. If this affluence is very concentrated, the tourist pressure in these periods is much greater. Among other aspects, it is a key issue for the design of urban infrastructures and services.
- Indicators of tourist intensity, which relate figures of tourist magnitude and values with magnitudes of local order, such as the number of residents, dwellings or homes. They reflect the importance of tourism in that city and, internally, in its different areas and neighbourhoods.
- Tourism density indicators, produced similarly to tourist intensity indicators but based on surface magnitudes.

With respect to the traditional line of study of indicators, the most recent reflections on overtourism in urban destinations incorporate two novelties. In the first place, the importance given to the monitoring of housing for tourist use. This is a totally disruptive factor at the level of urban tourism, which greatly favours the processes of residential displacement associated with tourist gentrification. These processes are affecting, above all, spaces that are off the beaten track, neighbourhoods in the process of touristification due to the expansion of this accommodation formula. Secondly, the use of web scraping techniques and the application of data mining to obtain supplementary data to feed possible overtourism indicators is also new. These techniques are applied, for example, to understand the magnitude and dynamics of the supply of housing for tourist use marketed through platforms such as Airbnb. The fact that the data are geolocalized also allows for a much more detailed spatial analysis, identifying the places where tourist pressure is concentrated at a much lower cost than conventional systems used in the past.

However, all the recent reflection on overtourism and indicators leads us to the same problem as with previous work on carrying capacity in urban destinations. In essence, the problem lies in the inability to establish values based on which many visitors can be considered too many. In other words, values that establish the point of equilibrium from which the disadvantages of tourism outweigh its benefits. Responding to these questions implies investigating the local perception of tourism since similar figures on magnitude, dynamics, seasonality, intensity and density of tourism can give totally disparate local responses. This is done through surveys, interviews and, more recently, the capture of opinions in social

networks with the techniques of web scraping and data mining mentioned above. In any case, contemporary urban societies are far from homogeneous, so each stakeholder will perceive the advantages and disadvantages of tourism according to their principles and interests.

In addition, the spatial concentration of tourist activity in urban centres implies an unequal distribution of benefits and burdens. The growth of tourism benefits the urban community in terms of GDP, employment and overall prosperity. On the other hand, the most negative effects are concentrated in urban centres, in such a way that their residents accumulate the problems of tourist pressure when they only receive a reduced part of the potential benefits that tourism generates for the city. Solving this gap is one of the challenges of urban management in the coming years, and will only be achieved through an agreement between the different stakeholders based on the model of urban centre, tourist destination and city that is desired in the medium and long term. The definition of this model must serve as a reference scenario to determine the sustainability or unsustainability of current tourism growth, therefore establishing the carrying capacity thresholds that give a sense of value to all indicators designed or yet to be designed. An exciting challenge that must give its support to a new research agenda.

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