



Research Article

A new urban diagnostics approach for measuring *touristification*: The case of the Metropolitan Area of Barcelona



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ABSTRACT

In the last decades the global tourist industry has been transformed by rapid growth, resulting in many destinations reaching a state of touristification. This phenomenon is a socioeconomic and spatial transformation process that can contribute to the creation of a tourism monoculture.

This study aims to measure the level of touristification found in the Metropolitan Area of Barcelona (MAB), focussing on social, spatial and environmental aspects. The study's originality lies at the territorial level of research. The primary intended outcome of the research is to provide an analytic methodology to support informed decision-making for sustainable urban tourism policies at the metropolitan level.

In the MAB a polycentric pattern of touristification can be observed in an area that is currently undergoing two processes: the increase of tourism supplies in the first ring of MAB municipalities and the distribution of tourism fluxes on the coastal destinations. Furthermore, four typologies of municipalities have been established based on their level of touristification growth. Finally, this study demonstrates the importance of discussing these processes at the metropolitan level and providing a methodology relevant to other metropolises worldwide.

1. Introduction

Urban tourism significantly alters the landscape of contemporary cities, affecting social cohesion and the well-being of citizens. The international tourism industry is transforming cities into objects for cultural consumption, and the rapid growth of tourism, fuelled by globalisation, increasingly compromises the sustainable development of tourist cities (Fainstein & Judd, 1999; Cañada, 2019; Cheer et al., 2019).

Barcelona, and more generally Catalonia, has long been an attractive destination for tourists (Degen & García, 2008; Palou, 2012; Santomà et al., 2013; Tomàs & Négrier, 2018). At the beginning of 2020, the Barcelona City Council forecast that an average of 155,000 tourists a day would visit the Catalan capital that year, totalling 50 million tourists, i.e., almost 30 times the residential population. The tourism industry represents a leading economic sector for the city, with a 12% contribution to the city's GDP, accounting for 9% of all employment (Ajuntament de Barcelona, 2020a, 2020b).

The effects of tourism in Barcelona over the last two decades – and the resulting challenges – are not confined to the city limits

Abbreviations: MAB, Metropolitan Area of Barcelona.

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(Crespi-Vallbona & Domínguez-Pérez, 2021). Tourism has been expanding into adjacent municipalities, creating an urban *continuum* around the Catalan capital. As tourism gradually spreads into these neighbouring territories, policies are adopted that are often similar to those of the capital (Glasser et al., 2019), highlighting the need to develop supra-municipal tourism planning analysis tools.

The impact of tourism on a city has many dimensions, including spatial, social, economic, ecological and environmental. In each case, research is needed to define and implement a sustainable urban tourism model that can adapt to contemporary tourist cities' physical and social characteristics. Therefore, this article aims to measure touristification, i.e., the transformation processes that leads to tourism specialisation of a given area – in this case, urban landscapes in Barcelona and surrounding municipalities in the metropolitan area – and to provide a generally applicable methodology based on an exploratory urban diagnosis approach (Leach et al., 2019).

The overall objective is to measure the portion of the city devoted to tourism in terms of its speed of growth, using analytic indicators from several study fields. The study has an exploratory character, in view of the fact that the touristification literature currently available and the methodologies for measuring it are limited.

This research aims to answer the following question: How can we measure touristification of contemporary cities? The absence of specific studies on touristification indicators and the difficulties in finding a unique definition of this phenomenon emphasise the need for a more robust framework. For this reason, the present study has an exploratory character, and the research dynamic adopted is inductive. Furthermore, this research aims to fill the aforementioned literature gap, and its originality lies in its diagnosis methodology and scale, which are not local, as is usually the case, but metropolitan.

To answer the research question, the authors defined four study phases developed in the article's sections. The first three are descriptive, and the last one is evaluative. The first section deals with the theoretical framework of touristification and the metrics adopted to measure it in previous research. In the next section, the proposed methodology is detailed, together with the material's sources and limitations. Next, the results and discussion section gather the data analysis and elaboration. The authors also present a debate on the touristification phenomenon, including its definition, the suitable metrics for measuring it and their application to the study area. The authors gathered the observations of prominent experts to frame the debate on the state of touristification in the MAB. Finally, the concluding section reflects on the current global situation and the future tourism model, including suggestions for future research.

Indeed, the outcome – the methodology and set of indicators – might be tested and applied to different contexts to support administrations and local communities in the policy-making process.

2. The relationship between gentrification and touristification

The terms *touristification* and *gentrification* are often associated. The inaccurate use of these two terms, particularly touristification, is often associated with a negative attitude towards tourism (Ojeda & Kieffer, 2020). The literature review below explores three leading schools of thought on the relationship between touristification and gentrification.

The first definition holds gentrification responsible for touristification (Gotham, 2005). Gentrification is often found to be an indicator that an area will soon be promoted as a tourist destination (Fainstein & Judd, 1999). Gentrification lays the foundation for tourism development through the creation of facilities, services and attractions. In this first case, gentrification acts as a trigger for touristification.

The second approach inverts the relationship, contending that touristification is in fact a vehicle for gentrification (Barata-Salgueiro et al., 2017). On one hand, the focus is directed toward 'transnational gentrification' (Sequera, 2020, p. 79), a transformation process elicited by foreign investors – both private citizens and businesses – that through the purchase of second residences promote the development of tourist services and amenities. A response designed to meet tourist demand ultimately contributes to a process of gentrification. On the other hand, a phenomenon is singled out in which touristification of central neighbourhoods in well-developed tourist cities leads residents to move to other parts of the city in search of tourist-free urban spaces, consequently gentrifying new areas. Thus, tourism is a gentrification process that causes social exclusion and resident population displacement.

Furthermore, Cocola-Gant (2018, 2019) states that touristification and gentrification are independent phenomena that feed off each other. Tourism tends to be prevalent within gentrified areas because gentrification develops both consumption facilities, and tourist attractions simultaneously, thus accelerating the increase of pressures associated with gentrification (Cocola-Gant, 2018). Nevertheless, it is overly-simplistic to assume that touristification is only a facet of gentrification. These two processes share similar features, but impact the city differently (Sequera, 2020). Both are related to people's mobility and affect the housing market, local businesses and community life; however, different market dynamics propel them – the touristification at the international level and the gentrification at the local level.

Scholars in recent years have been more inclined to focus on touristification's social impact. In their most recent research, Milano et al. (2023) reflected on interactions between all these dynamics, with an emphasis on residents' perspective. Indeed, the authors stated that 'touristification processes are acknowledged differently based on how long residents have lived in the neighbourhood' (Milano et al., 2023, p. 16). This observation further emphasises the complex nature of touristification, which is also reflected in its analysis.

2.1. State of the art: towards a set of indicators

Evaluating the impact of tourism on a destination is a complex task because of the enormous quantity and diversity of variables to consider. Furthermore, although indicators are recognised as important tools for analysis, technical and conceptual difficulties often limit their use (Torres-Delgado & Saarinen, 2014). This section includes four case studies that attempt to index tourism's impact on destinations with different objectives and methods. As mentioned earlier, measuring touristification is not the objective in these cases,

which aim to provide complementary references to define the present study's indicators. All four cases noted a lack of data availability.

Case 1. Copying with success: managing overcrowding in tourism destinations.

This study, published by McKinsey & Company and the World Travel and Tourism Council (WTTC) in 2017, addressed the issue of overcrowding in touristic cities. The report included five main categories of problems associated with excessive tourism, gathered into indicators. The methodology examined nine metrics, among which, the most relevant and well defined indicators for the study of urban transformation were the density of tourism – defined as the number of arrivals divided by the number of square kilometres in the area encompassing TripAdvisor's top 20 attractions for the destination; tourism intensity, in which the ratio between residents and arrivals is calculated; and attraction concentration, which describes the urban environment based on the most frequented urban paths, highlighting their common characteristics in terms of habitability, security, attractiveness and liveliness (McKinsey & Company & WTTC, 2017).

The report included benchmarks that cities could use to assess overcrowding risk, creating five value ranges. Furthermore, the study included four application examples – Barcelona, Buenos Aires, Chongqing and New York City – to provide consistency for the assessment tool. These indicators are referred to in the following cases and in this study as the McKinsey tool.

Case 2. Overtourism: impact and possible policy responses.

In 2018, the EU Committee on Transport and Tourism (TRAN) commissioned this report to several experts from different academic institutions. In 2018, Peeters et al. (2018) measured overtourism and its associated risks in 105 identified potential cases in EU member states.

In this case context, tourism intensity is determined by the annual number of bed nights per tourist, while tourism density is the annual number of bed nights per sq km. These measures include the relative distribution of Airbnb and conventional accommodation, as well as the proximity of cruise ports, airports and UNESCO World Heritage Sites (Peeters et al., 2018).

Case 3. Environmental externalities in Barcelona tourism.

The third case entails a report that the Barcelona Regional Agency published in 2019 in the Tourism Strategic Plan Barcelona, 2020a, 2020b (Ajuntament de Barcelona, 2017a, 2017b, 2017c, 2019; Barcelona Regional, 2019). The focus shifted from economic and social themes, to more environmental ones and counted on the following environmental qualitative indicators.

The methodology adopted in this report consisted of a survey that the Agency of Energy of Barcelona conducted with the collaboration of the Barcelona City Council's Tourism Department. The authors conducted 138 interviews (with 85 owners of 'traditional' tourist accommodation and 53 of tourist apartments, from now on referred to as HUT – from the catalan *Habitatge d'Us Turístic*), with results and other bibliographic references used to estimate the city's impact.

Case 4. Measuring overtourism: indicators for overtourism – challenges and opportunities.

A recently published study aimed to 'explore the phenomenon of overtourism' (Weber et al., 2020, p. 7). In this contribution, the authors conducted a thorough literature review of previous overtourism studies, retrieving all relevant indicators used and integrating them with new ones. The indicator set was organised into four sections: general indicators (primary destination-related data); experimental indicators; World Travel and Tourism Council Indicators (the nine metrics developed by the McKinsey tool); and additional indicators (site-specific for each destination).

Without a doubt, the experimental indicators group enriched this study enormously. The combination of quantitative and qualitative data stressed the need to integrate different analytical methodologies and the importance of using qualitative indicators to replace absent quantitative data. Among all the experiments, a notable indicator concerned the existence of regulations on tourism's traditional accommodation and services, as well as new ones concerning sharing-economy-related services, e.g., Airbnb and Uber.

Furthermore, the authors also reflected on the creation of an indicator set for monitoring overtourism. Indicators are classified into driver, supply, demand, impact (environmental, economic and social) and response. Significant attention should be paid to the driver indicators, which emphasise the extremely dynamic attitude of tourism. All these indicators are viewed as growth rates based on comparing two time periods. This approach offers an opportunity to provide a dynamic diagnosis of a destination.

3. Materials and methods

3.1. The study area: the sample

When testing the methodology, the study considered the territories' dimensions, populations and data availability, then proceeded using a multilevel approach, in which the Barcelona municipality was analysed at the district level, while the other cities were analysed at the municipal level due to population differences (see Fig. 1 and Table 1). The final sample comprised 35 municipalities and 10 districts, totalling 45 territorial units and representing a consistent number for achieving a comparative evaluation.

The data that support this study's findings were derived from the following resources available in the public domain.

- Institut d'Estadística de Catalunya (idescat.cat)
- SIMBA - Sistema d'Indicadors Metropolitans de Barcelona (iermbdb.uab.cat)
- Statistic Department of Barcelona Municipality (ajuntament.barcelona.cat/estadistica)
- Open Data BCN (opendata-ajuntament.barcelona.cat)

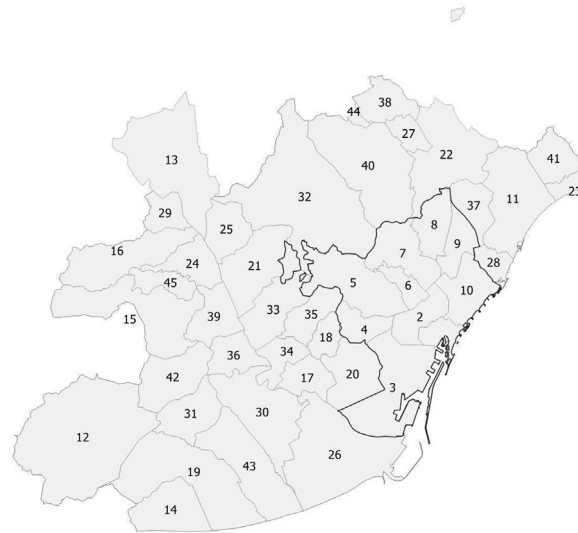


Fig. 1. The study area [1–10, Barcelona's districts; 11–45, MAB's municipalities] (source: the authors).

Table 1

Barcelona's districts and MAB municipalities.

Ref	Barcelona's Districts	23	Montgat
1	Ciutat Vella	24	Pallejà
2	Eixample	25	El Papiol
3	Sants-Montjuïc	26	El Prat de Llobregat
4	Les Corts	27	Ripollet
5	Sarrià-Sant Gervasi	28	Sant Adrià del Besòs
6	Gràcia	29	Sant Andreu de la Barca
7	Horta-Guinardó	30	Sant Boi de Llobregat
8	Nou Barris	31	Sant Climent de Llobregat
9	Sant Andreu	32	Sant Cugat del Vallès
10	Sant Martí	33	Sant Feliu de Llobregat
Ref	MAB Municipalities	34	Sant Joan Despí
11	Badalona	35	Sant Just Desvern
12	Begues	36	Santa Coloma de Cervelló
13	Castellbisbal	37	Santa Coloma de Gramanet
14	Castelldefels	38	Barberà del Vallès
15	Cervelló	39	Sant Vicenç dels Horts
16	Corbera de Llobregat	40	Cerdanyola del Vallès
17	Cornellà de Llobregat	41	Tiana
18	Esplugues	42	Torrelles de Llobregat
19	Gavà	43	Viladecans
20	Hospitalet de Llobregat	44	Badia del Vallès
21	Molins de Rei	45	La Palma de Cervelló
22	Montcada i Reixac		

The study is integrated further with information retrieved from other websites, e.g., TripAdvisor, Timeout, Touropia, Barcelona Tourism's official website (in the case of the Tourism Specialisation indicator) and direct phone calls or emails to the municipalities' urban planning departments (in the case of the Governance indicator).

3.2. Detailed methodology

To achieve this study's first three objectives, the authors adopted mixed qualitative and quantitative methodologies (Fig. 2). To collect the data, they used the Delphi method, an iterative technique organised in several steps that deeply address an issue. This case entailed two phases. First, experts were required to answer questions in a semi-structured interview composed of 10 questions (average time: 35 min). They were then asked to fill out an online survey (average time: 8 min). The experts were selected considering discipline diversity: four geographers; four economists; four architects and urban planners; two anthropologists; two sociologists; two tourism studies experts; and two demographers.

During the first phase, the author interviewed a group of experts in October 2020, conducting the interviews in English, Spanish,

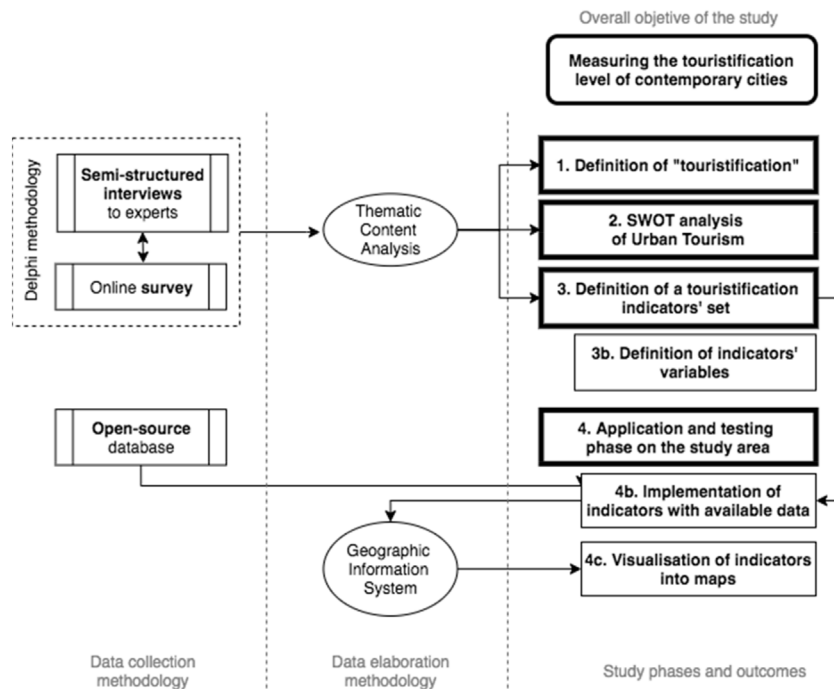


Fig. 2. Methodology and study phases (source: the authors).

Catalan or Italian, based on interviewees' preferences. All conversations were recorded, and their content was examined further through a thematic content analysis (TCA) conducted using atlas.ti software. The content resulted in a set of possible indicators and a SWOT analysis.

During the second phase, the same group of experts evaluated the indicators list, ranked the SWOT analysis retrieved from their interviews and integrated it into the literature review. The interviewees conducted this part autonomously by filling out an online survey, then attributed a value between 0 and 5 to a list of possible indicators and a list of strengths, weaknesses, opportunities and threats (i.e., SWOT), elaborated based on the literature review and the experts' interviews.

The Delphi methodology outcomes comprised a list of 21 touristification indicators with their scores and the SWOT analysis. Also, the TCA of the interviews allowed us to discuss the definition of *touristification*.

The final objective was to apply the indicators to the MAB case study. The set of indicators resulting from Delphi was implemented with the open-source database of public administrations and other institutions for achieving it. This phase aimed to define the indicators to include in the study based on data availability representing the main research limitation. As a result, the number of indicators was reduced drastically to four, visualised through GIS technology.

Therefore, the outcome comprised the four maps of the indicators – from which data were available – and the methodology based on the complete indicators list, which also is relevant in other contexts.

3.3. Research limitations

This study's main limitation is related to the lack of availability of current tourism data, which strongly affected the territory-level analysis and, consequently, the cartography and results.

First, the study cases cited mostly used estimation techniques due to data unavailability. This approach is difficult to use when considering broader territories other than a single municipality, and for this reason, it was not adopted in this study.

Second, data accessibility differences in the 36 MAB municipalities were enormous. None of the municipalities – with the exception of Barcelona – has open-access databases on their websites, so information was retrieved mostly from supra-municipal bodies at the municipal level. No data were provided at the neighbourhood level, except for the capital. As a result, a multiscale analysis was chosen. Territorial surface was the main variable considered at the time of comparing municipalities, despite the significant geographic differences and the use of land (e.g., the municipalities that contain infrastructure or the ones characterised by floodable or vast rural areas).

Despite this limitation, the methodology was designed to be implemented easily with newer data, which hopefully will be available at the same level as the entire study territory in the near future.

4. Results and discussion: towards a set of metrics for measuring touristification

4.1. What is 'touristification'?

During the semi-structured interviews, the first question focussed on the definition of *touristification*. The answers confirmed several schools of thought mostly related to the field-of-study perspective. Indeed, based on the results, touristification might be interpreted and measured based on two main perspectives: economic and social.

The first group of interviewees (65%) viewed touristification as a tendency to direct a specific territory's economic activities towards tourism. This first group of experts contained two subgroups. The first viewed touristification as a neutral transformation process entailing a spatial translation of a market dynamic. This economic-dynamic phenomenon develops over several phases with diverse impacts on destinations. During the first phase, touristification is when a territory develops touristic features. Once consolidated, touristification dynamics might transform the area's economic activities towards the tourism sector. If these economic and spatial transformation processes are not monitored, they have the potential to generate a tourism monoculture. This causal relationship can lead to negative connotations around the term touristification. This is evidenced by the fact that the second subgroup of experts defined touristification as a destination's excessive economic dependency on the tourism sector due to a gradual shift from resident-oriented businesses (ROBs) towards tourist-oriented businesses (TOBs). These experts regarded touristification as the point at which tourism takes precedence over other economic activities.

The second group of interviewees (35%) provided a definition that gave precedence to a more social perspective, with the group being split into two subgroups. Four experts referred to touristification as another facet of gentrification. Indeed, the term touristification first emerged from early debates on gentrification, with an emphasis on displacement of the resident population (Gotham, 2005). Therefore, touristification is the process of land-use change in which tourism-related functions replace traditional activities. The other interviewees referred to touristification as the moment when tourism affects a specific territory – a street, neighbourhood or city – in a way that prevents or substantially alters the quality of life for residents in that territory. In extreme cases, interviewees commented that touristification is a process that deprives a destination of authenticity. According to Belhassen et al. (2014), touristification results in the complete transformation of urban spaces into tourism spaces.

The thematic content analysis conducted on the interviews confirmed the difficulty of reducing such a complex phenomenon down to one single term. Notably, a common idea is that when we orient a territory's economy towards the tourism sector, we are touristifying. To summarise the interviews, touristification is a territory's economic, spatial and social transformation as a consequence of tourism sector growth, regardless of its developmental stage. It also can be described as a given area's level of tourism specialisation.

4.2. SWOT analysis: an evaluation of urban tourism

During the interviews, the experts listed the strengths, weaknesses, opportunities and threats (SWOT) of urban tourism. These data were used to create a list of 64 points, which the interviewees ranked by significance of impact through the online survey. Among the strengths of the urban tourism phenomenon, experts stressed the positive impact on the economy in the form of job opportunities, income generation and effects on other sectors. Furthermore, the impact on the local community's quality of life, with the activation of social revitalisation processes, and encouraging bottom-up transformations also ranked high on the list. In this framework, aspects related to spatial transformation did not rank very high, e.g., regeneration of urban settings and promotion of urban innovation (Porfido et al., 2019). The reduction of micro-criminality and the creation/consolidation of an international image of the city ranked some of the lowest. This last point is fascinating and conflicting because tourism – in a broader sense – is often associated with destination internationalisation (Milano et al., 2019).

Experts listed a group of 15 weaknesses found in urban tourism, which ranked higher than strengths in terms of the importance of their impact. This observation indicates that the opinion of weak aspects is homogenous. Indeed, the first group of weaknesses was related to the economic transformation of local businesses, which are oriented toward tourism and determine a loss of traditional activities, impacting residents' quality of life, which includes access to affordable housing (Milano & Mansilla, 2019). Furthermore, this economic metamorphosis determines social and spatial changes, e.g., city polarisation. It also reduces social cohesion, impacts vulnerable groups and feeds mobility processes, e.g., gentrification. All these weaknesses reveal the tourism industry's low resilience, which significantly affects urban landscapes, as it does not respond in real time to the needs of local residents.

Opportunities score an average of 3, all the way up to 5, with a slight variation ± 0.6 . Most opportunities were found in creating new spatial solutions, e.g., facilities and public spaces, re-evaluation of historic neighbourhoods and valorisation of local resources. In this framework, economy-related opportunities were sidelined. Indeed, job opportunities and wealth generation were ranked lowest on the list.

Finally, the experts listed and ranked the significance of 12 threats associated with urban tourism, all of which ranked highly with scores of 4+. Most threats were related to social aspects and how urban tourism can significantly affect local communities. The highest ranked threat was the risk of creating a tourism monoculture. Indeed, the transformation of a city area into a highly specialised tourism district can potentially lead to residents' expulsion, massification, congestion and saturation of public spaces, as well as a breakdown of social cohesion, increases in socio spatial inequities and fostering of vulnerability (Arias & Quaglieri, 2016; Cocola-Gant, 2018; Cañada, 2019).

The 64 SWOT points can be grouped into three main thematic categories: economic; social; and spatial. Fig. 3 indicates that urban tourism, without a doubt, presents strengths predominantly related to economic advantages, while the weaknesses mainly impact the social sphere. Notably, most of the opportunities relate to spatial issues, and the threats are distributed equally between the three.

Observing this last figure, experts emphasise the tendency for urban tourism to impact the social fabric negatively, while spatial and economically positive impacts are not questioned.

4.3. Definition of touristification evaluation indicators and their variables

During the semi-structured interviews, experts enumerated possible indicators based on their expertise, which were then integrated with indicators from the study cases presented above, to comprise 21 metrics. The experts then scored these indicators from 0 to 5 (with zero representing the lowest value and five the highest).

The indicators were split into three categories: general indicators; experimental indicators; and additional indicators. The first comprised a set of various indicators that aim to capture more traditional destination-related data. The second contains various experimental indicators (see Weber et al., 2020). The final category includes additional qualitative indicators that can be calculated only through surveys (see Table 2).

The main objective of this set of indicators was to create a space- and time-related analysis, i.e., a model that can study the theme of time and space conflicts. Speed and time are crucial variables for understanding the cause-and-effect relationship between promoted policies. Considering the rapid nature of tourism transformation, indicators should be as dynamic as possible. For this reason, each indicator's final value results from comparing two different years. The percentage results indicate either growth or a decrease. The higher the growth, the faster the touristification process.

Among the highly scored general indicators are those most traditionally related to tourism flux, intensity and density. Measuring the concentration of tourists, tourism services, and accommodations is recognised as a consolidated tool to evaluate the touristification of given areas. The two metrics were related to residents' access to the housing market. In this first group, the relationship with environmental issues appears to be sidelined.

The second group of experimental indicators are intended to measure the economic and spatial transformation of touristic areas, based on residents' satisfaction level. The experts also viewed sociodemographic loss, governance policies and specific tourism mobility networks as fundamental contributions to touristification. At the bottom of the list were occupancy rate, public works, signage and visibility on social networks. Most of the indicators were difficult to adopt because of a lack of data availability. Aside from enriching the set, those indicators analysed several aspects of city development that cannot be analysed with traditional data indicators (such intensity and density based on bed nights figures), emphasising the urge to integrate this typology of research into more updated analysis methodologies.

The final group related to qualitative studies emerges through the importance of a survey about social cohesion, followed by tourism-related employment satisfaction. To implement the set of indicators, the author defined the variables to include for calculating each one. As noted earlier, the study's main limitation was data availability; therefore, this phase was fundamental in determining the indicators to implement in this study. (see Table 3)

4.4. The MAB's touristification level: application to the study case

This section includes the final selection of indicators and their visualisation, map by map. The number of indicators falls drastically due to data availability.

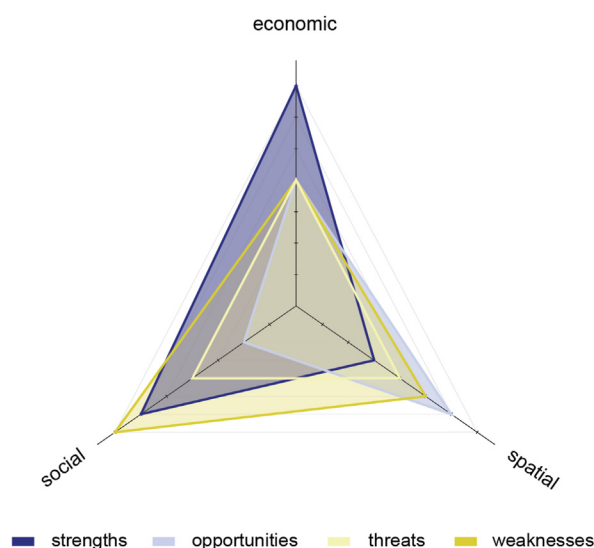


Fig. 3. Details of SWOT analysis results by main themes.

Table 2

Indicators retrieved from study cases and interviews, with corresponding scores assigned by experts in the online survey.

Indicator	Description
General indicators (7)	
1. Tourism flux	This indicator aims to observe the ratio of residents to tourists in a given area.
2. Tourism density	The indicator expresses the concentration of tourism accommodation in a given area by the annual number of bed nights per sq km.
3. Tourism intensity	This indicator aims to express the intensity of tourists' presence in a given area by the annual number of bed nights per inhabitant.
4. Concentration of Touristic Apartments (HUT)	Thematic indicator dedicated to sharing-economy-related issues. It aims to evaluate the concentration of HUT in a given area to measure their impact on the local housing market.
5. Availability in the housing market	Intended as the ratio of empty-full housing units (which provides information on touristic apartments, second residences and the availability of space for resident families), this indicator measures housing stock availability and accessibility.
6. Accessibility in the housing market	This indicator measures local citizens' purchasing power and their access to the housing market based on the relationship between average rental price and salary.
7. Resource consumption and waste production	This environmental indicator intends to measure average resource consumption and waste production related to the tourism sector.
Experimental indicators (12)	
8. Diversity and concentration of (TOB) economic activities	Intended as a tool for evaluating a specific area's economic specialisation level, it measures the diversity and concentration of economic activities.
9. Tourism specialisation of the urban landscape	This indicator measures the concentration of tourism attractions in a given area and their influence range (short-medium distance from the attractive point).
10. Residents' satisfaction with tourism (indirect)	Evaluation of residents' satisfaction by analysing tourism-related official complaints presented by the city council (e.g., noise).
11. (Loss of) sociodemographic diversity	Diversity is synonymous with balance in the ecosystem, as it is in the city. Less variety will elicit a more homogeneous socioeconomic fabric. This indicator measures changes in the sociodemographic profile.
12. Tourism (exclusive) mobility	This indicator aims to evaluate the existence of tourism-exclusive (or priority) mobility lines by accounting for bus stops (or lines), ticket sale analysis and tourist frequency data in the city metro area and bus lines.
13. Governance I: institutions	This indicator aims to measure the tourism governance development level through the number of tourism-related institutions and residents' associations.
14. Governance II: plans; strategies; and policies	This indicator aims to measure consolidation of tourism governance by considering the existence of tourism policies, (strategic) plans and initiatives in a given area.
15. Instagrammability	Observing the number and concentrations of posts uploaded on IG and Twitter, this indicator aims to evaluate social networks' influence on specific attraction points or city areas.
16. Tourism signage	This indicator aims to measure the visual impact of tourism signs/markers on urban landscapes.
17. Occupancy rates and use of public spaces	This indicator aims to measure public spaces' occupancy rates by evaluating bar terraces (and other activities).
18. Public space typologies	Given that public space quality is a vital asset for urban tourism development, this indicator analyses the typologies of public works related to public space improvement.
19. Multilevel seasonality by hour, day, month	This indicator studies businesses' opening hours to understand to whom they are oriented to develop a more precise framework of the given area's attitude towards specific population groups.
Additional indicators (based on surveys) (2)	
20. Social cohesion related to tourism and residents' satisfaction (direct)	This indicator aims to evaluate a given city area's social cohesion, particularly relating to tourism activities.
21. Employment and job satisfaction	This indicator aims to measure the satisfaction of employees involved in tourism-related jobs.

Table 3

The final set of indicators implemented with a data source [IEC: Institut d'Estadística de Catalunya (idescat.cat); SEU: Extranet de les Administracions Catalanes (seu-e.cat); SIMBA: Sistema d'Indicadors Metropolitans de Barcelona (iermbdb.uab.cat); deBCN: Departament d'Estadística de l'Ajuntament de Barcelona].

2. Tourism density	2.1 Territory surface/IEC, SIMba, deBCN 2.2 Tourism accommodations' bed places, 2014–2018/SIMBA, deBCN
3. Tourism intensity	3.1 Population 2014–2018/SIMBA 3.2 Tourism accommodations' bed places, 2014–2018/SIMBA, deBCN
4. Concentration of touristic apartments	4.1 Territory surface/IEC, SIMBA, deBCN 4.2 Number of HUT bed places, 2015–2018/deBCN, openBCN
14. Governance II: plans; strategies; and policies	14.1 Existence of the Tourism Department in the City Council, 2018–2020/SEU 14.2 Tourism information and section on the official city website, 2018–2020 14.3 Presence of tourism as a thematic axis in the PAM (Pla d'Actuació Municipal) or PAD (Pla d'Actuació de Districte), 2018–2020/SEU, phone interviews 14.4 Existence of specific tourism plan (Pla Estratègic de Turisme/Plans urbanistics especials) or policies, 2018–2020/SEU, phone interviews

4.4.1. Tourism density

Tourism density is the growth ratio of hotel bed places to surface area from 2014 to 2018. This indicator aims to demonstrate the concentration of tourism accommodations in given areas (Fig. 4).

Starting with Barcelona, the high rate of tourism growth in the districts of Sant Martí and Gracia correlates with their close proximity to popular tourist attractions. A similar rate of growth can also be observed in Ciutat Vella and l'Eixample. A decrease in tourism activity in Sarrià-Sant Gervasi and Horta-Guinardó is indicative of an attitude of 'resistance' found in these districts towards tourism growth. It should be noted that in 2017, the Barcelona City Council approved the tourism strategy Turisme 2020 Barcelona (Ajuntament de Barcelona, 2017a, 2017b, 2017c). In this context, the issue of hotel accommodations represented a focal point, and the Pla Especial Urbanístic d'Allotjaments Turístics (PEUAT) (Ajuntament de Barcelona, 2017a, 2017b, 2017c) ceased issuing permits to build hotels in specific areas of the city. The effects of this are notable on the map at the MAB level. First, the Vallés area registered a sharp increase in hotel accommodations, particularly in Cerdanyola (+30% circa), Sant Cugat and Montcada i Reixac. Badalona's bed place numbers' also grew. In the Llobregat area, the situation is more stable, with minor variations. The only exceptions were the coastal municipalities of Viladecans (+37%) and Castelldefels (roughly +10%). Notably, Gavá, situated between those two growing destinations, has not seen any growth, probably due to awareness of tourism governance. While Gavá has a strategic tourism plan and an additional special plan for HUT, the other municipalities do not, which has likely made their territories more appealing to investors.

4.4.2. Tourism intensity

Tourism intensity measures the number of hotel bed places in comparison with the local population. This indicator expresses the growth of this ratio from 2014 to 2018. Observing the results, two considerations can be made. On one hand, between 2014 and 2018, the population in MAB increased by approximately 46,000 (28,000 of which were in the MAB municipalities and 18,000 in Barcelona). This suggests that a counter-urbanisation process is ongoing, i.e., a process of migration from industrialised cities to neighbouring areas (Arroyo, 2001), with definition and consolidation of new metropolitan dynamics. On the other hand, as discussed earlier, the highest hotel bed-place ratio variation was recorded in coastal municipalities.

Fig. 5 confirms the trend noted in Fig. 4, with coastal municipalities and districts increasing the ratio (Castelldefels, Viladecans, Badalona, Sants-Montjuïc, Ciutat Vella and Sant Martí), including several destinations in the Vallés area.

4.4.3. The concentration of touristic apartments (HUT)

The concentration of tourist apartments (HUT) has been the most discussed tourism related issue in the past few years, due to its impact on the residents' life quality. With the emergence of sharing-economy platforms, e.g., Airbnb and HomeAway, the housing market has been completely revolutionised. Unfortunately, no city or public administration was adequately prepared for this rapidly-developing phenomenon. Indeed, many cities still do not have legislation on this market trend. Moreover, Barcelona adopted reparative measures a considerable time after the HUT spread. The data represented in Fig. 6 refer to the officially registered HUT from 2015 to 2018. Although it is not the main focus of this study, it is essential to emphasise that the differences in numbers between the official data and available apartments on these platforms are enormous – as in the case of the Raval neighbourhood (Porfido et al., 2019).

Based on this figure, tourism fluxes are almost impossible to prevent. However, based on the data represented, almost all of Barcelona's districts registered a decrease in HUT bed places as a consequence of the measures undertaken by the municipality – the Pla

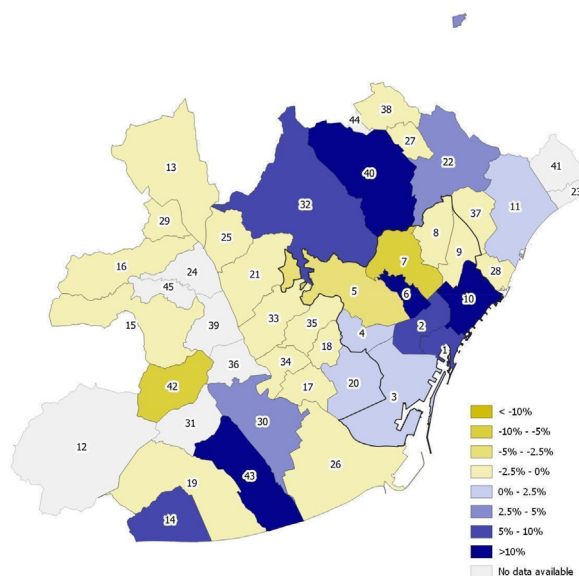


Fig. 4. The growth of tourism density in the MAB, 2014–2018 (elaborated on by the authors) [1–10, Barcelona's districts; 11–45, MAB's municipalities].

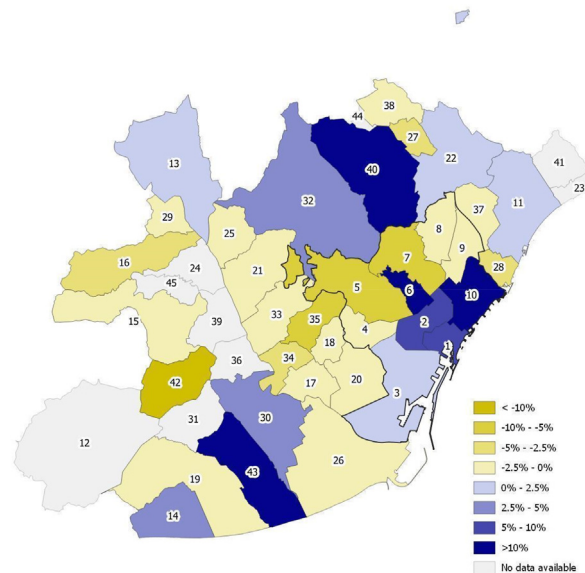


Fig. 5. The growth of tourism intensity in the MAB, 2014–2018 (elaborated on by the authors) [1–10, Barcelona's districts; 11–45, MAB's municipalities].

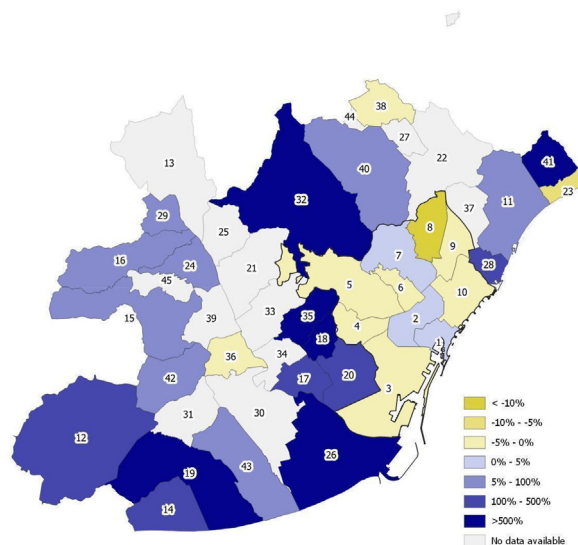


Fig. 6. The growth of tourism apartments (HUT) in the MAB, 2015–2018 (elaborated on by the author) [1–10, Barcelona's districts; 11–45, MAB's municipalities].

Especial Urbanístic d'Allotjaments Turístics (PEUAT) (Ajuntament de [Barcelona, 2017a, 2017b, 2017c](#)). Nevertheless, this caused a vast increase of HUT in the neighbouring municipalities (e.g., El Prat de Llobregat registered +1.733%; l'Hospitalet de Llobregat, +304%; Espulgues, +1.366%; Sant Just Desvern, +654%; Sant Cugat, +560%; Sant Adrià de Besos, +475%), indicating that tourism fluxes follow the physics theory on communicating vessels.

4.4.4. Governance II: tourism-related plans; strategies; policies

This final indicator, developed at the MAB level, aims to assess awareness and preparation of local municipalities for tourism issues. The four included variables aimed to evaluate the importance given to tourism in local urban and strategic plans regarding its relevance in the city council mission.¹ Altogether, 16 municipalities included tourism in their urban plans, but only 13 city councils adopted a

¹ When information was unavailable on the official websites, it was retrieved from direct phone calls or emails to the municipalities' urban planning departments from 30 November to 3 December 2020.

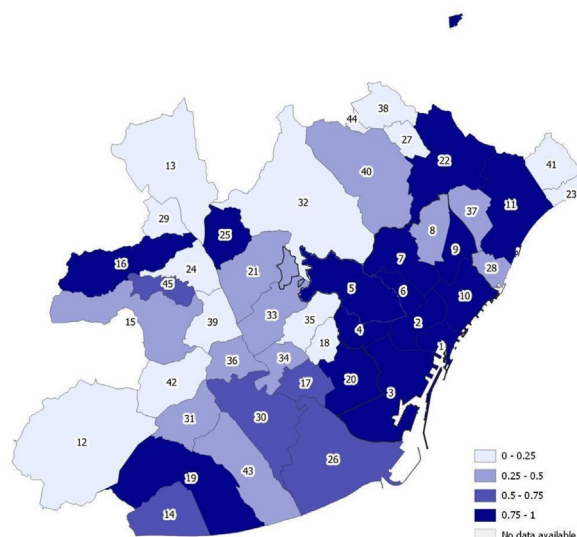


Fig. 7. The level of tourism awareness and governance tourism tools in the MAB, 2020 (elaborated on by the authors) [1–10, Barcelona's districts; 11–45, MAB's municipalities].

tourism strategy or developed special plans (e.g., HUT management). Altogether, 17 city councils delegated one of their representatives to tourism-related issues, with the establishment of a specific tourism department.² Moreover, almost all (28/36) included tourism information on their official websites (e.g., tourism attraction maps, itineraries and accommodation contacts). At the district level, all ranked equally except for Sarrià-Sant Gervasi and Nou Barris, which did not include any specific actions related to tourism in their district plans (PAD – Pla d'Actuació de Districte) (see Fig. 7).

Due to tourism density and the increase in HUT, many municipalities started to focus on tourism, including alignment of governance priorities and development of special plans. This has elicited great interest in taking advantage of tourism related opportunities, but a lack of consideration for the potential problems they might present.

5. Conclusions: a polycentric touristification in the MAB

Analysing the figures presented in the previous section leads to several findings, some of which are related strictly to MAB's urban context and others that are valid from a more regional perspective. Observing the figures, the MAB presented a polycentric pattern of touristification concentration, and the 36 municipalities can be divided into four main categories.

- **Highly (consciously) touristified.** These municipalities registered positive growth in all indicators and had developed – or were in the process of developing – tourism-related strategies for regulation purposes. These municipalities included coastal destinations, e.g., Castelldefels, Gavá, Viladecans, El Prat, Barcelona and Badalona.
- **On their way to becoming touristified (as a byproduct of Barcelona's proximity).** This category included several MAB municipalities, e.g., l'Hospitalet de Llobregat, Cerdanyola del Vallés, Sant Cugat del Vallés and Sant Adrià de Besos. These destinations are touristified mainly because their tourism industry is interrelated with that of Barcelona. For example, as a direct effect of the strict policies of Barcelona City Council on HUT and other accommodations, the tourism flux has been redirected out to adjacent territories. This trend is encouraged by the proximity of these cities to Barcelona, being accessible by metro or train, and by the lack of an adequate tourism strategy in most of their local governments.
- **Still not touristified, but welcoming tourism development.** Some municipalities directly connected to the Barcelona tourism fluxes have developed an exact and specific strategy in recent years, including Montcada i Reixac, Santa Coloma de Cervelló, Corbera de Llobregat and El Papiol. These cities, although having registered negative or slightly positive tourism growth, are preparing for tourism through specific plans that aim to attract visitors, yet simultaneously regulate them.
- **Still not touristified and are not willing to develop tourism.** Finally, some municipalities have not made this sector a priority, including Montgat and most municipalities in the remotest areas of Vallés and Llobregat. This fact is supported by the interviews realized for collecting information for the governance indicator.

A similar argument can be applied at the Barcelona municipality district level. The highest touristification level is registered in the districts included between the coastal area and the Avenida Diagonal. This represents a physical border between districts with the

² In most cases, tourism is associated with other departments, e.g., economic growth or development, trade and the environment.

highest and lowest levels of touristification. Based on the indicators, Ciutat Vella, Sants-Montjuïc, l'Eixample and Sant Martí are registering constant growth (except for bed places in hotels and HUT, which have been reduced due to new policies enacted in 2017).

Finally, reflecting on the results at two different levels of analysis leads to similar conclusions. Firstly, the main trigger elements that increase touristification levels are, without a doubt, the presence of attraction hotspots and the development of an easy and accessible mobility system. In both cases, municipalities and districts that were not touristified until a few years ago experienced a positive growth index due to the excellent quality of connections with tourism hotspots, including l'Hospitalet de Llobregat, Sant Cugat del Vallés, Cerdanyola del Vallés and Sant Adrià, and the districts of Sant Martí and Les Corts.

Consequently, this process elicited revitalisations of areas that later attracted TOBs and accommodation structures. However, this phenomenon also triggered a feedback mechanism that might lead to developing negative aspects of touristification (e.g., excessive growth of HUT at the expense of local communities) if it is not controlled and regulated through specific laws and policies.

In conclusion, the 'liquid' nature of tourism development demonstrates that touristification is a dynamic process that easily passes from one territory to another (as is the case of the first ring of MAB). The governance indicator demonstrates a dangerously poor awareness among many MAB municipalities concerning these issues, with a lack of specific plans, strategies or policies. Barcelona and other area municipalities' experiences should function as a reference point for considering tourism's effects from a medium to long-term perspective.

By following the four aforementioned indicators, it is possible to see how fast touristification changes urban landscapes and geographic direction. The methodology proposed and applied in this study was an urban diagnosis tool for understanding the dynamic phenomenon of touristification. Indeed, the idea of depicting the indicators as a growth index allows for measuring each metric and its variation over a time frame spanning four to five years, leading to a deeper interpretation of the touristification phenomenon and possibly facilitating informed decision-making for designing sustainable urban tourism policies and planning in tourism cities.

Legal and Ethical statement

Ethical considerations have been taken into account to guide this research. Respondents of the survey participated voluntarily, provided informed consent, and their personal data's anonymity and confidentiality have been guaranteed.

Declaration of competing interest

A competing interest statement is provided, even if the authors have no competing interests to declare.

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