# The values and plus values of built heritage resources in the digital economy era

Methodological approaches and multi-perspective analysis on peer-to-peer accommodation systems in urban contexts
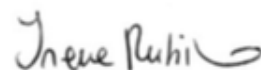
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August 26th, 2019

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# Summary

Built heritage resources are firstly valued for their cultural significance, but it is now commonly acknowledged that they present economic values too. These economic values may be constituted by use values, non-use values but also by the externalities stemming from them. In fact, the existence, conservation and *mise en valeur* of these resources generate effects that interest a variety of stakeholders as well as the places they are located in.

A traditional industry affected by built heritage resources is tourism, with special regard to the sectors of communication, education, commerce, catering and hospitality. However, the recent rise and spread of digitally-mediated peer-to-peer accommodation systems - such as the leading platform *Airbnb*- have recently expanded the type and number of stakeholders providing accommodation and consequently gaining economic advantages from the presence of tourist flows appealed by local attractions: in the most favoured capital cities of urban tourism, the growth of offer and demand patterns related to short-term rentals has disrupted the hospitality domain and altered the balance required to combine economic development with cultural, environmental and social sustainability. The news and the pioneering literature on the topic seem to suggest that short-term rentals are actually fostering the competition with the hotel sector, the real estate market and long-term rentals, as well as causing an increased pressure on historic centres, with consequences not only at the economic but also at the social level.

In light of this framework, this dissertation aims to enrich the debate originally introducing the built heritage component in the discourse and specifically investigating the case of an urban context that has started to experience a significant tourism growth since the beginning of the last decade, i.e. the Italian city of Turin. The research firstly aims to study the development of the Airbnb phenomenon by a diachronic and spatial perspective, identifying possible relationships between local built heritage resources and short-term rentals offer and demand patterns. Overall, the analyses carried out throughout the work capitalize on a set of geo-referenced data concerning Airbnb listings appeared on the Turin's market in the period 2009-2017, as well as on GIS-based information regarding the local built heritage and the socio-economic characteristics associated to the different sub-portions of the city. Given the supposed importance of the location factor and of possible spatial proximity patterns, the study

integrates descriptive statistics and regression approaches with the methods of spatial statistics, with special regard to *ESDA- Exploratory Spatial Data Analysis* (including *LISA-Local Indicators of Spatial Association*) techniques.

The results stemming from the study provide evidence that spatial relationships and spatial correlation patterns between the density of built heritage resources and Airbnb listings exist, and that the areas most affected by the new short-term rental reality are the residential neighbourhoods located in the proximity of the historic centre of the city. Interestingly, results also highlight that the most frequent and profitable type of litings are small apartments situated not only in upscale central areas characterised by high environmental quality, transports, shops and services but also in neighbourhoods with challenging socio-economic characteristics that are conveniently located in the nearby of the city centre. Considering that some of the neighbourhoods that are currently mostly interested by the Airbnb phenomenon have experienced gentrification processes in a relatively recent past, this thesis proposes that the transformation of small residential units into short-term rental lodgings is an economic strategy related to the cycle of life of previously gentrified neighbourhoods and of their inhabitants. This process is originally defined through the term *accommodification*, a neologism that refers to the conversion of use of the residential units (*to accommodate = to host*) but also to short-term rentals as a new function satisfying the current needs of previous residents (*to accommodate = to fit, to adapt)* and transforming the private space into a place that can be easily rent out for profit, even on a need-basis (*commodification*).

Quantitative and comparative analyses underline that at this stage of development Airbnb may still represent an opportunity for Turin, especially considering that the city is trying to differentiate its hospitality offer and attractiveness using the experiential key. On the basis of available data, economic consequences on the real estate and long-term rental sectors seem not already clearly perceivable in this phase, but the evidence provided by the literature advises to make monitoring among the top priorities, since socio-economic consequences – such as excessive pressure on the historic centre, alteration of the social fabric, competition for the same residential units and unaffordable housing- may be severe and preventive analyses combined with mathematical forecasts would allow both to take countermeasures on time and to address local development toward the most sustainable direction.

# Acknowledgments

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# Abbreviations Index

AMTP: Abbonamento Musei Torino Piemonte

ADR: Average Daily Rate

AR: Annual Revenues

EH: Entire Home/apartment

HZ: Homogeneous Zone

MADR: mean average daily rate (calculated for SZs)

MZ: Microzone

NB: Number of Bookings

OCACT: Osservatorio sulla Condizione Abitativa della Città di Torino

OCP: Osservatorio Culturale del Piemonte

OHCCT: Observatory on the Housing Conditions of the City of Turin

OICT: Osservatorio Immobiliare Città di Torino

OR: Occupation Rate

PR: Private Room

RN: Residential New/completely renovated

RU: Residential Used

SZ: Statistical Zone

SR: Shared Room

TPC: Torino+Piemonte Card

TREMO: Turin Real Estate Market Observatory

# Introduction

The various types of cultural significance attributed by the contemporary generation to buildings, architectural ensembles and other historic man-made immoveable relics represent the fundamental and intrinsic values of built heritage resources. If on the one hand intrinsic values constitute the very essence of built heritage, on the other one the recognition of these values also generates economic effects. For instance, it is widely acknowledged that the attractiveness exerted by built heritage resources may particularly influence the tourism industry, with special regard to the hospitality domain; this is acknowledged also for urban contexts, especially in an era characterised by high mobility trends, by an ever growing interest towards cities and by the reinforcement of the experience economy framework. With reference to the hospitality realm, the subjects that have been usually positively affected by the presence of built heritage and other cultural and environmental resources are –for instance- hotels, bed & breakfasts, pensions and so on.

However, the spread of digitally-enabled peer-to-peer accommodations systems connecting people willing to make profitable their under-used real-estate units with users seeking for short-term rentals (hosts and guests, respectively) has recently transformed the accommodation domain. On the one hand, this implies that new, private economic actors might benefit from the attractiveness of cities; on the other one, it means that monitoring the tourist flows only through traditional channels – e.g. people staying in hotels and other registered accommodation facilities- is not sufficient anymore, since the number of people preferring to stay in private rooms or apartments is constantly increasing. Given the advantageous nightly fares generally associated to short-term rentals, peer-to-peer accommodation systems such as the leading Airbnb (www.airbnb.com) might also have the power to increase and diversify tourist flows, but at the same time to modify the liveability, the nature and the social fabric of residential neighbourhoods; possible consequences may also regard the competition with the hotel sector and the influence on the real estate and long-term rental ones, as well as an increased tourist pressure on historic centres; in fact, even though peer-to-peer accommodation systems introduce themselves as sharing economy platforms favouring the discovery and the economic development of urban portions usually out of tourists' most beaten tracks, recent empirical evidence concerning

European tourism capitals suggests that these digital intermediaries may actually favour central areas, contributing to challenge the carrying capacity of these spots and to make permanent residency unaffordable and difficult. If discourses generally referring to "historic centres" have recently started to appear not only in the news but also in the academic literature, structured reflections specifically considering built heritage resources are still lacking.

In this framework, this Ph.D. dissertation aims to analyse the built heritage context in relation to sustainable urban tourism issues and to the development of peer-to-peer accommodation systems; the research is carried out through a multiple perspective approach, as to shed some light on an emerging - and complex- economic phenomenon and to provide empirical evidence able to open up further discussion. The enrichment of the debate will be performed through the original analysis of the Airbnb accommodation landscape of Turin, i.e. a 890,000-inhabitants city located in the North-West of Italy. This context is deemed appropriate since this city has – relatively recently- started to experience a tourist growth coherent with the general increased attractiveness of urban contexts. Additionally, even though the city is now trying to diversify its tourist and economic offer, museums and built heritage resources have greatly contributed to the allure of this destination so far, making the integration of built heritage in the discourse particularly legitimate. Moreover, strategies currently pursued at the urban and regional level aim at diversifying the hospitality realm too, and in this process short-term rentals might play an important role: as a consequence, data-driven reflections on this topic may constitute additional elements that could inform future regulations and management strategies.


With the support of various types of analyses and maps, this study will specifically examine a set of variables (e.g. number and types of Airbnb accommodations, occupation rates, estimated annual revenues) by a spatial perspective, using temporal and geo-referenced data to understand not only if and how the spread of Airbnb accommodations has interested the neighbourhoods of the city that have traditionally been more tourist-oriented, but also how this phenomenon has evolved. Whereas the investigation of the supply side allows to understand how the presence of cultural heritage resources has possibly influenced the local spread of peer-to-peer accommodations - with economic consequences in terms of revenues for the hosts, competition with certain categories of hotels, development of businesses at the neighbourhood level-, the analysis of demand patterns allows to better understand guests' choices and behaviours, also in light of the vicinity of the accommodations to museums and other cultural heritage attractions.

More specifically, the integration of GIS-tools and spatial statistics into the analysis will provide evidence that spatial autocorrelation patterns between built heritage resources and short-term rentals exist, suggesting that socio-economic consequences may particularly regard areas located in the vicinity of urban spots

characterised by environmental and historic-artistic quality. Then, this thesis advances the hypothesis that the presence of Airbnb listings in specific areas of the city might be related not only to the physical characteristics of some neighbourhoods (i.e. proximity to the historic city centre and residential character of the neighbourhoods themselves) but also to the cycle of life of previously gentrified neighbourhoods and of their inhabitants; the process combining the transformation of residential units into temporary lodgings with the satisfaction of gentrifiers' new needs is defined in this work through the neologism *accommodification*.

This Ph.D. dissertation is subdivided into six chapters. Chapter 1 frames this piece of research into the academic literature focusing on evaluation theories and methods, both presenting the most widely recognized theories of value and outlining the approaches usually followed to estimate the values attributed to and generated by cultural heritage and built heritage resources in particular. Even if a great part of the attention is addressed to the economic component of value and to the methods adopted to quantify the different value components, the natural and essential starting points of the work are the assertion and description of the cultural, multidimensional and intrinsic values of heritage. After this pivotal step, the concept of heritage as a good is introduced, and the methods that measure the economic values (i.e. use-values, non-use values and externalities) of heritage resources are summarised. Given the research topic of this thesis, a special focus is devoted to the study of the externalities generated from cultural heritage resources, with particular regard to urban and cultural heritage-related tourism; due to the intersection of short-term rentals with the real estate sector, the possible effects of built heritage resources on residential units located in their proximity are also described, making reference especially to European case-studies. Then, an overview on the use of data sets concerning overnight stays as a proxy for cultural heritage-related externalities is provided, and the challenges set by the emergence of digitally-mediated accommodation systems such as Airbnb - which nowadays represents the most widespread platform of this kind- are introduced. By a methodological perspective, the chapter aims also to advocate for the introduction of spatial analyses among the approaches to be adopted to investigate the possible relationships between built heritage resources and short-term rentals. In fact, the ever growing availability of GIS-tools and geo-referenced data concerning short-term rentals and significant urban spots allows to apply also to this field of study methods that have already been used in disciplines such as geography, ecology, epidemiology and so on. The integration of the spatial component into the analysis allows to go beyond general descriptions of phenomena – as usually performed with descriptive statistics- and to ground results to the physical space, with possible consequences on interpretation, decision-making and formulation of more refined research questions.

Chapter 2 aims to systematize and to critically present the recent and ever growing body of literature about peer-to-peer accommodation systems, with particular regard to Airbnb. The complexity of a reality that links both the digital and physical dimension is presented, and the research approaches currently undertaken by the literature on the topic are overviewed. Then, an in-depth analysis of the impact of Airbnb accommodations on historic centers and parts of cities characterized by urban heritage resources is conducted, paying attention to the socio-economic consequences affecting the demand and supply side, the hotel and real estate scenario but also the social fabric and the end-use of neighbourhoods; at this stage references to gentrification processes possibly facilitated by short-term rentals are made too.

Coherently with the theoretical and methodological approaches introduced in Chapter 1, in Chapter 3 a special focus is devoted to the contributions that analyse short-term rentals in light of the location of the lodgings, not only at a global but also at a local and intra-city level. Major attention is paid to approaches that combine the elaboration of choropleth maps with the calculation of spatially-based indexes or that implement robust analyses through the application of spatial statistics, particularly by the means of ESDA- *Exploratory Spatial Data Analysis* (including LISA-*Local Indicator of Spatial Association*) techniques. In fact, the latter approaches allow to identify and express in mathematical terms spatial relationships, whereas the former allow to better interpret the distribution of short-term rentals in light of socio-economic variables and other physical characteristics of the urban landscape, such as the presence of built heritage and other cultural resources.

Chapter 4 brings the discourse a step furher, shifting the focus from description to interpretation and contextualisation in light of sustainable tourism management, socio-economic issues and urban policies. In fact, this chapter aims to summarise which are the possible and current effects related to the presence of short-term rentals in urban contexts, paying particular attention to the impacts on historic city centres of tourist-oriented cities in Europe. The first issues that are faced regard the competitiveness of short-term rentals with respect to the long-term and real estate market; secondly, the risk of competitiveness with the hotel sector is delineated; thirdly, potential connections with gentrification processes and the alteration of urban landscapes are described; fourthly, challenges concerning regulation and taxation are summarised. Starting from this framework, research questions of the work are defined, originally introducing into the debate an explicit reference to built heritage resources. More precisely, the research questions that inspire the research are the following: *a) Is it possible to identify correspondences and correlation patterns between built heritage resources and the presence of Airbnb accommodations? Which are*

*the physical and socio-economic characteristics of the areas most affected by the Airbnb phenomenon?*

*b) Does the vicinity to areas with high densities of built heritage resources affect occupation rates of Airbnb accommodations and their prices per night?*

*c) What are the possible consequences related to the presence of Airbnb accommodations in areas with high densities of built heritage resources and other urban amenities? Are short-term rentals a particularly profitable solution able to interfere with the traditional real estate/rental market? Can Airbnb be considered as a catalyst of new and/or on-going gentrification processes in areas somehow related to built heritage resources?*

Coherently with a grounded-research approach, these questions are addressed selecting Turin (Italy) as a case study. In order to better frame the case-study, Chapter 5 describes Turin under a socio-economic perspective, providing details and figures on the tourism sector and on the real-estate and long-term rental markets; at this stage, references to gentrification processes that changed the social fabric of some central neighbourhoods are made too.

Chapter 6 tries to answer to the research questions of the work through the implementation of different approaches, methods and tools: GIS-based choropleth maps, visual exploration and spatial statistics are the ways through which possible relationships between built heritage resources and short-term rentals are explored; descriptive statistics and regressions attempt to investigate Airbnb offer and demand patterns, whereas heat-maps illustrate the evolution of the Airbnb reality by a chronological and spatial perspective; comparative analyses and references to theories related to gentrification are employed to interpret the short-term rental phenomenon and explain if and why this entrepreneurial initiative may have consequences on socio-economic aspects of specific zones of the city, included the ones located in the proximity of built heritage resources.

Finally, conclusions both summarise the main findings emerged from the research and interpret the results coherently with the general frameworks outlined in the introductory chapters. In light of the main limits of the research – which are also recalled in this part- and on the basis of the new hints fostered by the results stemmed from the study, future steps of investigation are lastly suggested, as to facilitate the integration of data analysis with the urban policies and management strategies of the city.
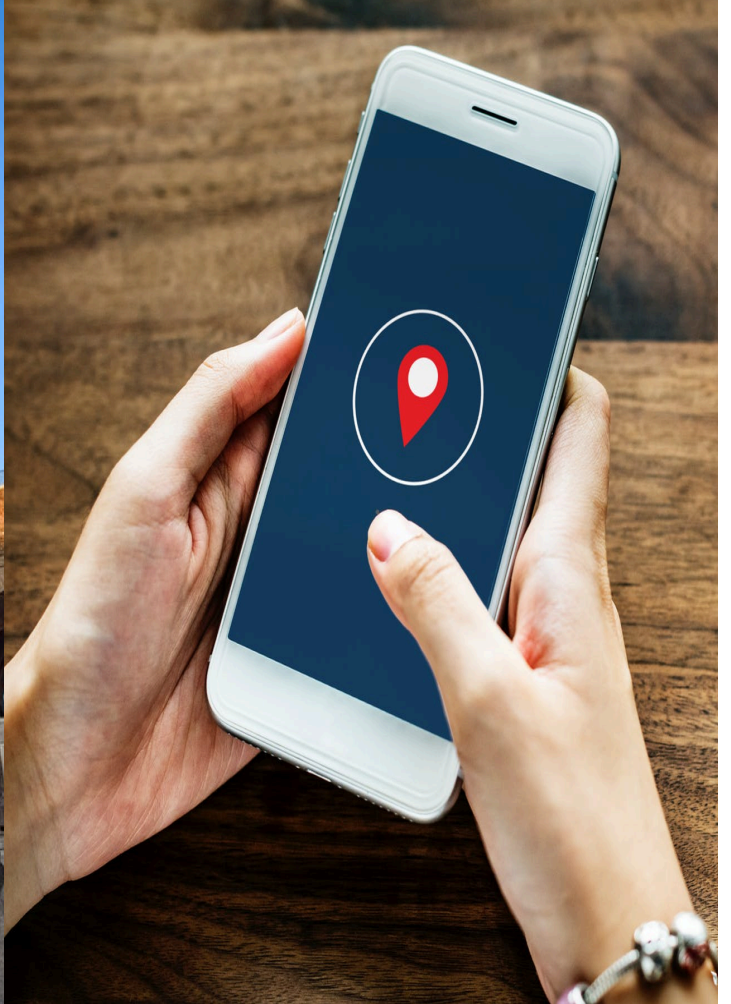
# Chapter 1

# The multiple values of cultural and built heritage resources: evaluation approaches and the need for new research perspectives

## 1.1 The cultural and intrinsic values of heritage

Cultural heritage is a complex concept that is constantly negotiated and redefined by individuals and communities of interest. Even though the steps that have progressively shaped the meaning of cultural heritage are multiple[1], and even though the debate about this topic is ever evolving, a definition that is currently shared by many stakeholders at the international and sovra-national level is the one proposed by the Council of Europe in 2005 through the means of the Faro Convention[2]. According to the definition advanced by the signatories, cultural

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[1] The rise and evolution of the concept of cultural heritage have followed different paths in different countries, and the historical reconstruction of these processes is beyond the scope of this piece of work. However, it seems important to recall at least some of the documents developed at the international level that in the last decades have contributed to the progression and diffusion of the concept. Some examples are represented - for instance- by the Athens Charter (1931), the Venice Charter (1964), the document stemmed from the 1972 UNESCO Convention, the Amsterdam Charter (1975), the Burra Charter (1982), the Nara Document (1994) and the 2003 UNESCO Convention (ICOMOS 2004). For definitions, approaches and attitudes towards elements of what is now called cultural heritage in periods preceding the reflections carried out at the international level, see -for instance- the work of prof. E. Romeo (Romeo 2007).

[2] The official name of the document is *Council of Europe Framework Convention on the Value of Cultural Heritage for Society* and it was issued by the Council of Europe in 2005 in the Portuguese city of Faro (Council of Europe 2005). Even though the concepts promoted by the Faro Convention have widely permeated the international debate in recent years, it must be noted that the convention has been ratified up to now only by a selection of countries (Council of Europe 2018). The Convention was signed by Italy in 2013 but it has not been ratified by the Parliament

heritage can be interpreted as *"a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time"* (Council of Europe 2005). Independently from the tangible or intangible nature of cultural heritage[3], it is evident that the concept of multiple values lies at the very core of its meaning. As acknowledged by the Faro Convention, the importance and the different interpretations attached to cultural heritage represent the inherent values of this resource, and actions undertaken towards heritage should never compromise these values[4].

In the broad realm of cultural heritage resources, a particular category is represented by the so called built heritage, which includes single buildings and other architectural items but also ensembles of buildings considered as carriers of certain values. Single buildings – being isolated or not- can definitely represent a form of built heritage, but especially in urban contexts it is frequent that ensembles of historic buildings are actually valued, and in some cases the value is attributed to the ensembles themselves rather than to the single buildings constituting them.

If meanings and values are multiple, the types of cultural significance that can be attributed to cultural and built heritage resources can be various too[5]. For instance, with specific reference to a cultural heritage building or site, cultural significance can be classified as belonging to one or more of the following types: aesthetic, historic, scientific, social, spiritual (ICOMOS Australia 1999) but also symbolic or related to the concept of authenticity[6] (Throsby 2005). More

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yet. Opinions expressed by some eminent Italian intellectuals about the contents of the Faro Conventions can be accessed in a recent contribution (Montella et al. 2016).

[3] The *Convention for the Safeguarding of Intangible Cultural Heritage* drafted in 2003 by UNESCO defines intangible cultural heritage as the *"practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage"* (UNESCO 2003); as specified in the document, possible manifestations of intangible cultural heritage may be oral traditions, performing arts, traditional craftsmanship, rituals, festive events and other social practices and knowledge concerning nature and the universe. A synthesis of the process that has progressively led to the recognition and protection of intangible heritage assets is available, for instance, in the article published by M. Vecco in the *Journal of Cultural Heritage* in 2010 (Vecco 2010).

[4] If the protection of the inherent values of heritage can be extended to all kinds of actions undertaken towards heritage, it must be underlined that article 10c of the Faro Convention particularly refers to economic policies.

[5] For a seminal contribution on the types of value that can be ascribed to works of art and monuments, see Riegl 1982 (first published in 1903).

[6] With regard to the authenticity value, it is important to underline that this concept is strongly cultural-specific, and that the debate about the meaning and implications of authenticity in the cultural heritage field is very lively. This concept has been particularly challenged especially after

specifically, aesthetic value is related to the formal or environmental features of a building or site, which are perceived as displaying characteristics of particular beauty or exceptionality; historic value emerges when a building or site testifies an event or a context of the past, or more generally when its meaning is interpreted and constructed considering the flow of time; scientific value may be present when a building or site is a source or object of scholarly interest. Then, social value is understood as the capacity of a place or building to benefit and bind together members of the society, or as the reflection of the rules and beliefs shared by a given community of people; spiritual value exists when individuals or communities interpret the site or building as a place that favours a sense of connectedness with the infinite, or -for instance- a religious behaviour; symbolic value refers to the power of a building or site to connect a community with concepts or events that are felt as important for the definition of the identity of that community (no matter how it is extended or defined). Finally, authenticity values are attributed to sites or buildings when they are perceived as the genuine and original expression of the creativity of a community, and/or when they present characteristics of integrity, being it physical, functional or linked to ideas and meanings.

As underlined by some authors, the typologies proposed by different disciplines and scholars vary and are inevitably reductionists or unable to describe the multifaceted and evolving nature of cultural significance (Avrami et al. 2000, pp. 7-8), but classifications are nevertheless useful to foster a critical reflection on the concept and inform policies and decisions on the conservation and management of the physical objects or places that carry those values.

Inherent characteristics are also referred to as *intrinsic values*, they do not depend on any market or financial value that they may have (Snowball 2013), and they represent the features - or attributes- that distinguish cultural heritage resources from other goods.


## 1.2 The good of heritage and heritage as a good

As mentioned in the above paragraphs, heritage is a complex concept, which is far from being immune from conflicts, being them physical, symbolical or ideological. More precisely, it could even be stated that the notion and the existence of heritage in itself is intrinsically confrontational: heritage is something that has been left, that has been inherited from the past and that has survived - under the form of memory or of a material remain- the negotiating table of history and time. Not surprisingly, the last decades have witnessed the spread of contributions focusing on the notions of contested and dissonant heritage (Bruce and Creighton 2006; Smith 2006; Tunbridge and Ashworth 1996), heritage

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the inclusion in the debate of the points of view of Eastern Asian cultures, such as the Chinese and the Japanese ones.

protection, conservation and interpretations during conflicts (Brosché et al. 2017; Frigerio 2014), heritage at risk and *thanatourism* (Light 2017; Hartmann 2014); additionally, the shifts of political balances and points of view, together with changes occurred in the interpretation of history, have contributed to the construction or the rehabilitation of new heritages. However, when considering values, the values that are generally attributed and associated to heritage in the common discourse are positive, and in many cases cultural heritage resources are interpreted and lived as a good and enriching element, that can contribute to the construction of the identity and of the wellbeing of society.

What matters in a discourse on the values of cultural heritage is not only the positive and "good side" of it, but also the concept of heritage as a good: in fact, this is fundamental not only to better understand its meaning, but also to reflect on the methods that can be used to assess its economic value. First of all, the concept of heritage as a good can not be taken for granted: in fact, up to the 1970s, environmental and cultural heritage resources such as monuments, archaeological sites, historic buildings, etc. were considered neither as goods nor as an object of economic measurement, since they were deemed unlimited and not linked to a real use, thus not meeting the characteristics that define a good in economics (i.e. not being unlimited and having an utility and use). Since the 1970s, this view has changed instead, and environmental and cultural heritage are now considered scarce resources that have utility and which are thus considered economic goods subject to valuation (Coscia and Fregonara 2004, p.9). More specifically, environmental and cultural heritage resources are generally considered public goods, since they present the following characteristics: they are non-excludible and non-rival. They are defined as non-excludible because it is generally unfeasible to exclude users from their enjoyment: if the degree of non-excludability may depend on the nature of the good - e.g. portable objects such as works of art can be practically subtracted from collective enjoyment even if they have a public status-, the principle of non-excludability particularly applies to the built heritage, especially to its external features. In fact, as underlined by some authors, it would be difficult to subtract from the enjoyment of people or certain groups of people the view of a façade of a building, especially when located in living parts of cities (Navrud and Ready 2002a). Additionally, even if the exclusion would be possible in theory, the costs that would be attached to this operation would be probably higher than the benefits stemming from it (Stellin and Rosato 1998).
Then, they are non-rival in consumption because they can be enjoyed simultaneously by several people, without a deterioration of the quality of the enjoyment; additionally, the enjoyment experienced by multiple subjects actually increases the value generated by the cultural good. As for non-excludability, some degrees of non-rivalry exist: in fact, when phenomena of congestion possibly compromising the quality of the enjoyment or the conservation status of the

cultural heritage goods may take place (Peacock 1995), some measures to regulate access - e.g. entry fee, maximum capacity rules- may be implemented (Navrud and Ready 2002a). Given these limitations and the possible coexistence of different degrees of non-excludability and non-rivalry, cultural heritage resources are thus also defined as *impure/mixed public goods* (Stellin and Rosato 1998), in order to distinguish them from "pure" public goods perfectly meeting the principles of non-excludability and non-rivalry (Scheme 1). Additionally, as in the case of building façades and historic urban tissues, mixed public goods can also be represented by privately owned goods that nevertheless present a public component of value, i.e. by goods for which it is difficult to separately treat the private and public components of value (Coscia and Fregonara 2004, p. 19).
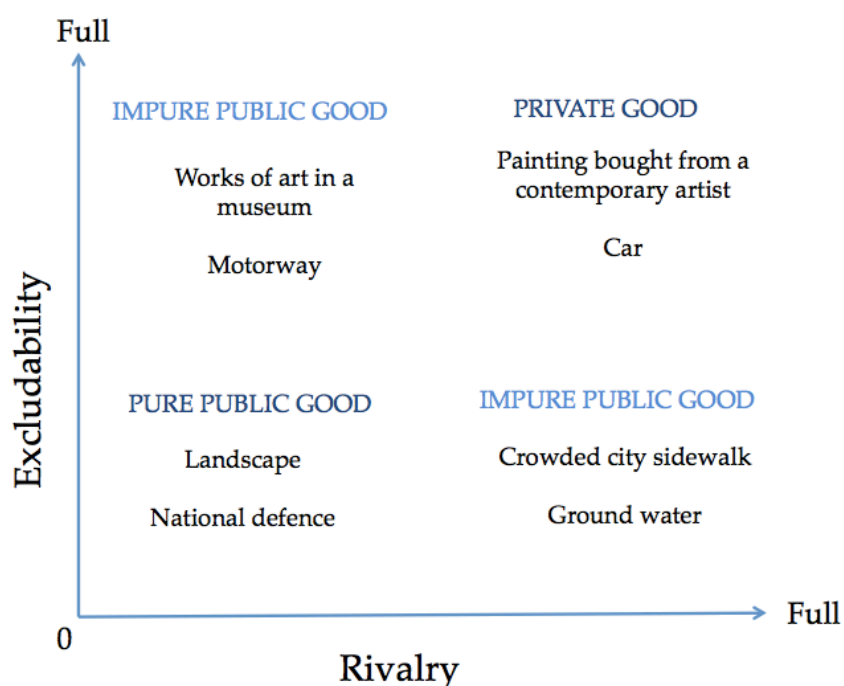


**Scheme 1.** Characteristics of private goods, public goods and impure public goods
(Author's elaboration on concepts reported in Stellin and Rosato 1998
and Navrud and Ready 2002a)

In light of its inherent values, cultural heritage is also frequently considered as a *merit good*[7] (Koboldt 1997; Musgrave 1987 in Peacock 1995), i.e. a good that presents particularly meritorious characteristics and it thus needs to be supported and regulated by an external authority such as the State, regardless of the preferences and the costs that single individuals would or could be able to spend to enjoy it (Coscia and Fregonara 2004, p. 20). In fact, cultural heritage resources

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[7] As underlined by M. Mazzanti (2002), the concept of merit good and of cultural heritage as a merit good is not accepted by all authors. In fact, some argue that the concept of merit good is political in nature, and that therefore it should not be considered as an element of discussion in the field of microeconomics.

are usually unique, non-reproducible goods that do not satisfy primary needs and that do not follow regular market rules described by traditional supply and demand curves: since transactional costs would be too high, they would not be associated to a concrete demand, and they thus represent a market failure; as a consequence, they require the corrective intervention of an external actor (Coscia and Fregonara 2004, p. 20). Additionally, at the core of the definition of merit goods there is the concept of information deficiency (Duffy 1992 in Mazzanti 2002): in fact, single individuals may or may not be aware of the benefits stemming from the encounter with the good, and experts or an authority such as the State take responsibility for deciding what is good and beneficial for individuals, thus intervening with subsidies and other policies in order to support the existence and the use of the good itself (Sirchia 2000b, p. 27)[8]. This implies that to some extent individuals demand their consuming decisions and preferences to others, in opposition to traditional microeconomic approaches that assume that individual preferences regulate the market.

If on the one hand cultural heritage resources may not have a market value, on the other one they nonetheless present a multi-faceted economic value, which will be explained in the following paragraph.

## 1.3 The economic values of cultural and built heritage resources: use-values, non-use values and externalities, between tangible and intangible

If on the one hand cultural heritage resources are undoubtedly defined by their intrinsic cultural characteristics and by the meanings that communities attribute to them in given contexts (Cerreta et al. 2014), on the other one it must be stated that it is now widely recognized that cultural heritage - given its status of good-present economic values, too. Whereas cultural value is qualitative in nature, the economic value concerns the utility, the price (e.g. *willingness to pay*) and the importance that subjects (such as individuals or the markets) attribute to the good considered (Throsby 2005; Severino 2011). As highlighted by David Throsby, one of the leading scholar in the domain of cultural economics[9], the economic value can be decomposed into the following components:

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[8] The intervention of the State is justified not only considering the present generation, but also the following ones: in fact, it is acknowledged that the current generation usually values the benefits stemming from the present use of resources, whereas it does not take into sufficient consideration (i.e. it underestimates) the benefits that should be enjoyed also by future generations. In this framework, the State and its branches thus function as public actors safeguarding intergenerational interests (Sirchia 2002a, p. 9). The concept of intergenerational interest and value will be better explained in the following paragraphs.

[9] David Throsby is currently Distinguished Professor of Economics at Macquarie University (Sydney, Australia). He is considered as one of the founders of the disciplines known as Cultural Economics and Economy of Culture. Considering the Italian framework, a special tribute must be

- *use values*: they represent the benefits that are enjoyed by the subjects that directly experience the cultural good and/or the services enabled by the cultural good (e.g. benefits perceived by residents, excursionists and tourists visiting a cultural heritage site);

- *non-use values*: they represent the value that is attributed to a cultural good by a subject, even if that subject has not directly experienced that good yet or she/he will never experience it. More particularly, non-use values can be subdivided into:

    - *existence value*: the value that is attributed by a subject or a community to the mere existence of a cultural good, even if that good will never provide direct benefits to those subjects (i.e. people value the existence of a given cultural heritage item, even if they will never experience direct benefits stemming from its existence); generally speaking, existence value tends to be greater for goods that present characteristics of either rarity or uniqueness (Stellin and Rosato 1998, p. 11);
    - *option value*: the value that is recognized to a good when people do not exclude that the cultural item will be directly experienced by them or by their children or by others in the future; it can also be conceived as an "insurance premium" that people adverse to risk would pay to guarantee the availability of the good in the future (Stellin and Rosato 1998, p. 10; Pearce and Moran 1994);
    - *bequest or intergenerational value*: the value that is assigned to a cultural good in light of its transmission to future generations.

Coherently with their nature (i.e. being non-excludible and non-rival goods), built heritage resources are also interlinked with *externalities*, which represent the effects and spillovers that are generated from the existence of a cultural good and that are able to affect other economic actors. For instance, the enhancement of the conservation state of a building characterised by architectural and historical values, as well as the improvement of the related cultural offer, may generate significant positive externalities, also in the context of urban regeneration projects (Manganelli 2007).

The different use and non-use values listed above all contribute to the definition of the Total Economic Value (TEV) of a heritage asset (Scheme 2). Using a different terminology, it is possible to state that the TEV concept accounts both for the tangible and intangible values of a heritage asset; in fact, with specific reference to built heritage resources, it takes into account both the use-values and externalities related to the encounter with the resource and a variety of non-

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paid to Walter Santagata, professor of Cultural Economics at the University of Turin until his sudden death in 2013.

use/independent from use values, which are equally -or even more- related to the intangible values associated to the resource itself.
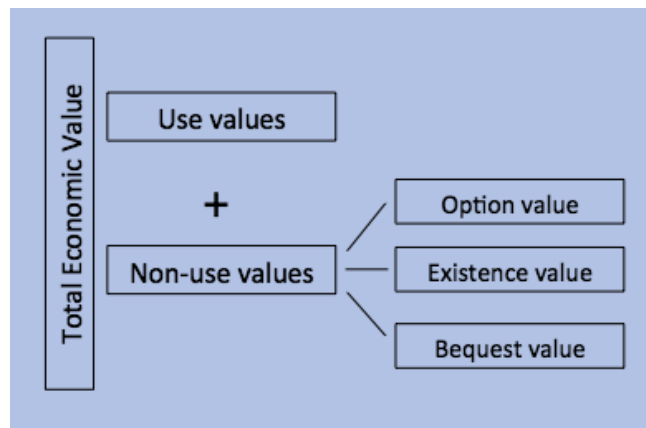


**Scheme 2.** The Total Economic Value framework
(Author's elaboration on concepts described in Throsby 2005)

With reference to the *use-values* component, it can also be added that some scholars (see, for instance, Sirchia 2002b, p.22) prefer to apply a further distinction, separating *direct use values* (e.g. visits *in situ*) from *indirect use values* (e.g. fruition through the media), often accompanied by a further articulation of the profiles of users / potential users of these assets, such as - for example- direct, indirect, potential and future users (Coscia and Curto 2017). Some authors operate further distinctions, e.g. classifying as *passive use* the incidental enjoyment that may arise -for instance- from the encounter with a monument or a façade of a building by pedestrians (Throsby 2002, p. 52); in this case, this benefit is also defined as a positive *externality*: however, the literature highlights that a translation into monetary terms of this type of benefit is usually not performed, since it is difficult both to identify the populations of beneficiaries and to quantify the amount of money that they would be willing to pay to protect/enjoy the cultural resource (Throsby 2012, p. 52). About this point, it is possible to anticipate here that TEV is frequently investigated measuring people's willingness to pay (WTP) for the conservation and/or enhancement of the cultural heritage resource under study (see par. 1.4.1), since this approach is able to capture both use and non-use values. *Indirect use values* may be referred to as positive externalities too, as in the case -for instance- of the influence exerted by built heritage resources on real estate prices of residential properties located in their proximities (Rosato 2008); in fact, it is known that real estate properties are affected by environmental externalities, which are incorporated into market prices (Del Giudice et al. 2017).

*Non-use values* are linked to possible future use (*option value*) but they can also be inspired by altruism and benevolence towards other human beings and perspective generations (*existence value* and *bequest value*), as well as by ethics and the pleasure that is obtained when other people's preferences and needs are

satisfied; however, what matters most is that non-use values too depend on the intrinsic values attributed by people to the good itself.

As underlined by academics (Sirchia 2002b, pp. 21-22), the TEV concept developed in the late 1980s-early 1990s in the realm of environmental economics and in the framework of sustainable development (Pearce and Turner 1990; Pearce and Moran 1994), and it advanced in an innovative way that the utility of a resource is not necessarily linked to its direct use but rather to its maintenance throughout time, and maintenance is justified right in light of the intrinsic value attributed to the good itself. As a consequence, it is evident that the concept of intrinsic value lies at the very core of the TEV approach. Overall, TEV can be defined as the sum of all benefits obtained from a resource (Sharp and Kerr 2005), and this framework tends to firstly identify value components and then to translate and express them into monetary terms. For instance, the total use value engendered by a given cultural heritage resource (e.g. building or site) over a given period of time is frequently calculated on the basis of the entry price paid by visitors (Throsby 2012); in the event that the heritage site entails the provision of services or some sort of commercial exploitation (e.g. cafés, gift shops, etc.), revenues stemming from these activities are usually included among benefits too (Throsby 2012).

When discourses on values are applied to decision-making processes that regard hypothesized projects and interventions focused on cultural heritage, the Complex Social Value (CSV) theory - which considers as a fundamental value component the intrinsic values attributed by communities to environmental and cultural heritage resources- (Angrisano et al. 2016) may be taken into account too. In the CSV lexicon, the term "intrinsic values" is frequently employed as a synonym of values that are independent from the use of the resources, whereas the form "extrinsic values" is applied when referring to use-values (see Fusco Girard 1992, p. 157).

As explained by scholars, *"the Complex Social Value of a resource can be defined as a combination of its different economic values and its 'intrinsic value', that can be deduced from the knowledge relating the role of this resource in a specific social/cultural/institutional context"* (Angrisano et al. 2016, p. 169). In other words, CSV incorporates the notions of use-values, non-use values and intrinsic value explained above, but it particularly stresses the accent on the social value of heritage, on the collective meaning-making process performed by communities with regard to heritage and also on the role played by cultural heritage resources in specific social, cultural or institutional contexts. More specifically, CSV *"is determined by the values of the community itself and by the capability of an asset to satisfy them, by its characteristics, that is, by its ability to generate benefits in the different dimensions considered (economic, environmental, social) for direct, indirect, potential and future users"* (Angrisano et al. 2016, p. 171).

Apart from the focus on the social dimension of value, the main difference occurring between TEV and CSV is represented by the means through which the

value components are expressed. In fact, TEV tends to quantify both use and non-use values in monetary terms, whereas CSV expresses the different value components coherently with the nature (e.g. quantitative and/or qualitative) of the components themselves. This means that the value components are not necessarily expressed through monetary terms but -for instance- through weights and indexes, instead (Cerreta and Mele 2012; Coscia et al. 2018d). In other words, it can be stated that the CSV approach thus inspires a multidimensional evaluation, where the goal is not to maximise the economic utility but a set of identified elements and criteria. The result of the process is thus not a single index but it rather stems from quantitative and qualitative analyses that are usually expressed in cardinal terms and then –all together- in ordinal terms (Fusco Girard 1992).

In light of its intrinsic values, cultural heritage can represent an economic driver too. In fact, the economic value of cultural heritage and its potential of being an important economic resource have been acknowledged not only in the academic field but also by heritage practitioners, authorities and by international conventions on the protection, valorisation and management of heritage. For instance, the above mentioned Faro Convention recognizes the potential of cultural heritage as a factor for sustainable economic development, and in order to make full use of this potential signatories have committed to: a) raise awareness on the economic potential of cultural heritage and utilize it; b) consider the interests and the specific character of cultural heritage, when deciding economic policies; c) ensure that these policies respect the integrity of cultural heritage without compromising its inherent values (Council of Europe 2005, art. 10).

In general terms, it is also acknowledged that cultural heritage resources can activate economic development processes not only with reference to the cultural sector, but on a more general level. In fact, supply chains related to cultural heritage are multiple: for instance, they may include publishing, design and building activities, logistics, communication and cultural production, restoration and applied researches on heritage, but also satellite activities related to tourism, education and enjoyment of heritage (Tarasco 2006). More particularly, the supply chains that are activated depend not only by the nature of the cultural resource, but also by the types of services that generate from the cultural resource in itself.

However, a peculiarity of built heritage - which includes buildings and other architectural items that are considered as particularly valuable for their architectural quality and aesthetics, their ability to testify and transmit the craftsmanship and genius of past generations, their connection to historic events or characters, or for other reasons related to one or more of the possible intrinsic values mentioned in previous paragraphs- is that it is usually not excludible for what concerns at least its exterior components, and -as anticipated above- it is thus particularly likely to generate effects on its surroundings and on the subjects encountering it. For instance, among the sectors that may be activated or at least affected by the presence of built and cultural heritage resources, one of the most important is tourism (Tarasco 2006), which combines the economic levers with

the objective of maintaining and transmitting the *genius loci* of the territories (see par. 1.7).

## 1.4 Estimating the value of cultural and built heritage resources: evaluation methods

The rise of the importance and of the application of evaluation methods devoted to the assessment of environmental resources -such as the natural and the built heritage- was already acknowledged by scholars at least 20 years ago, and the causes of this methodological boost have been identified by some authors both in the growth of the qualitative and quantitative demand of tourism and in the extension of the sensibility towards the scarcity - and consequently the conservation- of natural and cultural resources (Stellin and Rosato 1998), which are considered not only as factors activating development but also related to the wellbeing of society (Stellin and Rosato 1998; Mazzanti 2003). Another cause that has triggered the advancement of evaluation methods has been the emergence of concepts such as sustainability and accountability. In fact, the enduring scarcity of economic resources has progressively challenged both cultural heritage institutions and authorities responsible for the protection, conservation and management of cultural heritage, which are now struggling in identifying the right priorities and are competing for the needed resources (Ready and Navrud 2002a). Additionally, they are now invited to demonstrate the impacts that cultural heritage resources and institutions have on society and on the context they are located in. Evaluation practice has thus become an essential instrument for the implementation of sustainable public policies, and nowadays evaluation methods do not aim only to estimate the value of cultural heritage through methods that translate in monetary terms non-market values, but also to estimate the added value engendered by the existence, conservation and *mise en valeur* of cultural heritage assets. The methods progressively developed to estimate different aspects of value assigned to cultural heritage assets are usually subdivided into stated preferences and revealed preferences techniques (Coscia and Vycpalek 2008).

Stated preferences techniques evaluate and estimate the value of hypothetic future scenarios (usually entailing a change with respect to the present status) through the investigation of the opinions and preferences declared by a sample of stakeholders; investigations may be carried out through different forms (e.g. face-to-face, phone-interviews, etc.) and are usually conducted with the support of a pre-defined set of questions. Revealed preferences techniques perform economic valuations and evaluations on the basis of effective people's behaviours instead; more precisely, these techniques analyse substitute markets - i.e. markets that may be affected by the value of the cultural heritage resource under study- to estimate the non-market value component of heritage and heritage-related assets (Mazzanti 2003, p. 90).

### 1.4.1 Stated preferences techniques

*Stated preferences techniques* are often implemented with regard to the cultural heritage sector because they are able to capture both use and non-use values, also in the cases when a real demand curve does not exist (Mazzanti 2003). In fact, stated preferences techniques usually investigate hypothetic scenarios and their implementation does not depend on the actual attendance of the cultural heritage sites under study but it is based on the opinions and preferences expressed by participants (who might value a certain hypothesis for its use but also non-use values). The most important techniques belonging to this category are the contingent evaluation method, the conjoint analysis methods, focus groups and the Delphi technique (Mazzanti 2003).

*Contingent evaluation* is a very well-established approach that aims at assessing the value of a proposed change in the present status (e.g. enabling access to a heritage site, supporting conservation works of a heritage building, etc.) and/or at identifying the most valued options through questions that ask participants to express their willingness to pay (WTP) for the proposed change/changes[10]. In some cases a variant may be applied, i.e. asking participants how much they would be willing to accept (WTA) to renounce to a given good or benefit (Throsby 2005, p. 122)[11]. Through statistical and mathematical methods, results stemmed from the involvement of a representative sample are then extended to the number of individuals and/or households that are estimated to be possibly affected by the change, as to obtain a number indicating in monetary terms the overall value of the change and/or of the good. The limits of contingent evaluation are multiple[12], but nevertheless it is still widely used by practitioners and researchers; moreover, it is also frequently applied in a predicting way, as to estimate hypothetical demand curves and economic sustainability of cultural

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[10] As anticipated, the research can be conducted through different modalities (e.g. by mail, on the phone), but up to now experts have recommended to perform face-to-face interviews. At this stage, web-based and interactive approaches could probably be experimented too. On the basis of the characteristics of the project and the research objectives, WTP amounts can take the form of taxes, donations or other forms.

[11] However, the WTA option is not very frequently suitable for public goods.

[12] An important limit concerns the hypothetical nature of the scenarios proposed to participants; then, some people may not state their real WTP either because they are aware that they would unlikely be excluded from the benefits stemming from a public good (free rider problem) or because they fear that their answers would lead to worsening conditions (e.g. tax increase, establishment of fees, etc.). Additionally, partial information provided to participants and a poor research design may compromise the reliability of results too. A further limit is represented by the fact that case-studies and associated scenarios are frequently presented singularly, i.e. without making reference to other possible causes that the participants could desire to sustain: as a consequence, the sum of the WTP amounts declared by a participant for different projects could either exceed the sum that the individual would pay for the conservation of cultural heritage in general or be financially unsustainable (Throsby 2005, p. 123). For a detailed analysis of the limits, corrective procedures and question options linked to the contingent evaluation method, see, for instance, the contributions of M. Mazzanti (2003) and M. Bravi and R. Scarpa (2000).

heritage-related initiatives.

*Conjoint analysis methods* originally developed in the marketing sector, but they have started to be adopted also with reference to the cultural heritage sector since the late 1990s. These methods interpret cultural heritage resources as multi-dimensional and multi-attribute goods, and they aim to evaluate the preferences expressed by participants for single attributes/ for changes occurring with regard to one or more attributes (Mazzanti 2003, p. 101). As underlined by scholars, the basis of this approach is K. Lancaster's micro-economics theory (Lancaster 1966), which assumes that consumers perceive a good as formed by a vector of characteristics that provide a certain degree of satisfaction and that can be expressed through shadow prices (Mazzanti 2003, p. 102).

*Focus groups* and the *Delphi technique* are approaches presenting a more qualitative nature, and they aim to address in detail specific research questions either alimenting a discussion on a given topic with a limited amount of stakeholders (in the case of focus groups) or obtaining opinions from authoritative subjects or experts in the field (Coscia et al. 2019).

## 1.4.2 Revealed preferences techniques

*Revealed preferences techniques* include – among the others- the travel cost method, the discrete choice method and the hedonic price method instead. In brief, the *travel cost method* is especially used to estimate the recreational value deriving from the fruition of the cultural good and it is based on the recording and analysis of the costs performed by visitors when attending the site; the data considered refer to the behaviours declared by the visitors participating to the research (Mazzanti 2003, p. 91). Due to its intrinsic characteristics, this method is able only to capture the direct use values associated to the good and it can be performed only ex-post. The *discrete choice method* estimates the value of a visit to a given cultural heritage site calculating the probability that it is visited, when other alternatives are present. The method entails to propose to participants to select an option between two or more alternatives (e.g. visiting a cultural heritage site, going to the cinema, visiting an alternative cultural heritage site or a certain museum…), progressively changing the options presented. The assumption underlying the method is that people, when confronted with a discrete set of alternatives, make rational choices that maximise the utility related to the choice. Then, a further approach is the *hedonic price method*, which is widely applied for its versatility. As for the conjoint analysis method, the underlying assumption of this approach is K. Lancaster's micro-economics theory (Lancaster 1966); in general terms, hedonic price techniques aim to isolate the effect that different qualities of a good have on values, expressing them in monetary terms. With reference to the cultural heritage sector, the method can for instance be applied to

quantify the values attributed by people to different aspects of the visit to a cultural heritage site, but it can also be used to estimate the value of living in a building considered as built heritage (e.g. purchasing price of a residential unit located in a historic building) or even to calculate the value of living in the proximity of a cultural heritage site or of another significant spot (e.g. purchasing price of a residential unit located in the proximity of a baroque church). Even though the *hedonic price* approach can indeed be used to estimate the value of private goods, it is particularly suitable to estimate the value of public goods that do not present a market: though the analysis of substitute markets – i.e. markets that are influenced by the cultural heritage resource under study- it estimates the value of the cultural non-market component of the asset (Mazzanti 2003, p. 90). As highlighted, the method is widely applied to the real estate sector: when applied to the real-estate context (e.g. a residential unit located in proximity of a built heritage resource), the hedonic price approach *"attempts to identify the different components of a property and each component's contribution to the overall property value"* (Rypkema 2012, p. 114). For the versatility of its application and the relevance that it will assume for this research, the hedonic price method will be analysed in more detail in the following paragraphs.

### 1.4.3 Estimating revealed preferences through the hedonic price method: variables and regression models

Coherently with K. Lancaster's micro-economics theory (Lancaster 1966), an important step for the estimation of the single value components and of their contribution to the overall value of a given good is the identification of the attributes (i.e. variables) of the good itself. In the real estate sector, the types of variables that are usually taken into account are categorised into *intrinsic characteristics* and *extrinsic characteristics* (Rosasco 2010; Morano 2001; Curto et al. 1992)[13]. Some of the variables that can be considered as intrinsic characteristics are, for instance, the number of bedrooms, the number of bathrooms, the square meters/feet of the residential unit, the number of garages, the presence/absence of facilities such as the lift, the swimming pool, the garden, etc.; then, other characteristics related to the history and architecture of the building (such as the age of the property, the construction period, the architectural

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[13] On the basis of a literature review performed on case-studies mainly published in Italian and international journals, P. Rosasco (Rosasco 2010, p. 74) identifies eight different groups of variables, related to: location, local environment, dimensions of the unit, building characteristics, functional systems, finance and economy, market trends and type of subjects and conditions involved in the purchasing process, and "others". With particular reference to location-related variables, they can refer to the place where the residential unit is located (e.g. urban/extra-urban area, neighbourhood, etc., according to the aims of the study) but also to the distance from certain externalities (e.g. parks) or services. Environmental variables can refer to the environmental quality of the area but also to socio-economic conditions, such as poverty index, criminal rates, etc.

style), together with the conservation state and the overall condition of the building are intrinsic features too. Extrinsic characteristics are for instance exemplified by the location of the property and by the environmental conditions (e.g. level of noise, crime rate, density of shops and services, availability of public transports in the vicinity, etc.) of the area/neighbourhood in which the property is located (referred to as *microintorno* in Italian language). These aspects are usually of particular importance, since a great part of the value may come exactly from the surrounding context. In this framework, the distance from the city centre or from other significant points and the proximity to built heritage resources can be accounted for too; in this case, the presence of built heritage resources act as factors possibly influencing the values of the properties considered in the study. With specific reference to the Italian context, the location variable is frequently expressed considering the Microzone in which properties are located in (Rosasco 2010, p. 88); as known, Microzones present homogeneous urban characteristics and they identify specific segments of the real estate market, as prescribed by the DPR 138/98[14] (Curto et al. 2005).

As a general guideline, the variables adopted should depend on the availability of relevant data but also on the variables that could be more significant in the market area under study (Rypkema 2012, p. 115). The instrument that is used to calculate and express the contribution of each characteristic of the product to its overall value is the *regression*. In mathematical terms, regression models aim to describe and explain through a function the relationships existing between a certain number of explanatory variables (independent variables or predictors) and the response variable (dependent variable), which in the real estate sector is usually constituted by the price of the residential unit or of the goods considered (Rosasco 2010, p. 35)[15].

Regression can be performed between two or more variables, and the formula that expresses the regression function is the following[16]:

$$y = f(x_1, x_2, \ldots x_n) + \varepsilon \qquad (1)$$

where:

$y$ = dependent variable (e.g. overall value of the residential unit)

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[14] The contents of the DPR (Decreto del Presidente della Repubblica) 138/98 are available at : http://def.finanze.it/DocTribFrontend/getAttoNormativoDetail.do?ACTION=getSommario&id={ CE130656-7850-4531-9B95-F17CC19790C4}.

[15] Prof. P. Morano (Morano 2001, p. 19) defines the regression model as *synthetic* (since it operates through the direct comparison between the object of the estimation and analogous goods), *quantitative* (since it considers both quantitative and qualitative variables, but it expresses them all in quantitative terms), *uniequational* (given that it describes the analysed phenomenon through a single equation), *monoparametric* or *pluriparametric* (depending whether it performs the comparison considering either one – as in the simple regression- or more parameters –as in the multiple regression-), *probabilistic* (since the function contains both a deterministic component and a stochastic one).

[16] The functions and explanations presented in the present and following paragraphs are based on the descriptions available in Rosasco 2010, pp.36-62 and Morano 2002.

$x_{1,2,...}$ = independent variables contributing to the overall value of the unit under study

$\varepsilon$ = casual error

*f(x)* represents the deterministic component, whereas $\varepsilon$ is the stochastic/casual component that considers all the factors that do not allow to the above mentioned relation to be a perfect mathematical function (Rosasco 2010).

When a *j* number of observations is made (where *j*= 1, 2,…k), the system of equations can then be expressed through this concise form:

$$y_j = f(x_{j1}, x_{j2}, ... x_{jn}) + \varepsilon_j \tag{2}$$

Equations describing the relations existing between the variables can be either linear or non-linear. In the case of linear models, when the independent variable considered is only one (*simple regression*), the function can be represented in geometric terms as a line (where $b_0$ is the intercept and $b_1$ the angular coefficient) and it assumes the following form:

$$y_j = b_0 + b_1 \cdot x_{j1} + \varepsilon_j \tag{3}$$

In other words, the function can be interpreted as the line that best approximates the distribution of the data linked to the available observations. The approach that is used to identify the function of the line that best approximates the value of the observations is the ordinary least squares method (OLS), which selects the line that minimises the sum of the squares of the differences between the observed values and the ones estimated/predicted by the function.

In the case of multiple independent variables (*multiple regression*), the function assumes the following form instead:

$$y_j = b_0 + b_1 \cdot x_{j1} + b_2 \cdot x_{j2} + ... + b_n \cdot x_{jn} + \varepsilon_j \tag{4}$$

In this case the OLS method is applied too, and then the validity of the model needs to be verified checking to what extent *a)* the used variables are collinear, *b)* the found parameters are significant and *c)* the model presents goodness of fit[17]. More precisely, the goodness of fit is expressed through the R squared (in the case of simple regressions) and the adjusted R squared (in the case of multiple regressions), which can assume a value between 0 and 1 (where 0 indicates that the model is not able to explain the relationships between the dependent variable and the independent variables, whereas 1 indicates a perfect explanatory power of the model). The selection of the variables to be introduced in the model can follow the rules of the *step up selection* (independent variables are progressively

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[17] For a detailed description and the mathematical formulation of these concepts, see Rosasco 2010.

introduced one after one in the model, starting from the one that manifest the highest correlation coefficient with the dependent variable), *step down selection* (each independent variable is progressively eliminated from the equation, starting from the one that manifests the lowest correlation coefficient with the dependent variable) or of a combination of the two (*stepwise regression analysis*).

Generally speaking, variables can be either *quantitative* (i.e. expressed through values referring to a continuous scale, such as square meters) or *qualitative*. Qualitative variables can take the form of *categorical, ordinal* or *dummy* variables. Categorical variables imply that the variable under study can be described with two or more categories, but these categories do not have an intrinsic ordering; ordinal variables present categories that can be ordered instead (e.g. 1= sufficient conservation quality of the building, 2= good, 3= very good); dummy variables are also defined as dichotomous (i.e. only two categories are present) and they frequently indicate the absence (=0) or presence (=1) of a characteristic (e.g. presence/absence of the elevator). In order to simplify the regression model, some quantitative variables can alternatively be expressed under the form of a dummy variable (e.g. establishing that 1 or 0 is assigned depending on whether a certain condition is respected or not)[18].

When working on the model, the presence of *outliers* (i.e. of anomalous data that present a low or non-existent degree of similarity with the other observations included in the study) needs to be considered too: in fact, their presence may alter the descriptive and explanatory power of the model, since they may highly affect the coefficients of the regression equation (Rosasco 2010, p. 55; Morano and Tajani 2014). Outliers can be mainly identified graphically (when performing simple regressions, which can be visualised on a Cartesian plane) or analytically (especially in the case of multiple regressions, when the number of independent variables considered does not allow to visualise the relationships on a Cartesian plane), and it can be decided to exclude them from the model, if deemed appropriate[19].

During the process that leads to the finding of the model that presents the best goodness of fit (i.e. the highest adjusted R squared), linear models are usually

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[18] As recalled by P. Rosasco (Rosasco 2010, p. 53), a frequent example is represented by the conversion of distances in dummy variables: for instance, if a building is located below a certain distance from a given landmark the value 1 is attributed, whereas if it is located above that distance the value 0 is attributed.

[19] For the application of robust methods for the detection of outliers see, for instance, the contribution of P. Morano and F. Tajani (Morano and Tajani 2014). As underlined by the authors, the detection and/or removal of outliers is a very sensitive issue, since also the improper elimination of good cases from the analysis can lead to unreliable results. As noted by the authors, *"it does not make sense to decide the elimination of a data just because the regression model shows better performance. In this way, it is likely to eliminate good cases without any reason"* (Morano and Tajani 2014, p. 108); as a consequence, before cleaning the data set, it is recommendable to investigate the cause of the anomaly and check the effects on the regression model that result from their elimination.

elaborated first, since they result to be simpler and more easily understandable and interpretable. However, some phenomena might be better explained through non-linear models (e.g. with a multiplicative, exponential, logarithmic or power function): this happens when the independent variable affects the dependent variable in a way that is more than proportional or less than proportional of the variation concerning the independent variable. In practical terms, the best model is found trying firstly the linear model and then the non-linear models, finally selecting the one that presents the highest adjusted R squared value.

## 1.5 A specific application: the effects of built heritage resources on urban real estate values

Generally speaking, built heritage resources are usually considered a type of urban amenity contributing to the quality of the environment and to the appeal of an urban area[20]; additionally, these resources may also have the power to attract other facilities such as restaurants, cafes and shops but also high-skilled high-income workers and professionals, with the consequence of possible knowledge-led spillover effects (Koster and Rouwendal 2015) but also social segregation problems (Koster et al. 2013; Rypkema 2012). Overall, it is thus commonly acknowledged that historic buildings, cultural amenities and the general "historic-cultural ensemble" affect the attractiveness of different areas of cities and consequently real estate prices (Nijkamp 2012)[21] (Figure 1).

However, given the frequent co-existence in the same place of both historic amenities and various types of facilities and economic activities, it can not be excluded that the correlation between the presence of built heritage resources and house prices is spurious (Koster and Rouwendal 2015). In fact, as noted by scholars, an area may be particularly attractive because subjects have progressively decided to work/reside there, implying that *"identifying spatial*

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[20] E. Glaeser and colleagues (Glaeser et al. 2001) identify four main types of amenities: a rich variety of services and consumer goods; aesthetics and physical urban setting, together with weather; public services and finally "speed", which could be expressed also as ease of mobility. According to the authors, the presence of amenities is fundamental for urban and economic growth. Then, a contribution by J.K. Brueckner and colleagues (Brueckner et al. 1999) classifies amenities into *exogeneous* and *endogenous* amenities. *Exogeneous* amenities can be either natural (e.g. pleasant topographical features such as a river) or historical (e.g. well-preserved buildings from the past, museums, monuments, etc.); *endogeneous* amenities reflect the current economic state of a city instead (e.g. gyms, upscale restaurants, shops, etc.), and they can also be defined as "modern". These authors too identify a connection between the presence of amenities and high income residents.

[21] The contribution elaborated by economist Peter Nijkamp (Nijkamp 2012) presents a synthesis of the main articles devoted to the influence exerted by built heritage on real-estate prices. However, coherently with what already underlined by other authors (see, for instance, Ahlfeldt and Maennig 2010), the great majority of the studies cover U.S.A. and other non-European contexts. This suggests that it would be recommendable not only to conduct studies on different contexts, but also to adopt spatial econometric methods and share results through academic channels and journals recognized at the international level.

*externalities in the data requires an exogeneous source of variation in the attractiveness of a location"* (Rossi-Hansberg et al. 2010, p. 486).



**Figure 1.** Historic-cultural ensembles increase the attractiveness of urban areas
and positively affect real estate prices
(*Source*: https://pixabay.com/it/roma-spagnolo-passi-monumento-2294191/)

In order to overcome this limit, two scholars from the Netherlands have recently assessed the influence of historic amenities on real estate prices correlating the magnitude of subsidised investments in historic amenities registered nationwide in the Netherlands in the period 1985-2011 with changes in residential real estate prices occurred in the same period and in the same areas; as stated by the authors, the study has taken into consideration a large dataset, since around 70% of all house transactions have been included in the analysis[22]. According to the authors, since this approach accounts for an element of change (the subsidised interventions) that concerns historic amenities, it should be considered more reliable than traditional approaches that do not isolate built heritage resources from other amenities in estimating the effect of historic resources on local real estate markets. More particularly, the two authors have tried to analyse both the direct and indirect effects of interventions regarding

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[22] Alternative approaches aiming at evaluating the influence of changes occurred to built heritage or environmental resources on real estate values are simulations. For instance, P. Rosato and colleagues aestimated the increase of real estate values in different areas of Venice (Italy) possibly resulting from the implementation of the MOSE project, which aimed at protecting the city from high tides (Rosato et al. 2017).

historic amenities. As a premise, the two direct effects identified by the authors are the following: a) the increase in the quality of the historic amenities stemming from the interventions raises the overall amenity level of the neighbourhood; b) investments on historic amenities may encourage households to meliorate the maintenance and outward appearance of their properties too. The possible indirect effect is represented by subsequent changes in house prices that possibly occur when the new housing quality is enjoyed by neighbour households (Koster and Rouwendal 2015). The results emerging from the performance of a set of regressions considering different variables lead authors to conclude that a one million euro per square kilometre increase in investments in cultural amenities led to a price increase of 1.5-3.0% of non-targeted buildings. Authors particularly attributed the above mentioned price increase to investments in cultural heritage resources since state maintenance of buildings other than the ones eligible for subsidised interventions was not generally improved (Koster and Rouwendal 2015). Additionally, they noted that, coherently with what already outlined by other authors (Rossi-Hansberg et al. 2010)[23], the effects of the investments were particularly intense in the radius of 250 meters from the interventions, i.e. especially at the neighbourhood level. The study is thus overall particularly interesting for the approach adopted but also for its conclusions, which indirectly suggest that not only the mere existence of built heritage resources but also the implementation of restoration processes can have an impact on the surrounding context, included a positive effect in real-estate prices.

A study released by the London School of Economics in 2012 and commissioned by English Heritage has investigated the relationships occurring between built heritage resources and real estate prices with reference to the English context instead (Ahlfeldt et al. 2012). The study focuses the attention on properties located in or near conservation areas, which present heritage-related characteristics and are subject to a certain degree of protection. Authors distinguish between a so called *"heritage effect"* - which is related to the specific characteristics of the buildings and may have consequences both internally (i.e. affecting the value of a property with these characteristics) and externally (i.e. affecting the value of nearby properties, including the ones that are outside conservation areas) – and a *"policy effect"*, which is generated by the legislation and regulations elaborated to protect the areas. In order to isolate the two effects, authors have compared the changes of property prices inside a newly designated conservation area with the ones occurred in otherwise similar location whose

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[23] In one of their studies, E. Rossi-Hansberg and colleagues (2010) investigated the role of housing externalities on average land prices and on their distance-decay patterns in Richmond (Virginia, U.S.A.). The authors defined housing externalities as nonmarket interactions (deriving from the interaction of residents with their houses, which are located in a given location characterised by surrounding houses, streets, green areas, etc.) and they found that their effect decrease by half approximately every 1,000 feet (i.e. nearly 305 meters). In this case, the source of variation that they considered was an urban revitalization programme.

status did not change. Among the other results[24], authors found that properties located in designation areas indeed present a premium price, which tends to increase with the size of the area and with the time gone by since designation. Additionally, a premium price of about 5% seems to be present also just outside the borders (0-50 meters) of the areas, even though it progressively decreases with distance and becomes nearly zero at about 500 meters. Authors also found that, on average, the increase in price of properties located inside conservation areas is estimated at +0.2% with respect to properties that are not located in areas with such characteristics. Low evidence of the designation (i.e. policy effect) was registered instead.

The influence of designated landmarks on condominium transaction prices has been studied also for Berlin: in this case the positive external effect generated by the presence of the landmarks on surrounding property prices was found within a distance of approximately 600 meters, with price impact halving every 90 meters[25] (Ahlfeldt and Maennig 2010). Additionally, the authors also investigated whether residents particularly valued either the proximity to a single landmark or to a variety of landmarks: this seems of particular interest, since it allows to estimate whether greater value is put on single attractive landmarks or on ensembles of historic amenities; as suggested by the two scholars, this also allows to evaluate whether landmarks are perceived either as perfect substitutes or as complementary, with possible consequences on conservation policies too. About this point, the two scholars confirmed that landmarks do not represent perfect substitutes but rather amenities that are especially valued when located in ensembles, as reflected by real-estate markets. More precisely, in the case of Berlin residents seemed to show preferences both for proximity and variety of landmarks.

A further example of the influence of built heritage resources on real estate prices is offered by the case of the Dutch city of Zaanstad, for which 20,000 individual housing transactions over a period of 22 years (1985-2007) was analysed (Nijkamp 2012; Lazrak et al. 2011). Adopting a spatial hedonic model, the study found that any dwelling positioned inside a protected area was valued from 23.4% to 26.4% more than others located outside such areas, and that the presence of a

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[24] The study integrated quantitative and qualitative methods and it also aimed to: identify the aspects of living in a conservation area most/least valued by residents; investigate their perceptions about real-estate prices and values in the areas; map their opinions about restrictions concerning the alteration of properties and their attitudes towards alterations requested by neighbours. Interestingly, the study highlighted that the most valued benefits in living in such areas are represented by the possibility to live in a peaceful residential environment, frequently conveniently located to jobs or commuting facilities; additionally, authors found that residents perceive their properties as expensive but nonetheless providing a sense of price stability. With regard to the alteration of properties, about 40% of respondents objected to a neighbour's application of alteration, as to avoid loss of light, view or privacy; however, some also mentioned the loss of local character as a reason of opposition (Ahlfeldt et al. 2012).

[25] As explained by the authors of the paper, the impact of heritage in spatial terms was assessed considering various distance measures from landmarks, then estimating a heritage potential equation (Ahlfeldt and Maennig 2010).

"historic-cultural ensemble" matters: in fact, it was estimated that any additional dwelling with a heritage status was able to raise the average value of all other houses located within a radius of 50 meters by + 0.24-0.28%.

With reference to the Italian context, R. Amabile and P. Rosato (Amabile and Rosato 1998) investigated the role of location in affecting real estate prices of the city of Treviso; authors found that, being equal the intrinsic characteristics of the residential units considered, the vicinity to the city centre and/or to historic and environmental treasures was associated to the highest average prices per square meter, which in these areas also manifested the highest uniformity of distribution. On the contrary, values were lower and more fluctuant in areas presenting environmental assets combined with penalising characteristics such as industries, heavily trafficked roads, popular housing, abandoned areas, etc.

Some of the studies mentioned above also tested whether and to what extent the status of cultural heritage building influenced its real-estate market prices. In line with other academic contributions, the studies mentioned as a premise that the fact of being a cultural heritage building may in some cases have either a mixed or negative effect on real estate market prices, since protective regulations limit owners' capability to alter the unit, even though subsidies or tax exemptions may be obtained (Nijkamp 2012, p. 100; Ahlfeldt and Maennig 2010,p. 288). In the case of Berlin, authors did not find any significant price differentials/premium prices for designated buildings (Ahfeldt and Maenning 2010). However, in the case of Zaanstad, it was found that properties presenting a heritage status were valued between 19.5% and 26.9% more than comparable houses without this status. A value premium for historic structures was found also in many U.S.A. and non-European case-studies too, as suggested by the literature review presented by P. Nijkamp (Nijkamp 2012) and D. Rypkema (Rypkema 2012).

Author D. Rypkema (Rypkema 2012) has also reflected on the reasons why buyers would be willing to pay a premium price for living in a cultural heritage building and/or protected area. Firstly, he noted that benefits may be related to aesthetic appeal, social prestige and individual commitment to preservation. Then, pedestrian accessibility, a mixed use of the neighbourhood and urban character may play an important role too, when present. Thirdly, when cultural heritage buildings are located in city centres or other areas with a high density of amenities and services, proximity to these ones may play a very important role too, as already underlined by other above mentioned scholars. Finally, he identified public policy reasons: in fact, when these buildings are associated to a regeneration strategy entailing the enhancement of the physical environment as well as protection, the market recognizes the confidence manifested by public authorities with the payment of a premium price.

As underlined by economist Nijkamp (Nijkamp 2012), the conduction of economic investigations about market aspects of cultural heritage through spatial hedonic price models represents a great challenge of our times. In fact, even

though an increasing volume of hedonic price studies in the area of urban cultural assets has recently appeared, detailed analyses investigating cultural heritage-related externalities in light of a spatial proximity framework are still largely lacking, and thus require further exploration (Nijkamp 2012, p. 97).

## 1.6 The role of built heritage in gentrification and urban regeneration processes

Built heritage and especially regeneration processes triggered by cultural heritage resources can also activate gentrification phenomena. Gentrification was originally defined as the uplift of the social status of residential areas taking place when the middle class –i.e. the "gentry"- moves to working-class spaces or generally disinvested neighbourhoods to open businesses or establish their residence, contextually lobbying to obtain infrastructure improvements (Glass 1964 in Brown-Saracino 2014). Gentrification has been the object of an ever growing debate since 1964 - when sociologist Ruth Glass coined the term with reference to the processes occurring at that time in London- and its meaning and actors may now present different peculiarities from context to context (Brown-Saracino 2014). The most straightforward possible downsides of this process were already highlighted by Ruth Glass, and they are represented by the expulsion of previous residents no longer able to support the new living costs of the area and by social segregation.

With specific reference to gentrification processes activated by cultural and built heritage resources, the literature has identified positive effects such as private investments, improved public services, a positive business climate, the renovation of previously vacant properties, property appreciation and the implementation of adaptive reuse projects overcoming functional obsolescence (Rypkema 2012). Interestingly, gentrification processes can also encourage higher rates of property ownership: in fact, if the decline cycle preceding gentrification may favour the shift from owner occupants to tenants, regeneration processes can actually foster the reversal of this tendency. However, at the same time possible downsides may regard both the economic (e.g. rising of taxes and monthly rates) and social sphere; about this last point, the potential change of the community character and composition due to the advent of new types of residents might be associated to conflicts between old and new residents (Rypkema 2012). As a consequence, mitigating measures (e.g. related to the provision of favourable housing and the facilitation of inclusive economic conditions for different segments of the population) need to be consequently implemented[26].

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[26] In this sense, State-led programmes and private initiatives related to the conservation and valorisation of the Historical Centre of Havana represent a best practice: in fact, they have contributed both to the preservation of built heritage resources and to the enhancement of the local

### 1.6.1 Some examples from Italian contexts

Among the studies available in the literature, some specific contributions focusing on gentrification processes interesting the historic neighbourhoods of Italian cities were elaborated (Diappi 2009a; Curto et al. 2009), contributing to the articulation of the debate and to the interpretation of the phenomenon in specific contexts. In addition to the general principles described above, L. Diappi (Diappi 2009a) noted that gentrification is frequently fostered by an imitative behaviour generated by the interaction of a multitude of individual decisions, which have a reciprocal influence within a certain spatial context/environment. Decisions are taken by a variety of actors – including owners, tenants and real estate operators-, which act on the basis of information accessed at the local level; in most cases, changes that occur at the neighbourhood level stem from micro-transformations activated by the multitude of individual actors. This process can be spontaneous, even though public and urban interventions may create favourable conditions facilitating the process (Diappi 2009a). As recalled by L. Diappi, according to scholar N. Smith the inversion of the tendency and the turn towards a gentrification process is led by real-estate investors, whereas the subsequent life-cycle of the neighbourhood depends on single owners' attitude towards private investments; this attitude may be influenced by the conditions of the local market and by what already realised –or not realised- by other owners. By an economic perspective, N. Smith explained gentrification through the *rent gap theory*, which states that investments and gentrification occur only if prospective investors foreseen a value gain following the renovation. As recalled by prof. G. Semi - sociologist working at the University of Turin- N. Smith and other scholars (Hackworth and Smith 2001; Lees et al. 2008, in Semi 2015) have proposed to interpret the global gentrification process in light of a sequential perspective, with different waves presenting specific characteristics (Semi 2015, p. 176). According to these authors, the first gentrification wave takes place in the late 1960s-1970s only in cities located in the North-East of the U.S.A. and in Western Europe; during this phase, investors and real-estate actors take advantage of low land and real estate prices existing in depreciated neighbourhoods and start to perform considerable purchasing operations. From the late 1970s to the late 1980s, the process interests central neighbourhoods that were previously partially abandoned and starts to involve not only big and global cities but also smaller cities; this phase is characterised by social conflict and by the high discontent of the working class, which is forced out from the interested neighbourhoods. The late phase (late 1980s-early 1990s) of this second wave witnesses a slowing down of the process, due to a decreased availability of capital to be invested in the real estate market in general and in those areas in particular. Then, a third wave occurs up to the early

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context maintaining a clear social orientation and avoiding gentrification (Peña Díaz and Cazanave Macías 2014).

2000s, when the expanding economy of the 1990s and the low interest rates encourage both public actors and real estate investors to initiate gentrification initiatives also in neighbourhoods different and distant from the city centre; the process has negative socio-economic effects on the less advantaged inhabitants, who experiment not only unemployment but also rising inhabiting costs. Then, from the early 2000s, local gentrification policies especially enabled by the public intervention appear to be interwoven with the logic of the national and the global market.

In Italian contexts, gentrification is often characterized by a) centrality of location; b) replacement of social actors and c) redevelopment of buildings. According to authors, the centrality pattern depends on the increasing demand of accessibility and good quality of life[27], which can be frequently found right in central areas; however, given the limited amount of residential units available in central neighbourhoods, at a certain point the demand starts to interest neighbouring areas that may present urban decay characteristics. However - as advanced by L. Diappi-, considering that the phenomenon affects some areas and not others, it could be reasonable to assume that aesthetic, environmental and urban structure characteristics may play an important role. More particularly, the author states that socio-economic approaches usually underestimate the characteristics of the urban form; the presence of historic buildings, rivers and other pleasant environmental elements, the existence of a mix of residential and productive functions, together with the availability of retail stores favouring walking-distance shopping and the perception of a village-like atmosphere - providing identity and sense of belonging- may facilitate the process instead (Diappi 2009a), and their role should be more deeply investigated. With regard to the social actors involved, D. Ley highlighted that a key role is played by a middle class characterised by a non-standardised life style, by conscious consumption preferences and by a cultural attitude valuing the conservation of the historic image of the urban city core (Ley 2003).

In general terms the examination of some Italian case-studies available in the literature (i.e. Milan, Genova and Turin) allows to identify some recurrent patterns, pros and cons related to the gentrification processes in these contexts (Diappi 2009): for instance, gentrification seems to begin from the city core and then to interest other neighbourhoods; the size of the involved residential units progressively decreases with the status of the occupants, i.e. old owners, new owners, new tenants, old tenants; accessibility of the new location and its historic value are some of the elements most appreciated by new occupants; the lack of parking, the presence of noise and pollution are elements cited by new occupants

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[27] For a literature review concerning the relationship between urban environmental quality and human well-being, see the article by I. Van Kamp and colleagues (Van Kamp et al. 2003). Coherently with this framework, a contribution by prof. A. Oppio and colleagues (Oppio et al. 2016) has recently proposed the application of the Multi-Attribute Value Theory and of relevant evaluation methods to firstly assess the quality of the built environment and then facilitate interventions favouring public health.

as possible and annoying downsides.

In the case of Milan, a mild gentrification process respecting the mix of functions and the spatial segregation of the neighbourhood *Isola* has taken place during the past decades. The process in this area has been influenced not only by the urban structure, but also by the characteristics of the properties: in fact, the average limited size of residential units has resulted not appropriate for older gentrifiers with higher expenditure capabilities (and probably manifesting more demanding requirements and living standards).
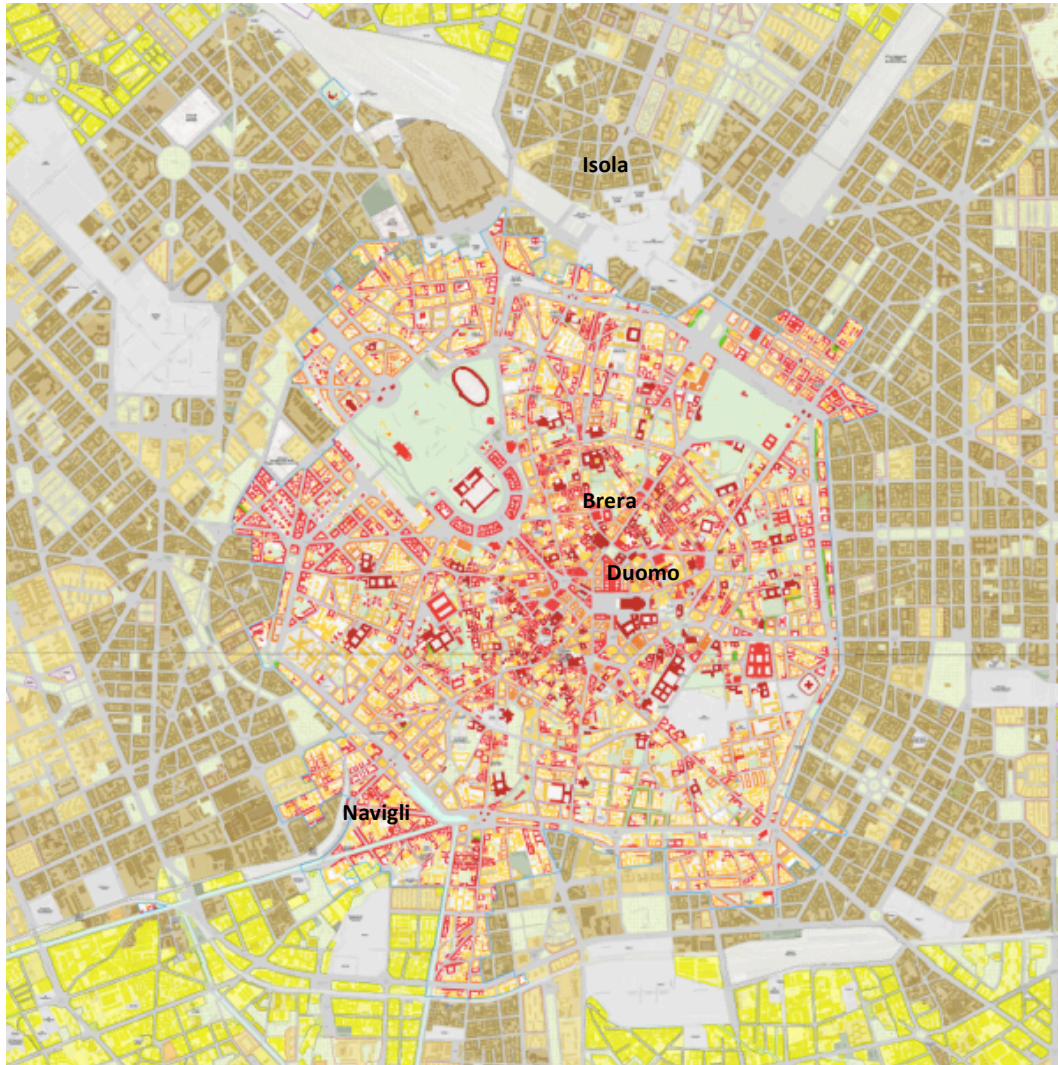


**Figure 2.** Milan (Italy): location of the neighbourhood *Isola* with respect
to the zones of *Duomo*, *Brera* and *Navigli*
(*Source*: author's elaboration on map accessed at http://www.pim.mi.it/pgtonline/)

The example of Genova offers some insights on the evolution of the process and on the turnover of the occupants instead, highlighting the evolving nature of the phenomenon[28]: in fact, scholars (Gastaldi 2009) explained that some

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[28] Some recurrent steps are also represented by a "neo-bohemian" phase taking place at the beginning of the process (i.e. when the area is still in a degradation status but nevertheless presents advantages such as affordable prices, centrality and possibility to provide a personal character to

gentrifiers initially started to experience the area by day/night for different reasons; then, they transformed their attendance into temporary residency (e.g. through co-housing and due to job and family uncertainty); and finally they opted for a permanent housing solution in the place. However, in some cases these pioneers decided to move from the gentrified area, due to increased rents, family reasons or noises produced by people attending the area at night. About this point, authors also underlined the different attitude of residents and temporary users towards the goods existing in the area: whereas the former manifested respect and care towards the public spaces, the latter (and especially night-users) tended to use them in a utilitarian way.
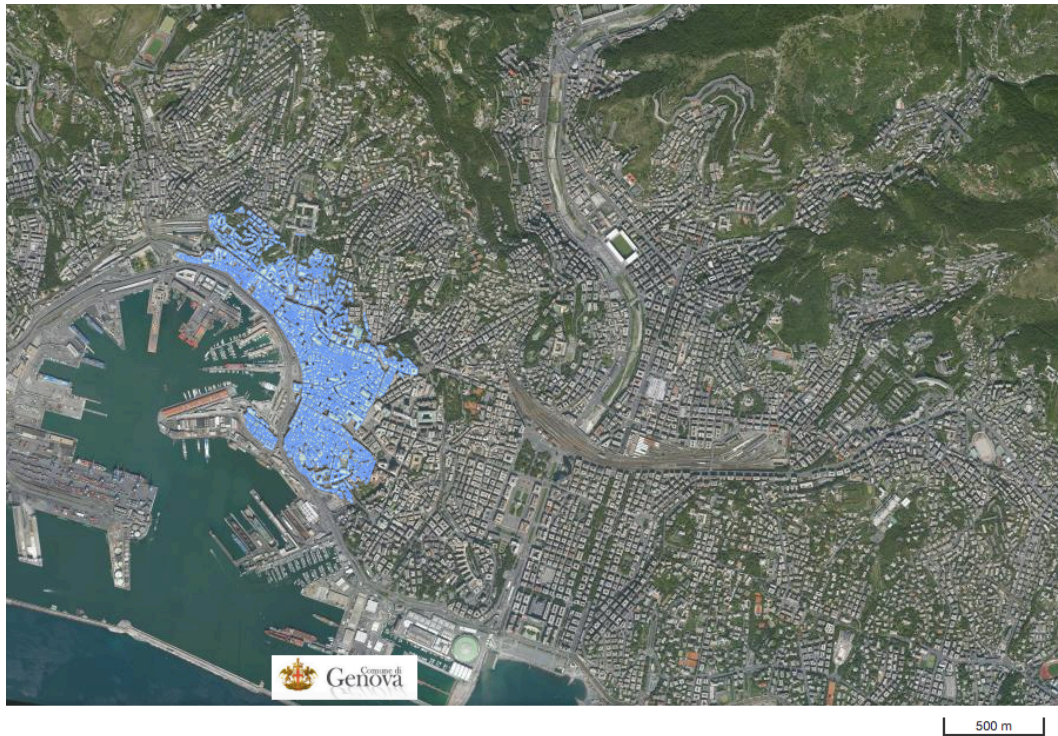


**Figure 2b.** Genova (Italy): gentrification processes have mostly occurred
in the historic centre of the city (blue area)
(*Source:* https://mappe.comune.genova.it/MapStore2/#/viewer/openlayers/1000000789)

## 1.6.2 The case of Turin (Italy)

With particular regard to Turin, a portion of the "Porta Palazzo" area is one of the parts of the city that has experienced a gentrification process since the 1990s. If a public-private interest in the renovation of the area arose in the 1970s already, in the late 1980s the 50 hectares surrounding the building of the Municipality were still described by local newspapers as a critical area experiencing a decrease

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the environment) and then by a subsequent stage, that starts when the area has become trendy already and it attracts the middle class (Diappi 2009a).

of residents, with 5,000 apartments in the hands of 3,000 owners unable - or unwilling- to embark on a process of renovation (Semi 2015, p. 177). The public-private investments of the 1990s fostered the actual transformation of the area instead[29], and a change in the residential framework occurred together with the establishment of trendy commercial activities and of creative professionals' studios but also with the favouring of the nightlife. These interventions transformed the nature of the area, which started to be commonly referred to as "Quadrilatero Romano", since at that point it was clearly differentiated from the rest of "Porta Palazzo". Transformations overall fostered a change that regarded both users and residents of the area (Semi 2015, p. 179), and a boost in the gentrification process of the area was activated again by the local government, which freely released commercial licenses up to 2007.

As evidenced by empirical research, the "Quadrilatero Romano" has progressively attracted educated residents appealed by the centrality of the neighbourhood, its transport connections and services, and also by the historic and architectural value of the buildings (Curto et al. 2009). In this specific case the turnover of the populations mainly occurred spontaneously and only a limited amount of forced displacements –especially interesting families of poor immigrants that were considered as contributing to the degradation of the zone- took place (Semi 2015, p. 178). Ad-hoc researches have allowed to particularly identify two different types of gentrifiers: an educated, young and culturally-active subject, highly attracted by trendy pubs and restaurants but open to change its residence in the future; and a less young subject, willing to reside in the area also in the future.

Another part of the city of Turin that has been – more recently- interested by a gentrification process is San Salvario, i.e. a neighbourhood built in the 19th century and located between the Porta Nuova railway station and the Valentino park along the Po river. By a social perspective, San Salvario is characterised by a mix of social classes and religious beliefs, with a visible presence of immigrants; by an architectural and structural point of view, the buildings of this neighbourhood are mainly characterized by commercial spaces at the street level and by residential units in the upper floors instead, making them particularly suitable for mixed uses. Since the beginning of the present century, the neighbourhood has been the object of a limited amount of restoration initiatives – focusing only on certain buildings manifesting bad conservation conditions-, but

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[29] As reported by G. Semi, scholars S. Belligni and S. Ravazzi have noted that 1990s public investments mainly interested three areas, that –in the fascinating definition of the authors- facilitated the development of a *polycentric*, *polytechnic* and *pyrotechnic* Turin. The first concerned infrastructures, transports, urban development, renovation and re-use of ex-industrial areas; the second regarded renovation and innovation initiatives especially focused on the local Polytechnic university; the third aimed at culture, events and entertainment (Belligni and Ravazzi 2012). For a description of the process that has progressively transformed the image and identity of Torino – especially after the 2006 Winter Olympic Games-, see the third part of this dissertation and the articles written by prof. A Vanolo (Vanolo 2008; Vanolo 2015a; Vanolo 2015b).

at the same time it has undergone a deep commercial turn, with the activation of trendy places blinking to nighthawks' preferences and with the establishment of shops inspired to creativity, localness and sustainability principles. Before this commercial turn and the advent of new users, the area was perceived as unsafe – for the presence of immigrants, prostitution and illicit trafficking of drugs-, whereas it is now promoted as a multicultural zone favourable for shopping, entertainment, multiculturalism and student-life (Semi 2015, pp. 180-182). As argued by prof. G. Semi, commerce has played a key role in the transformation process of the neighbourhood, whereas more limited effects have been registered so far for what concerns real estate prices – which have nevertheless increased- and the composition of the resident population – which continues to count a certain percentage of immigrants and of people with different socio-economic extractions-. However, in this case the new use destinations and the new users have caused social conflicts between residents and the noisy -and sometimes disrespectful- night-users, and this situation has led to the creation of local committees promoting a respectful use of the area (Semi 2015, p. 182). As underlined also by other authors, San Salvario is now one of the pulsing spots of Turin's playscape (Crivello 2011), and cultural events such as "Paratissima" – i.e. a bottom-up contemporary arts exhibition taking place in streets and courtyards– have contributed to social cohesion and to the integration of the life of the neighbourhood at the local level (Rota and Salone 2014).

Then, a further neighbourhood that has partially changed its functions and that has definitely increased its commercial activity is Vanchiglia, i.e. a zone neighbouring the historic city core of Turin which – as San Salvario- has been interested by a commercial expansion from 2007 onwards, when the release of new commercial licenses stopped in the Quadrilatero, with the consequent involvement of adjacent zones (Semi 2015, p. 181).
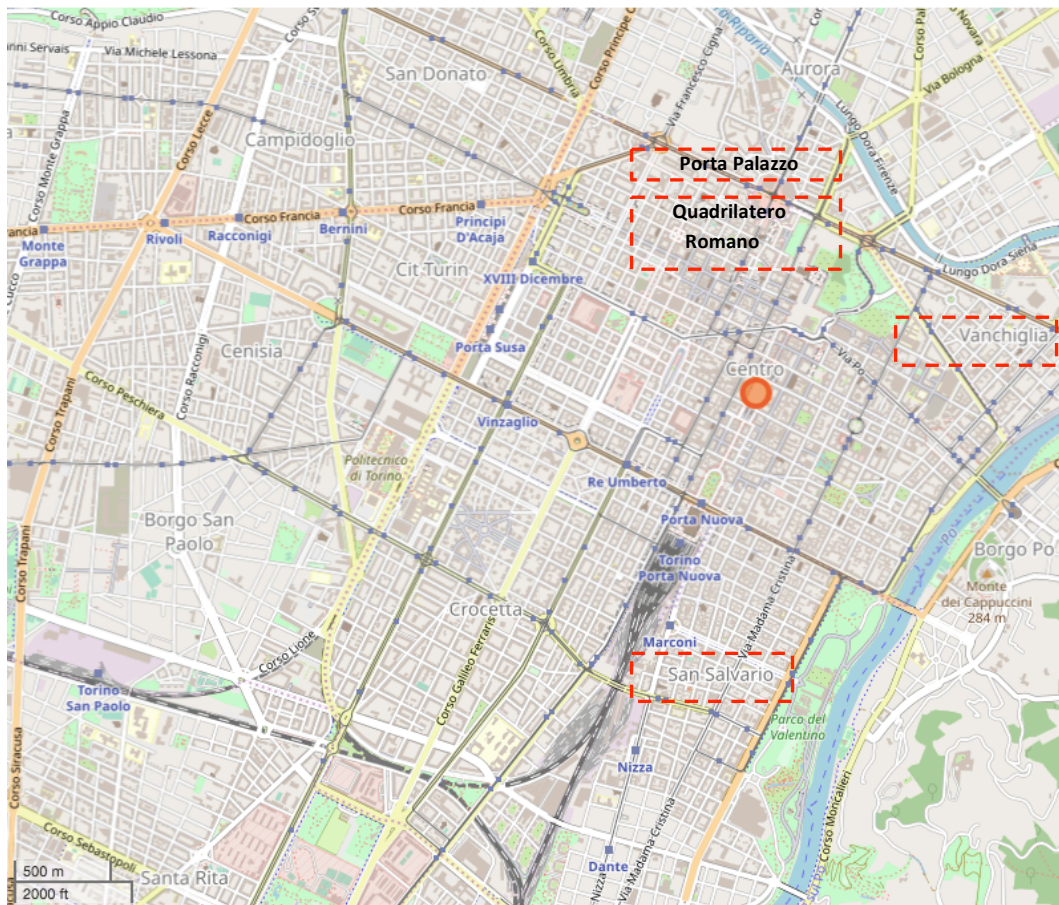
**Figure 3.** Turin (Italy): urban areas that have been interested by gentrification and renovation processes
(*Source*: author's elaboration on image accessed at
https://www.openstreetmap.org/relation/43992#map=16/45.0739/7.6800)

## 1.7 Built heritage-related externalities: the example of urban tourism

In western urban contexts built heritage and its capacity – when it is properly maintained- to create unique and pleasant sceneries that combine with the possibility to enjoy the services of contemporary life contribute to aliment tourism. When built heritage and cultural heritage resources in general represent the main attraction and reason to visit the place, it is possible to talk about cultural heritage-related tourism. However, considering both the complexity of stimuli currently offered by urban contexts and the multiple motivations that may lead people to visit a place[30], it is possible to identify not only culturally

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[30] The body of literature about visitors' motivations is broad and constitutes a specific research field. Some of the categorisations and segmentations mostly used in the literature are presented by J. Page (Page 2007, chapter 3) and by D.B. Weaver and L. Lawton (Weaver and Lawton 2006, chapter 6). A widely used perspective is, for instance, the *travel career approach* outlined by P.L. Pearce, which interprets one's leisure travels as an evolving – if not evolutionary-

motivated but also culturally inspired and culturally attracted tourists (Bywater 1993 in Smith 2003, p. 31)[31]. As underlined by some authors, the attractiveness of an urban context derives from the unique combination and interaction of a variety of landscapes, namely the natural, infrastructural man-made, cultural man-made, social, human and financial landscape (Fusco Girard 2014; Fusco Girard 2013). In this framework and with the ever growing attractiveness exerted by present cities – which are multifunctional entities more and more characterized by density and diversity, whether of cultures, buildings or facilities- cultural heritage related tourism is becoming more and more interwoven with a more general form of urban tourism.

## 1.7.1 Urban tourism as a blended reality

As underlined by G. Ashworth and S. J. Page some years ago, cities are particularly suitable for the development of tourism given the variety of stimuli that they provide; however, even though studies on urban tourism begun to appear in the 1980s, theories on the topic are still widely lacking (Ashworth and Page 2011). The difficulties in elaborating general reflections are greatly related to one of the paradoxes of urban tourism: in fact, most of urban facilities are used both by local citizens and non-resident city-users such as tourists, making the analysis of tourists' patterns, behaviours and socio-economic impact difficult to evaluate; this situation is also reinforced by the fact that contemporary uses of the city seem to manifest a convergence between locals' and tourists' forms of consumption. Additionally, the internal geography of contemporary cities has evolved, resulting in a complex structure where different functions and consumption patterns blend; as highlighted by the authors, cities are now perceived as a series of sub-systems searched for their ability to potentially satisfy users' leisure needs and preferences[32]. In this context, the role played by cultural heritage may be variable

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process linked to the satisfaction of particular needs -such as the ones listed by A. H. Maslow's hierarchy of needs (Maslow 1970)-; according to this approach, people's motivations change also with their travel experience (Pearce and Lee 2005).

[31] According to the definitions provided by M. Baywater (1993) and reported by M. Smith (Smith 2003, p. 31), *culturally motivated* tourists are attracted to a destination mainly for cultural reasons; they are a particularly desirable market segment since they are usually high-income visitors who tend to spend several nights at the chosen destination; *culturally inspired* tourists tend to visit major cultural destinations (such as art cities), to spend shorter periods in the destination and not to visit a given place twice, and their behaviour may contribute to unsustainable forms of tourism; *cultural attracted tourists* tend to attend cultural events and attraction located in the area where they are currently staying, and for their behaviour they can be assimilated to excursionists. Far from being totally exhaustive, these definitions are nonetheless useful to underline that the cultural component may play a different role in different people's leisure agenda. As reported by M. Smith (Smith 2003), cultural tourism is not a form of niche tourism but rather a growing phenomenon; its increase depends both on growing people's mobility patterns but also on the extension of the concept of "cultural".

[32] Since the 1990s, the concept of "post-modern tourist" has emerged; this perspective subverts traditional distinctions such as culture/street life and high/low culture, and sees tourism as part of the everyday life, making difficult to differentiate it from other activities (Smith 2003, p. 18).

in relation to visitors' motivations, but it might be advanced that the contribution of built heritage to create a pleasant environment and urban quality is particularly important, since – as reported by G. Ashworth and S. J. Page- *sightseeing* and *wandering about* are two of the activities that tourists declare to perform the most when visiting an urban context (Figure 4).



**Figure 4.** Wandering about is a tourists' favoured activity and built heritage can contribute to attract visitors and to make the experience pleasant (*Source*: https://pixabay.com/it/belgio-bruxelles-la-grand-place-3707925/)

Even though the reduction of built heritage resources and of their intrinsic values to a pleasant scenery may be questionable and it is undeniable that more should be done to help visitors transform serendipitous encounters into meaningful occasions of learning and personal growth[33], this reality needs nonetheless to be taken into account, and the contribution of built heritage not only for the attraction of visitors but also for the creation of a memorable and enjoyable experience needs to be evaluated[34]. Some authors have also noted that forms of "new urban tourism", where the educated cosmopolitan consuming class

[33] The communication of cultural heritage and the strategies developed to facilitate visitors' meaning-making process represent other specific fields of research. In recent times a particular attention has been devoted to the potentialities and to the current role of web and digital resources allowing to access information before, during and after the visit. An emerging filed of research and empirical application is then represented by location-based mobile solutions enabling contextualised learning in open-air contexts (Boiano et al. 2012) or in indoor environments such as museums (see Rubino et al. 2015; Rubino 2014; Xhembulla et al. 2014; Rubino et al. 2013 for findings stemming from personal first hand research).

[34] Interpretative and participatory processes involving a variety of stakeholders may be fundamental to favour the conservation, knowledge and promotion of heritage resources that have not been fully valorised yet (see, for instance, Coscia et al. 2018b; Coscia et al. 2018c; Coscia and Curto 2017).

move through cities as part of its lifestyle have emerged (Braun 2010; Füller and Michel 2014), contributing to the mix between visitors and residents and to the transformation of certain neighbourhoods.

## 1.7.2 Economic and social effects

Positive economic effects activated by urban and cultural heritage-related tourism may regard the development of the local economy and of sectors such as transports, hospitality, food and beverage, craftsmanship and commerce, cultural services and so on. In general terms, authors usually estimate the economic impact of tourism considering direct expenditures (related to tourists' direct consumption of goods and services), indirect expenditures (i.e. the money that recirculates in the urban economy through tourism enterprises) and induced impact (i.e. the expenditure generated from those employed in tourism and its effects on the local economy); additionally, the concept of leakages (i.e. expenditures made by tourists but affecting areas different from the visited local system) is taken into account too (Page 2007, p. 396).

If certain levels of tourism are reached, negative effects may be generated instead, causing potential conflicts between residents and temporary visitors[35] and also overall unsustainability – especially in the so called "historic centres"-[36]. In

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[35] The evolution of locals' attitudes towards tourism development has been described through the so called *"irridex"*, i.e. the index of resident irritation developed in the 1970s by G. Doxey (Doxey 1976 in Weaver and Lawton 2006, p. 287). This model identifies five stages: *euphoria*, *apathy*, *annoyance/irritation*, *antagonism* and *resignation*. In the first phase, locals are enthusiastic about new comers, whereas in the second they become used to their presence. Irritation starts to arise when tourists flows become significant and locals start to feel that the social, cultural and environmental sustainability of their local system is under threat; these attitudes evolve into antagonism and then result into a resignation stage that leads residents to either leave or accept the altered community setting. The main limit of this model is that it considers locals as a *"homogeneous entity evolving along a single perceptual trajectory"* (Weaver and Lawton 2006, p. 287).

[36] It must be noted that the anglophone literature concerning tourism, hospitality and cultural heritage-related issues frequently presents the term *"historic centre"*. This expression is usually adopted to indicate the most ancient part of the city and/or the part that presents the highest concentration of historical tangible heritage resources such as monuments, historic houses, religious buildings and so on. More particularly, the concept of "historic centre" does not refer to buildings or relics of a particular era, but it has a relative meaning instead: in fact, it may refer to the most ancient nucleus from which the city originated (being that moment in the 1800s, as for some USA cities, or in ancient Roman times, as it may happen in Europe), but also to a part of the urban context which is perceived as more ancient and somehow differentiated from other parts. Additional expressions used in the anglophone literature include also - for instance- *"old town"*, *"historic inner-city areas"* (Nijkamp 2012) and *"historic city core"* (O'Brien 2012; Rojas 2012; Medda et al. 2012; Ost 2012); this variety of vocabulary underlines that the temporal, geographical and symbolical dimensions may co-exist in the discourse and that a particular sense may prevail depending on the contexts of use and on authors' preferences. However, as noted by D. Cutolo and S. Pace, in the anglophone literature terms such as *"historic centre"* and *"old town"* usually entail intrinsic positive values, related to the valorization of the local historic-artistic heritage and to the development of tourism (Cutolo and Pace, p. 19). Whereas in the francophone literature the geographic component seems to prevail (*"centre ville"*, which sometimes becomes *"coeur de la ville"* if a symbolical meaning is present), the Italian language usually employs the expression *"centro storico"*. Some interesting definitions of "centro storico" date back to the late 1950s-

fact, intense tourism flows have put under stress many cities considered particularly attractive, overall negatively influencing the quality of life of local inhabitants (Colletta 2013a). Some authors have interpreted the predominance of tourist-oriented activities in cities with a strong "art vocation" as a worrisome phenomenon: according to these voices, the spread of recreational and hospitality functions has expelled local inhabitants; this has not only reduced the town/city to a simple scenery, but has strongly limited the intercultural exchange between foreigners and locals (De Caro 2013). As evidenced by the literature, tourists' desire to directly experience the atmosphere of particular historic neighbourhoods has progressively encouraged the rise and spread of hotels and other hospitality facilities in those areas, with the paradox of altering the "authentic atmosphere" of the place (Akin 2013). In order to be multi-dimensionally sustainable, a "harmonious tourism" integrated with the everyday life of residents should be advocated, instead (Ricci 2013). A certain attitude aiming at pleasing tourists' preferences has also led in some circumstances to the crystallization of the past, with the result of destroying the relationships between historic places and local inhabitants, which actually would represent the vitality of a place (Fusco Girard 2013a). According to professor L. Fusco Girard, tourism implies long-term costs, whereas benefits might be a short-term phenomenon and, most of all, may involve a limited set of subjects (namely tourists and people working in the tourism field). Costs connected to tourism should also include changes in relationships and lifestyles, which - if considered- would reduce the net benefits. Then, if on the one hand it is true that tourism multiplies use-values, on the other one an intense tourist activity may progressively erode the intrinsic values of heritage resources. According to the same author, a possible solution could be represented by the activation of a "conservation economy", i.e. an economy based on the valorisation of intrinsic values and of uniqueness, which adopts as temporal reference the long run and that is inspired by principles of equity, with a fair redistribution of the benefits among local inhabitants. In his view, an outcome deriving from tourism should be the creation of new cultural values through the means of the tourism itself (Fusco Girard 2013a).

Unbalanced uses of urban resources have led to the concept of tourist commodity too. Some studies identify as a tourist commodity any product or service for which at least 50% of users are tourists (Hall and Lew 2009).

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1960s (Longhi 2017; Albrecht and Magrin 2017), e.g. when architect and intellectual Roberto Pane attributed to "historic centres" a sense of historical heritage/significance and to "ancient centres" the meaning of most ancient nucleus of a city. However, as recently reported by D. Cutolo and S. Pace, in Italy the expression "centro storico" has alluded to multiple and co-existing meanings (Cutolo and Pace, p. 19). Then, the term can also be used to indicate small hamlets with recognized historical heritage and also to cities in which historical heritage represents one of the most characteristic and important features, playing an important role for the local economy as well. Overall, the concept of "centro storico" is the result of a cultural stratification process, and even if an historical interpretation of the city as a complex would be more appropriate especially when treating cultural heritage-related issues (Comoli and Viglino 1992; Longhi and Rolfo 2007, p. 41), in some occasions the synthetic term "historic centre" will be used for brevity reasons. Unless otherwise noted, the term will particularly indicate the part of the city that presents the highest concentration of ancient historical tangible heritage resources.

However, the balance between tourist and non-tourist consumption may vary according to different contexts (e.g. small town or metropolitan city) and even micro-contexts (e.g. neighbourhoods): consequently, different cut-offs may also be used (Hall and Lew 2009)[37]. Overall, the problem of the carrying capacity can be considered as one of the most important critical issues related to tourism. If the concept can be intuitively grasped with certain ease, a definition universally accepted by academics and practitioners has not been elaborated yet, regardless of the amount of contributions trying to face the issue[38].

## 1.8 Arrivals and presences as a proxy for urban attractiveness and economic impact: challenges and opportunities in the age of peer-to-peer accommodation systems[39] and geo-referenced data

Since it has been argued that most of urban facilities are used both by local citizens and non-residents city-users such as tourists, the evaluation and measurement of the economic impact generated by this latter category of people may be difficult. An approach that has been traditionally used as a first step to quantify the people temporarily visiting the city for more than one day and then estimate economic outcomes is the monitoring of the statistical data set about overnight stays in hotels and other official accommodation facilities. However, this scenario has been recently transformed by the spread of sharing economy web platforms that connect people willing to rent their properties and users seeking for short-term accommodations, such as *HomeAway*, *Waytostay*, *Tripping* and the leading firm *Airbnb* (www.airbnb.com). If the role played by Airbnb in terms of competition with hotels is still under investigation and may vary from context to context, the exponential growth of accommodations and reservations taking place through the platform makes the analysis of Airbnb supply and demand an

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[37] In order to identify not only tourist commodities but also the patterns of use and exclusion related to cultural heritage resources, an additional approach could be represented by the estimation of the percentage of the local population (or of its sub-segments) that actually uses the resource. Moreover, the estimation of the percentage of the local population (or of its sub-segments) that is excluded from direct use due to tourists could constitute another indicator too, since it would express the level of pressure exerted by tourists and it would help reflect on the multi-dimensional sustainability of the phenomenon.

[38] The World Tourism Organization has defined carrying capacity as *"the maximum number of people that may visit a tourism destination at the same time, without causing destruction of the physical, economic and socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction"* (as cited in Neuts and Nijkamp 2012). A particular declination of the carrying capacity is crowding, which has been defined as the violation of the socio-cultural carrying capacity (Neuts and Nijkamp 2012, p. 2135).

[39] Some of the contents elaborated in this paragraph were presented at the "New Metropolitan Perspective 2018" conference (22nd-25th May 2018, Mediterranean University, Reggio Calabria-Italy) and then published in the Conference Proceedings printed by Springer International Publishing (see Rubino and Coscia 2019).

essential step to better understand the new economic dynamics enabled by ICT. In fact, coherently with a smart communities framework in which citizens play an active role in shaping the current socio-economic scenario (Calzada and Cobo 2015, De Filippi et al. 2017, De Filippi et al. 2017a), peer-to-peer accommodation systems are affecting both the supply and demand side of the hospitality sector – since on the one hand they are providing more accommodation alternatives for guests and on the other one they are allowing private citizens to undertake new economic activities-. In this framework, the implementation of appropriate methods of analysis taking into account these new hospitality patterns and the ever growing availability of geo-referenced data is now needed.

With the development of digitally-enabled peer-to-peer accommodation systems, the monitoring of traditional arrivals and presences is not sufficient anymore, since reservations and stays booked in private apartments and houses are greatly increasing. Then, considering that these systems have been mainly used up to now by tourists, the monitoring of these flows can represent a particular valuable tool to better understand tourists' behaviours, track the attractiveness of urban contexts -also in relation to different targets- and then estimate economic impacts. Given the novelty of peer-to-peer accommodation systems and considering the fact that the literature on this topic is still at its very beginning – both in terms of number of scientific contributions published and of perspectives adopted- the following chapters will treat in detail the genesis, characteristics, contradictions and challenges presented by these sharing economy instruments. After providing an overview of the phenomenon, the chapters will focus on the critical relationships that have started to occur between peer-to-peer accommodation systems and city centres, which are frequently characterised by a high density of built heritage resources.

Coherently with the total economic value framework described in previous paragraphs, contemporary approaches willing to estimate the value of cultural heritage resources need necessarily to integrate dimensions such as education, well-being, multi-dimensional sustainability, social equity and integration, identity and community building (Bertacchini and Segre 2016; Santagata 2014). If approaches aiming at assessing economic effects generated by cultural heritage begun to emerge in the late 1960s-1970s and then especially in the 1980s (Bollo 2013), the conduction of analyses focusing on social impacts – especially related to programmes activated by cultural heritage institutions- has started to be implemented only in the 1990s, and since then different theoretical frameworks have been adopted[40]. On the one hand, the choice and development of evaluation

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[40] For a comprehensive review of the theoretical frameworks adopted between 1990 and 2009 for evaluation, see the detailed contribution of C.L.S. Coryn and colleagues (Coryn et al. 2011). Nowadays, the most innovative methodological approach that is currently been used for planning and evaluating the social impact of specific projects and interventions is theory of change (ToC). Theory of change can be defined as an approach that aims to describe how and why an intervention or project fosters planned and unplanned changes in a given context, with reference to specific outcomes, targets and stakeholders. This process especially focuses on the identification of causal relationships among the components of a program (Morra-Imas and Rist 2009, p. 152)

methodologies able to capture the multidimensional values of cultural heritage resources in the realm of a fast evolving society is a fascinating challenge that fosters a continuous reflection on the concept of value – and that thus connects pure economic reasoning with social and humanist thoughts-; on the other one, with the evolution of the technological and socio-economic context, traditional approaches – such as the economic one- need to be updated and integrated too, as to take advantage of the new types of data now available (e.g. geo-referenced data) and perform analyses able to incorporate the socio-economic patterns currently taking place in contemporary times.

As a consequence, if the study of the economic impacts generated by cultural heritage assets represents both the research approach that has been most traditionally used in the area of impact studies and a branch of evaluation that counts very well-established methods, the recent spread of digital technologies and the rise of new economic paradigms nonetheless require that new research approaches are developed and adopted.

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and takes into account the chronological flow of events. More specifically, ToC (sometimes also called program theory) explains how and why an intervention firstly contributes to a chain of intermediate results and finally to the intended or observed outcomes (Funnell and Rogers 2011). Through the collection and systematic analysis of performance data, the original ToC model is tested against the actual results and processes experienced (Jackson 2013), as to critically analyse the observed phenomena and extrapolate conclusions. The main difference with the Logic Model approach lies in the explanatory power of ToC: whereas logic models are particularly beneficial to map out all elements of a program, ToC is useful to link the activities and strategies of a program with desired outcomes (Guthrie et al. 2005). Overall, the development of a ToC model is useful both in the planning phase of an intervention (to better outline the medium-term and long-term outcomes of the project, together with the actions and strategies to be adopted) and in the ex-post evaluation phase: conclusions and main takeaways can then serve to apply amendments and inform future interventions. Even though theory of change emerged in the mid 1990s in the United States of America in the field of program evaluation (Jackson 2013), this approach has started to be extensively applied worldwide in the early 2000s, and it is now used by many heritage-related charities and organizations as well. For instance, ToC is currently used as a framework to evaluate the social impact of heritage-related projects by UK charities and organizations such as The Churches Conservation Trust, the New Philanthropy Capital and the Architectural Heritage Fund. The need for the design and implementation of logic models and theories of change able to inform both the planning and reporting phases has been recently claimed by the UK Museums Association as well: in fact, in the report Measuring Socially Engaged Practice: A Toolkit for Museums (Museums Association 2018) the adoption of these frameworks is strongly recommended both to achieve and map social value and socially engaged practice.

## 1.9 Integrating and interpreting the spatial dimension: geo-referenced data, GIS tools and spatial statistics approaches

With the spread of GPS tools, web-maps and other ICT services able to capture and to communicate the location of a given object on the Earth's surface or near surface, geo-referenced data – i.e. data presenting either latitude and longitude values or projected x and y coordinates- are becoming more and more common (Longley et al. 2015). Geo-referenced data are particularly valuable because they allow not only to generally describe and analyse a phenomenon – as it happens for instance with the elaboration of descriptive statistics- but also to integrate a spatial dimension into its interpretation[41]. In this framework, GIS (geographic information systems) software programs are a fundamental tool for the visualization and elaboration of this kind of data.

GIS softwares are usually able to work both with raster and vector files. In the case of vector data, the fundamental features of a GIS project are points, lines and polygons. Each feature can then present specific attributes (i.e. values or other characteristics associated to single features), which allow not only to know the characteristics of single features (e.g. inhabitants of an area, median value of real-estate properties, length of a street, etc.) but also to better understand a phenomenon, if interpreted contextually.

A first step leading to meaning-making is the elaboration of maps that allow the visualisation of data; in fact, geovisualization has the goal to facilitate thinking, understanding and knowledge construction (Longley et al. 2015, p. 268) about phenomena that entail a geographical component, with a scale that usually ranges from the architectural to the global level. Geovisualization may be used to reach different objectives, such as exploring, analysing, synthesizing and presenting spatial data (Longley et al. 2015, p. 268).

Data can be visualised in different ways, e.g. depending on the nature of the data themselves and on the messages that the researcher wants to convey. Among possible visualization methods, an important role is played by *choropleth maps*; choropleth maps describe the properties of distinct areas (e.g. census tracts) through colours, shades, etc. which symbolize the value of a specific variable (Longley et al. 2015, p. 45). Choropleth maps can be based on either spatially extensive variables (e.g. total population) or on spatially intensive ones (e.g. proportions, ratios, densities); however, some scholars recommend to use choropleth maps only with spatially intensive variables or with spatially extensive variables converted into spatially intensive ones (Longley et al. 2015, p. 47), i.e. with normalized data (Longley et al. 2015, p. 293).

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[41] For the integration of GIS tools into multicriteria analyses aiming at supporting decision-making processes that regard cultural heritage resources, see the contributions of prof. A. Oppio and colleagues (Oppio et al. 2015; Oppio et al. 2014).

Other types of maps are then constituted by *heat maps*, which identify areas where the density of cases is especially high, thus forming hotspots (Longley et al. 2015, p. 312).

Then, a further step is represented by the implementation of spatial analysis[42]. In general terms, spatial analysis can be considered as *"a set of methods whose results are not invariant under changes in the locations of the objects being analysed"* (Longley et al. 2015, p. 291); then, spatial data analysis can be broadly defined as *"the statistical study of phenomena that manifest themselves in space. As a result, location, area, topology, spatial arrangement, distance and interaction become the focus of attention"* (Anselin 1996, p. 112). On the basis of the context, of available data and of the objectives of the research, spatial analysis can be used inductively (i.e. examining empirical evidence to identify patterns that might lead to the development of new theories), deductively (i.e. testing already existing theories against a set of data), but also in a normative way (i.e. providing empirical suggestions impacting the reality and supporting decision-making) (Longley et al. 2015, p. 294).

Exploratory spatial data analysis (ESDA) can be conceived as a data-driven analysis instead, since it approaches the analysis of data *"without many preconceived ideas, theories or hypotheses"* (Anselin 1996, p. 113). ESDA techniques *"aim to describe spatial distributions, discover patterns of spatial association (spatial clustering), suggest different spatial regimes or other forms of spatial instability (non-stationarity), and identify atypical observations (outliers)"* (Anselin 1996, p. 113).

When exploring the distribution of features (points in particular), a frequent issue is represented by the detection of possible *clusters*, as to understand whether observations are distributed randomly (i.e. all locations are equally likely to contain a point) or not (i.e. some locations are more likely to contain a point than others). Then, another issue is detecting whether the presence of one point in a location makes the presence of other points in the immediate vicinity more or less likely. Overall, three distribution patterns can emerge: *a) random*; *b) clustered* (with the presence of one point possibly attracting other points in the vicinity) and *c) dispersed* (with the presence of one point in a location decreasing the likelihood that other points are present in the nearby, which is typical of phenomena that imply the competition for space) (Longley et al. 2015, p. 308).

As underlined by scholars, two kinds of processes can be responsible for point patterns: points are actually located independently, but they are clustered because of varying point density (*first-order processes*); points interact, forming either a

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[42] In the scientific literature adjectives such as geographic, spatial and geospatial are all used, sometimes interchangeably. However, as underlined by leading scholars in the field of geographic information science (Longley et al. 2015, p.6 and 9), "geographic" refers to the Earth's surface and near surface (at scales from the architectural to the global), "spatial" refers to any space and it is thus more versatile, while "geospatial" is used to allude to a subset of spatial, specifically referring to the Earth's surface and near surface (thus similarly to "geographic"). In general terms, the expressions *spatial analyses* and *spatial statistics* seem thus preferable, since methods can be applied to different scales and contexts.

clustered distribution when interaction is attractive or a dispersed distribution when the interaction is competitive/repulsive (*second-order processes*).

Distribution patterns can be tested, for instance, with a variety of techniques, included the K function; when the distribution pattern is random, the plot on a horizontal (length of the radius of the circle) and vertical axis (K-function value) produces a straight line with a slope of 1; clustering at certain distances is indicated by departures above the line and dispersion by departures below the line (Longley et al. 2015, p. 308).

Another approach of study is then represented by area-based analyses, which arise from the necessity to simplify reality; in this case objects of the research are polygons, i.e. areas (determined on the basis of a variety of possible criteria) to which characteristics are ascribed.

### 1.9.1 Spatial statistics approaches

A growing field of research is now represented by the application of spatial statistics approaches. Generally speaking, the underlying idea inspiring spatial statistics reasoning is the principle known as "Tobler's first law of geography", which affirms that *"everything is related to everything else, but near things are more related than distant things"* (Tobler 1970)[43]. In other words, this means that similarities and interactions tend to decline over space in ways that are often systematic, in accordance with the principle of distance decay (Longley et al. 2015, p. 309).

As underlined by authors, spatial statistics can be considered a distinct area of research, which is based on the assumption that nearby georeferenced units are associated in some way: if traditional statistical theory bases its models on observations that are assumed as being independent, spatial statistics has a particular emphasis on location and it is based on the assumption of the non-independence of observations (Getis 2000). Overall, spatial statistics approaches may help researchers extract as much information as possible from georeferenced data and then find meaning in spatial data (Getis 2000).

Among the spatial statistics in current use, the sub-field of research that best applies to the study of social and economic phenomena is spatial econometrics. If on the one hand regression models represent a widely used approach in traditional econometrics, on the other one spatial econometrics concentrate on spatial regression models, which take into account spatial dependence and/or spatial heterogeneity (Getis 2000). As explained by A. Getis, *"spatial dependence occurs when there is a relationship between observations of one or more variables at one*

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[43] The concepts of "being related" and "near" have inspired the field of spatial statistics. However, it seems useful to recall here that Tobler's assumption and terminology have been questioned by some authors (Miller 2004; Tobler 2004). More particularly, some scholars have refused the concept of "law" applied to geography (see Tobler's 2004), while others have questioned its validity, especially in a time characterized by the shrinking of the world and by the fact that many activities have become more loosely connected to geographic space (Miller 2004).

*point in space with those at another point in space, while spatial heterogeneity results from data that are not homogeneous – for example, population by areas which vary considerably by size and shape"* (Getis 2000).

Spatial dependence can be investigated through different techniques. In this realm, an important role is played by spatial autocorrelation[44] statistics, i.e. quantitative techniques used to analyse correlation relative to distance or connectivity relationships (Miller 2004).

### *Defining spatial relationships*

First of all, at the basis of these techniques lies the conceptualization of spatial relationships[45]. In general terms, two main families of models can be identified: *distance models* and *adjacency models*. In both cases a fundamental step is represented by the definition of what is near/neighbourhood. In the first case (*distance models*) the researcher sets either a inverse distance or a fixed distance band or even a combination of the two (zone of indifference) as a threshold for the definition of "near". According to practitioners in the field, the fixed distance method is particularly appropriate when working with polygons that present a large variation in size (e.g. when large polygons are present at the edge of the study area and small polygons exist in its centre). Additionally, distance value should be selected on the basis of what is already known about the processes at the basis of possible clustering (e.g. most frequent commuting time to a given city), and it should guarantee that each feature has neither too few nor too many neighbourhoods (the recommended number is approximately 8). The optimal distance value could also be selected through an exploratory and iterative process (e.g. on the basis of results stemming from the implementation of the K-function for different distances; the most effective distance should be the one that presents a peak in the difference between the observed and expected K values).

In the second case (*adjacency models*) the researcher can choose which are the units that are "neighbours" to others adopting one of the following approaches:

a) *K-nearest neighbours*: the researcher defines a specified number of features that are considered as "neighbours"; this method is particularly appropriate when the values associated to the features are not normally distributed and

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[44] As underlined by A. Getis (2008), the term spatial autocorrelation was coined by A. D. Cliff and J.K. Ord and it firstly appeared in the late 1960s (Cliff and Ord 1969). However, the genesis of this field of study can be traced back to the so called "Washington School", which underlined the importance of spatial concepts and relative location as fundamental elements for geographic understanding already in the mid 1950s (Getis 2008). Before 1968 terms such as "spatial association", "spatial dependence" "spatial interaction" and "spatial interdependence" were already used (Getis 2008).

[45] The conceptualization of spatial relationships presented in this paragraph can be found in the GIS software on-line manual developed by ESRI: http://resources.esri.com/help/9.3/arcgisdesktop/com/gp_toolref/spatial_statistics_toolbox/modeling_spatial_relationships.htm.

when the researcher needs to consider a minimum number of neighbours in the analysis;

b)  *Spatial weights:* spatial relationships are conceptualized on the basis of particular criteria (e.g. travel time); in this case weights are usually expressed in their inverted form (e.g. 1/5 to indicate 5 minutes; 1/10 to indicate 10 minutes…), so that nearer features assume a weight that is higher than the one of less close features;

c)  *Polygon contiguity*: polygons are defined as neighbours if they share edges and/or corners with a target polygon. More particularly, the following types of contiguity – which are named after the corresponding moves performed in the chess-game- can be identified:

   a.  *Rook*: polygons are neighbours if they share edges with the target polygon;

   b.  *Bishop*: polygons are neighbours if they share corners with the target polygon;

   c.  *Queen*: polygons are defined as neighbours if they share edges or corners with the target polygon (Figure 5).
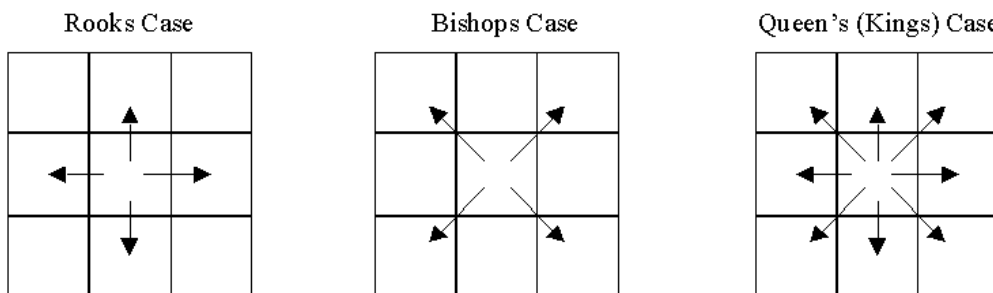


**Figure 5.** Polygon contiguity: types of contiguity
(*Source*: http://www.lpc.uottawa.ca/publications/moransi/moran.htm)

If rook contiguity can be selected for polygons that present a nearly regular shape (e.g. urban blocks), queen contiguity is usually employed for polygons that are characterized by a more irregular shape (e.g. countries, counties, etc.). Contiguity can be set at different orders: first order contiguity models consider as neighbours of a given polygon only the polygons in the immediate vicinity that share edges and/or corners with it; in second order contiguity models the selected criterion of contiguity is applied not only to the polygons in the immediate vicinity but also to the polygons that respect the same criteria with reference to the immediate neighbour polygons (i.e. neighbours of neighbours are considered as neighbours), and so on for subsequent orders.

In general terms, the polygon contiguity conceptualization is particularly effective when polygons are similar in size and distribution, or it can also be used in an

exploratory phase when no particular hypothesis about the distribution of data has been advanced (Longley et al. 2015).

In mathematical terms, the neighbourhood or contiguity structure is formalised in a spatial weights matrix *W* considering elements *i* and *j*, where $w_{ij} = 0$ when *i* and *j* are not neighbours (Anselin 1996, p. 114) and $w_{ij} \neq 0$ (e.g.1) otherwise; $w_{ii}$ is assumed as 0 and the matrix thus presents zero values on the diagonal.

The selection of the models and methods adopted depend on the characteristics of data, on the goals of the study and on the patterns that the researcher wants to assess; additionally, the choice should be theory-informed and/or it should reflect the inherent relationships existing among the features under study.

After having defined what is near/neighbour, it is then possible to proceed with the assessment of spatial autocorrelation. In general terms, spatial autocorrelation can be assessed at the global and at the local level; then, it is also possible to check whether and to what extent spatial autocorrelation exist between two variables (bivariate spatial statistics).

Global statistics assess the presence and magnitude of spatial autocorrelation considering the entire study area, without indicating where specific patterns take place. The techniques most frequently used to assess spatial autocorrelation at the global level are the Global Moran's Index (Global Moran's I) and the Geary's C Index.

### *The Global Moran's Index and the Geary's C*
The Global Moran's Index was developed by Patrick Alfred Pierce Moran in the 1950s and it is calculated as follows:

$$I = \frac{N \sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}(x_i - \overline{x})(x_j - \overline{x})}{(\sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}) \sum_{i=1}^{n} (x_i - \overline{x})^2}$$

**Figure 6.** The Global Moran's Index: formula
(*Source*: Di Salvatore 2018)

where *I* is the value of the Moran's index; *N* is the number of observations (spatial units); *i* and *j* are the locations of observations; $W_{ij}$ is the matrix of spatial weights; $X_i$ is the value x registered for observation at location *i*; $X_j$ is the value x registered for observation at location *j*; $\overline{X}$ is the mean of the values of the variable x.

Moran's Index values can range between -1 and +1, with -1 indicating strong negative spatial autocorrelation (high values clustered with low values; low values clustered with high values), +1 strong spatial autocorrelation (high values

clustered with high values, low values clustered with low values) and 0 no spatial autocorrelation (random distribution).

Results stemming from the calculation of the Global Moran's I are reported in a numeric form (index) and usually plotted on the so called Moran's scatterplot, a tool firstly developed and proposed to the academic community by scholar Luc Anselin in the 1990s (Anselin 1996). As described by the author, the scatterplot is based on the interpretation of the Moran's I as a regression coefficient in a bivariate linear regression of the spatially lagged variable (*Wx*) on the original variable *x* (Anselin 1996, p. 112).

The scatterplot is constituted by an *x* axis and *wx* axis, and from their intersection four quadrants are formed. The scatterplot is centred on 0,0 since the variables are taken as deviations from their means. The four quadrants in the scatterplot represent *"different types of association between the value at a given location ($x_i$) and its spatial lag, that is, the weighted average of the values in the surrounding locations ($wx_i$)"* (Anselin 1996, p. 117).

The points displayed on the upper-right quadrant represent high values (above the mean) surrounded by high values (High-High), whereas the points existing in the lower-left quadrant represent low values (below the mean) surrounded by low values (Low-Low). The upper-left quadrant and lower-right quadrant are associated to low values surrounded by high values (Low-High) and high values surrounded by low values (High-Low) respectively, and they correspond to negative spatial association.
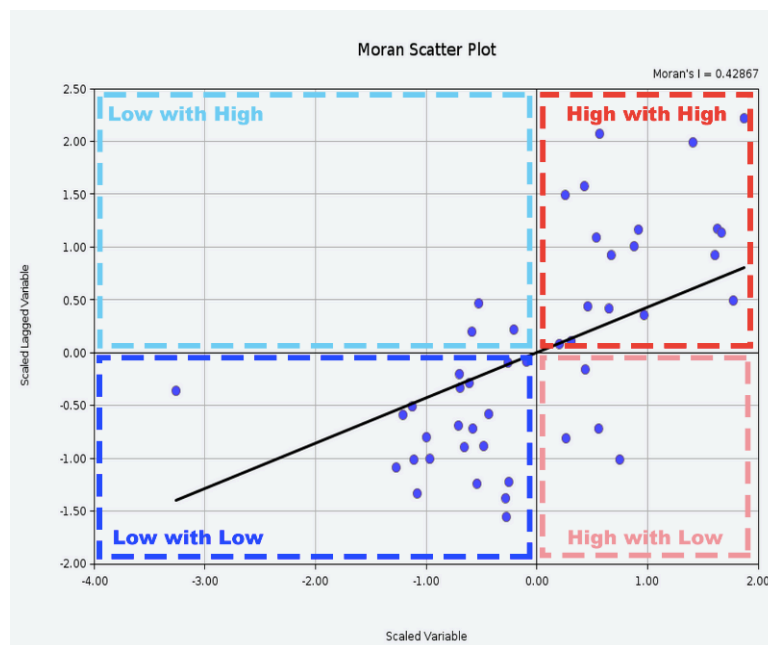


**Figure 7.** The Moran's Scatterplot
(*Source*: https://docs.aurin.org.au/portal-help/analysing-your-data/chart-tools/moraniscattervisualisation-workflow/)

The Moran's scatterplot is usually enriched with a linear smoother, whose slope indicates the Global Moran's Index; the linear smoother is particularly useful, for instance, to indicate the degree of fit and the presence of outliers. In fact, through the scatterplot it is also possible to visually identify the points presenting specific *x* and *wx* values and consequently detect observations with atypical location, e.g. points that are extreme with respect to the central tendency reflected by the linear smoother; these points can be spatial outliers, i.e. points that do not follow the same process of spatial dependence highlighted for the other observations. However, at the same time the scatterplot can also be useful to find the observations that exert a large influence (leverage) on the Moran's I (Anselin 1996, p. 122).

An alternative procedure that investigates spatial autocorrelation at the global level is the calculation of the Geary's C. The main difference with respect to the Moran's I is that in the numerator the actual values registered at each location (instead of their deviations from the mean) are considered. The values stemming from calculation vary from 0 to 2 and their interpretation is the following: 0 indicates perfect positive spatial autocorrelation, 1 indicates the absence of spatial autocorrelation (i.e. randomness), whereas 2 indicates perfect negative spatial autocorrelation (i.e. dispersion).

$$I = \frac{N \sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}(x_i - \overline{x})(x_j - \overline{x})}{(\sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}) \sum_{i=1}^{n} (x_i - \overline{x})^2} \qquad C = \frac{N \sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}(x_i - x_j)^2}{2(\sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}) \sum_{i=1}^{n} (x_i - \overline{x})^2}$$

**Figure 8.** The Moran's Index (left) and the Geary's C (right)
(*Source*: Di Salvatore 2018)

### Local Indicators of Spatial Association (LISA)

The assessment of spatial autocorrelation patterns at the local level is performed through *Local Indicator of Spatial Association* (LISA) techniques (Anselin 1995). Local indicators of spatial associations were proposed by Luc Anselin in the mid-1990s (Anselin 1995) and they allow to perform the decomposition of global indicators, identifying the contribution of each individual observation to the global value of the indicator (Anselin 1995, p. 94).

For instance, the Local version of the Moran's Index allows to identify local spatial clusters with a significant value of LISA. These local spatial clusters are frequently referred to as *hot spots*, and the accepted statistical significance level can be chosen by the researcher. In mathematical terms, a LISA ($L_i$) for a variable

$x_i$ observed at a location $i$ is expressed as (a) and it observes the (b) requirements (Figure 9):

$$L_i = f(x_i, xj_i) \qquad\qquad (a)$$

$$\Pr[L_i > \delta_i] \leq \alpha_i \qquad\qquad (b)$$

**Figure 9**. Local indicator of spatial association: definition (a) and requirements (b)
(*Source*: adapted from Anselin 1995, p. 95)

$L_i$ is thus considered as a function of $x_i$ and $xj_i$, i.e. the values observed in the neighbourhood $J_i$ of $i$ (Anselin 1995, p. 95). Then, $L_i$ is statistically significant whether the probability that its value is higher than a critical value ($\delta_i$) is either equal or lower than a certain significant level ($\alpha_i$).

In the case of local indicators of spatial association interpretative tools provided by a software such as –for instance- GeoDa include not only the Moran's scatterplot and value but also a map displaying High-High, Low-Low, Low-High and High-Low patterns, if present. Additionally, another map displaying the significant levels of the identified relationships (i.e. 0.05, 0.01 and 0.001) helps the researcher better interpret the strength of results.

The results stemming from the calculation of the Moran's indexes can then be treated with randomization/permutation procedures. For instance, the GeoDa software allows to perform a variable number of permutation (e.g. from 99 to 999), according to the confidence level that the researcher deems appropriate. According to scholars (Longley et al. 2015, p. 336; Anselin 1995, p. 96), the randomization process can be considered as a test of a null hypothesis, where the null hypothesis is that the calculated index is not different from the index that would have arisen from a different (random) arrangement of the spatial units. In fact, as noted by Longley et al., it is reasonable to ask whether the obtained value of the Moran's Index *"could have arisen by chance because even a random arrangement of a limited number of values typically will not give the theoretical value of 0 corresponding to no spatial dependence"* (Longley et al. 2015, p. 336). The null hypothesis evaluated through the randomization/simulation of a number of random arrangements is thus that the distribution of the values is random, with each feature receiving a value that is independent from neighbouring ones (Longley et al. 2015, p. 336).

### *The Bivariate Moran's I*

Finally, Bivariate Moran's I measures the correlation between the values of a variable $x$ at a location $i$ and the values of a different variable $y$ in areas identified as near or as neighbours. In the Moran Scatterplot the values of variable x are plotted on the horizontal axis, whereas the values of the other variable in

nearby/neighbouring areas are plotted on the vertical axis (Anselin 2003, p. 14). As noted by L. Anselin, the bivariate procedure can refer to two different variables but also to the same variable measured at two different points in time, making it suitable to measure space-time correlation (Anselin 2003, p. 14).

As underlined by scholars, spatial association does not necessarily imply causality (Smith et al. 2018), since two variables may be associated either due to a causal relationship or to a hidden variable causing the association itself; however, it nevertheless provides evidence of possible causality, to be assessed in light of other evidence and/or theory (Miller 2004).

If, on the one hand, the existence of spatial autocorrelation may be integrated and corrected in regression models, on the other one it can be considered as an approach bearing information in itself, given that it shows spatial associations existing among spatial entities (Miller 2004).

### *The modifiable areal unit problem*

It is important to underline that, when performing spatial analyses and/or statistical analyses treating data referring to areas, the *"modifiable areal unit problem"* (Longley et al. 2015, pp. 298-299) needs to be taken into account: in fact, it is known that the selection of the unit of analysis influences results and – likely- their interpretation. This problem arises from the fact that the object of studies facing –for instance- socio-economic issues are frequently areal aggregations (e.g. census tract) of the units under examination (e.g. inhabitants), and the nature of the aggregation used may not be able to perfectly represent the characteristics of single units (e.g. individuals) forming the group (*ecological fallacity*). Additionally, zones usually have a certain degree of internal heterogeneity, and this may increase the problem (Longley et al. 2015, pp. 122-123). However, zoning systems implemented for general socio-economic purposes usually maximise within-zone homogeneity, reducing the magnitude of the problem. In general terms, scholars have pointed out that relationships (e.g. correlation coefficients) tend to increase with scale. Then, units can be aggregated in a multitude of ways (*aggregation* or *zonation problem*), and this may lead to different results too.

### *Inferential statistics*

Given the nature and characteristics of geographic data, inferential statistics approaches – i.e. statistics that aim to describe and make inferences for a population on the basis of data concerning a random sample of the population itself- are not usually appropriate instead. First of all, in many cases the data under study represent the entire population existing in a given area rather than a sample. Then, inferential statistics are based on the assumption that observations are independent and that the sample is random: consequently, even though the reality investigated through a specific GIS project could be in theory conceived as a sample of a larger reality, the data set under study would represent neither a independent (given the property of spatial dependence of geographic data) nor a random (since all the points would belong to a circumscribed area) sample,

making generalizations erroneous. Inferential statistics approaches - e.g. confidence limits and hypothesis-testing- could thus be applied only in the cases in which the data set under study can be conceived as an independent and random sample of a larger population, otherwise their application could be misleading (Longley et al. 2015, pp. 335-336).

Results stemming from the exploration and analysis of geographic data should thus be considered as descriptive of the specific area under study, and generalizations should not be made (Longley et al. 2015, p. 336). However, the replication of the study in different study-areas may help researchers find differences and similarities among areas, supporting them in the potential elaboration of more general principles and tendencies.

### *Incorporating spatial effects in econometrics*

The incorporation of spatial effects in econometric methods has led to the development of a specific field of research, i.e. spatial econometrics. Spatial effects may result either from spatial dependence or from spatial heterogeneity (Anselin et al. 2008), and the inclusion of spatial variables into a model specification can occur *"by applying a spatial lag operator to the dependent variable, to the explanatory variables, or to the error term"* (Anselin et al. 2008, p. 629). As pointed out by L. Anselin and colleagues, *"a spatial lag operator constructs a new variable that consists of the weighted average of the neighboring observations, with the weights as specified in W"* (Anselin et al. 2008, p. 629), i.e. the spatial matrix expressing the previously defined spatial relationships. If spatial autocorrelation is not present, traditional econometric methods can be applied; however, if spatial autocorrelation exists, this needs to be taken into account and specific spatial models need to be developed. Spatial lag models *"include a spatially lagged dependent variable on the right-hand side of the regression specification"*(Anselin et al. 2008, p. 630)[46]; in other words, in spatial lag models the dependent variable is affected by the values of the dependent variables in nearby places. In spatial error models the spatial influence comes only from the error term instead: in theory, it could be eliminated through the detection of unmeasured variables, the reduction/elimination of the measurement error but also the identification of more appropriate spatial units of analysis (since arbitrary spatial units and/or administrative spatial units may not be suitable to describe and understand a certain phenomenon).

Finally, it can also be added that geographically weighted regressions (GWR) can also be performed. More precisely, geographically weighted regressions are able to model the local relationships existing between variables and a certain outcome. The underlying assumption is that the strength and direction of the relationship between a dependent variable and its predictors may change due to contextual factors; this means that rates of change are not assumed to be universal but that

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[46] In English terminology, right-hand-side (RHS) variables correspond to independent (or explanatory) variables, whereas left-hand-side (LHS) variable corresponds to the dependent (or outcome) variable.

they are rather determined by the local context (e.g. local culture or local knowledge)[47]. Coherently, regression coefficients should be considered not as global estimates but rather as specific for a given location (Brunsdon et al. 1996). GWR is generally considered as a sample-point-based technique, it is suitable for interpolation and it can be especially used as an exploratory tool enabling to refine research questions, since its results might highlight patterns that otherwise could be missed.

Given the growing availability of geo-referenced data, spatial analysis is progressively assuming greater importance, and the application of spatial analyses approaches will be thus performed with regard to built heritage, peer-to-peer accommodation systems and other variables.

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[47] The variations of the relationships over space are referred to as spatial nonstationarity (Brunsdon et al. 1996).

# Chapter 2

# The rise, spread and characteristics of Airbnb

## 2.1 The origins of the platform

The idea of using a digital platform to temporarily share part of the domestic space with travellers dates back to 2007, when a bunch of students transformed the sitting room of their apartment into an economically advantageous accommodation for people willing to attend a busy conference in the expensive and crowded city of San Francisco (U.S.A.). Once sensed the profit potentialities of the initiative, Brian Chesky -current CEO of Airbnb- and two other entrepreneurs thus decided to expand their business intuition, establishing a structured website allowing people to offer their under-used domestic space to temporary visitors (Guttentag 2015). After the encouraging success of the start-up phase, in 2009 the website was redesigned and renovated, assuming its current name (www.airbnb.com); from that moment, the variety of accommodation available for rent was extended, and Airbnb started to allow the rental not only of shared or private rooms, but also of entire homes and apartments (Guttentag 2015).

Since 2009 the number of listings published on the platform and the amount of economic transitions occurred have grown exponentially[48]: according to Airbnb official figures, the website is currently used in nearly 190 countries and 81,000

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cities, for a total of more than 5,000,000 listings and 300,000,000 people host overall[49].

## 2.2 Functions, actors and business model

By a technical point of view, Airbnb can be defined as a digitally-enabled peer-to-peer accommodation system in which users are represented by *hosts* (i.e. people willing to temporarily rent their real-estate property or sub-portions of the unit)[50] and *guests* (i.e. people seeking for a short-term accommodation in private houses). Following the peer-to-peer approach, users can take the advantage of the platform to be hosts and guests at the same time (e.g. using the platform both to rent their own property and to find an accommodation that suits their needs when travelling). To favour reliability and safety, the system requires users to communicate their personal details and ID before registering to the platform; users can then enrich their own digital profile, e.g. adding a personal description and a photo. The creation of a personal profile is typical of commonly used social networks (e.g. Facebook, Twitter, Pinterest, Instagram…) and it is finalized to favour personalization, attachment and self-expression; in this case, it also aims to foster recognisability and trust among users, which might meet in person as well.

Hosts are then required to create a single listing for each accommodation they want to put on offer: they are asked to upload representative photos, write a description of the accommodation and -optionally- of the neighbourhood, detail the services and facilities provided, determine the days in which the accommodation is available for rent, specify prices per night and other additional charges (e.g. cleaning fees), and choose cancellation terms and conditions[51].

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[49] For official figures reported by Airbnb and updates, please see https://press.airbnb.com/fast-facts/ (last accessed on 4th September 2018). A comparison with official figures available on the company website in November 2017 (i.e. 65,000 cities involved and more than 200,000,000 people globally host) indicates that the short-term rental market is still growing.

[50] Prof. Ugo Rossi (Rossi 2017) interprets Airbnb and the sharing economy in general in light of M. Foucault's idea of the "entrepreneur of the self", which relies on the concept that everyone can get profits from his/her own properties (e.g. house, means of transport…) and/or abilities (e.g. cooking).

[51] Airbnb allows hosts to choose among a variety of different cancellation options. Flexible terms allow guests to obtain a full refund of the accommodation costs if the booking is cancelled up to 24 hours before the expected start of the stay; if the guest does not communicate the revocation of the booking before this term, the price of the first night is not refunded, instead; then, if the guest decides to terminate her/his own stay early, service costs related to the nights not enjoyed and still remaining after 24 hours from the cancellation, are fully refunded. Moderate terms enable the guest to obtain a full refund if the booking is cancelled up to 5 days before the planned start of the sojourn; if the guest does not communicate the revocation of the booking before this term, the first night is not refunded, whereas the following ones are reimbursed for 50%; if the guest decided to leave early, the nights not enjoyed 24 hours after the cancelling are refunded for 50%. Strict terms entail a refund of 50% of the due amount if the cancellation occurs 7 days before the expected beginning of the stay; refund is not possible neither for revocations taking place after this term nor for nights not enjoyed. For more details and more cancellation options, visit https://www.airbnb.it/home/cancellation_policies#flexible (last accessed 4th

Guests can use Airbnb to finalize their accommodation choice and payment directly through the platform, instead. The basic step is to launch a search on the browser embedded into the platform, usually writing the name of the desired destination; then, further filters such as dates of the stay, number of guests, type of accommodation, price per night range, instant booking (i.e. possibility to book instantly, without waiting a confirmation message from the host) and others can be applied to refine the search (Figure 10).
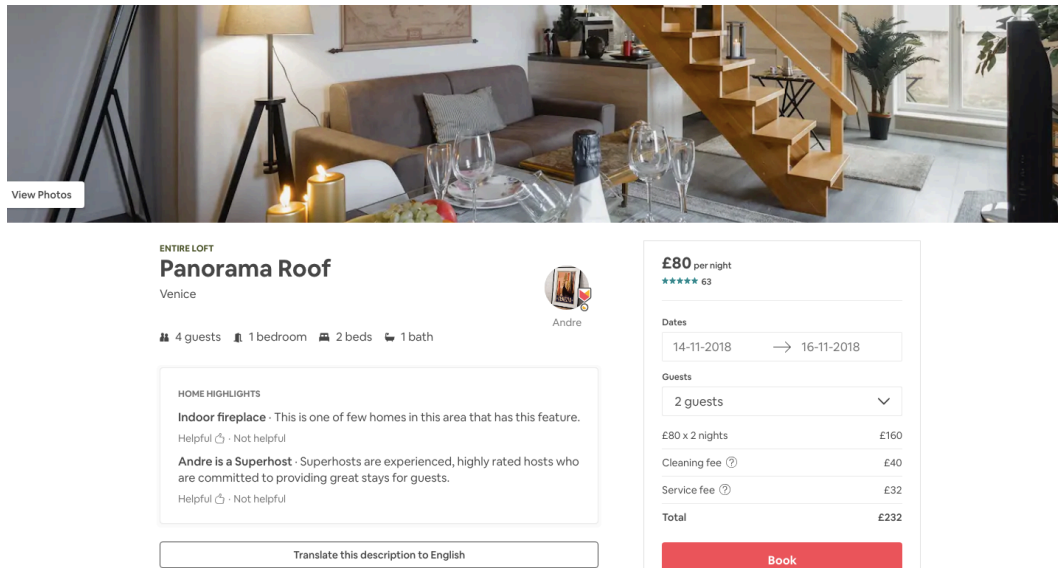


**Figure 10.** Example of Airbnb listing displayed to potential guests.
Total price and additional fees applied by the host are displayed on the right.
(*Source:* www.airbnb.com)

After the completion of the stay, guests are invited to rate their experience on a 5-stars scale; more particularly, guests have to rate their overall experience but also to express their level of appreciation with regard to the accuracy manifested by the host, the communication occurred with the host, cleanliness of the accommodation, location of the accommodation, check-in and value for money. Then, they are also encouraged to write a personal review of their stay. Hosts are invited to write a review of their experience with the guests (e.g. if they would recommend their guests to other hosts, if the guests behaved appropriately, etc.), instead. Additionally, hosts can also publicly reply to the reviews posted on the platform by their guests. The mechanism of reciprocal reviews is a fundamental component of the system: in fact, reviews on guests help the community of hosts decide whether to accept or not an accommodation request from certain guests; moreover, reviews written by guests can greatly influence the accommodation choice of future guests, who might rely more on consumers' points of view rather

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than on hosts' descriptions of their own property. Even if some authors have pointed out that users might tend to leave positive comments not to be negatively judged by the counterpart (Pizam 2016; Zervas et al. 2015), reviews and ratings nevertheless contribute to participants' decision-making processes. Additionally, with respect to other digital systems (e.g. TripAdvisor), the reviews written on Airbnb can be in theory considered to some extent more reliable and less manipulated since reviews can be left by users only after an actual economic transition has occurred[52].

Overall, Airbnb thus plays the role of a rental digital intermediary, and the intermediary costs of these economic transitions are charged both on hosts and guests: in fact, Airbnb adds a 6-12% of the accommodation costs to the bill paid by guests and retains the 3-5% from the earnings of guests (Guttentag 2015). Payments are mediated by the platform and can be performed and received through different modalities (e.g. PayPal, direct deposit, wire transfer)[53]. The business model adopted by Airbnb thus entails the generation of revenues charging both hosts and guests for the intermediary service (Oh and Moon 2016; Sundararajan 2013). Additionally, it could be added that this relatively new business model creates value building on assets of private individuals (Parker et al. 2016 in Täuscher and Laudien 2017), such as the spare residential space of hosts.

## 2.3 Beyond the sharing economy paradigm: other theoretical frameworks

The Airbnb phenomenon has been originally interpreted in light of the *sharing economy* framework (Oh and Moon 2016). In short, sharing economy generally refers to exchanges that entail the sharing of under-used goods or services; the providers of the goods/services are not usually professionals in the field and beneficiaries can become providers as well, if they want to share their resources. Peer-to-peer accommodation systems are thus characterized by horizontal, non-hierarchical relationships (*peer-to-peer*) in which roles are interchangeable; benefits can be monetary and economical, but also psychological, reputational, social and relational. By an economic point of view, the sharing activity allows providers to optimize the value of under-used goods/services, whereas beneficiaries can have access to the resource with

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[52] About this point it is important to note that authors found that on Airbnb ratings are usually higher than the ones registered, for instance, on TripAdvisor (Zervas et al. 2015); this phenomenon might be either caused by a matching of Airbnb guests' expectations with Airbnb actual offering or, as suggested by Zervas and colleagues (2015), it might be influenced by the reciprocal review process, where guests might be more generous with their reviews in order not to receive back bad reviews that could mine their future use of the service.

[53] For details about charges and payment procedures, visit https://www.airbnb.it/host/homes?from_nav=1 (last accessed 4th September 2018).

advantageous conditions (usually economical)[54]. In the sharing economy context, a fundamental role is played precisely by digital platforms: in fact, they allow not only to connect providers with potential consumers (and vice versa), but also to enable an effective and rapid communication between the parts, to carry out monetary transactions (if required) and to reinforce the relationships between the actors, contributing – at least in theory- to the building of a community[55].

Given the characteristics of the platform and the agents involved, S. Benoit and colleagues (2017) contextualize Airbnb in the framework of the *collaborative consumption*, which occurs when exchange is mediated by a triangle of actors, i.e. a platform provider (e.g. Airbnb), a peer service provider (e.g. an Airbnb host) and a customer (e.g. an Airbnb guest). The authors also explain that collaborative consumption differs from sharing economy since the latter does not necessarily entail a triadic relationship and it is not market-mediated.

Since the type of accommodation most frequently listed on Airbnb is represented by entire homes/apartments –as it will be more extensively described in the next sections- the sharing economy framework has recently been questioned by other authors. For instance, D. Guttentag (2015) has tried to interpret the Airbnb phenomenon in light of the *disruptive innovation* theory. This theory was introduced by prof. Clayton Christensen at the end of the 1990s, and it describes how products presenting unconventional characteristics -but providing alternative benefits- with the passing of the time can transform the market and catch a large part – if not the majority- of the customers. At the very beginning, the new product shows selling performances that are lower than the ones registered for similar products already established on the market; additionally, it presents benefits (e.g. a lower price, an easier way of use…) that initially seduce only a marginal portion of customers or even create a new market. With time, the characteristics of the new product improve and become interesting and valuable for a greater number of people. With diffusion, the product becomes more profitable for its providers but at the same time it starts to be a competitor for companies manufacturing products characterized by more traditional attributes. Given the progressive spread of Airbnb, it is thus easy to understand why this new system has been interpreted by some scholars in light of the theory described above, and the possible competition with the traditional accommodation sector has just started to be studied.

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[54] The sharing economy approach has currently interested a variety of sectors, ranging from the sharing of objects to the sharing of means of transport (e.g. Uber), workspaces and residential units.
[55] As noted by prof. Ugo Rossi, in many cases a sense of "community" does not actually arise, and the experience provided by the platform mainly consists into a narcisist exhibition of the self. More particularly, the author highlights that the sharing economy paradigm seems to be linked to the process of individualization that characterizes the societies experiencing advanced/late stages of liberalism (Rossi 2017, pp. 256-257).

## 2.4 The value proposition: between temporary residency, localness, authenticity and sustainability

According to founders, one of the added values of Airbnb is enabling guests both to experience accommodation solutions featuring unique characteristics and to live in the desired destination as a local. It is thus not a case that the value proposition claimed by the company in 2017 was *"Book unique homes and experience a city like a local"*[56]. The explicit meaning of this message is that Airbnb is a system that allows guests to live like locals or at least to directly experience how locals live in a given destination; implicit meanings seem to refer to the possibility of genuinely interacting with inhabitants of a city, staying in residential neighbourhoods and feeling part not only of the visited environment but also of a community composed by people sharing interests, lifestyles and values. The message also blinks to the concept of temporary residency and seems to overcome the association between travel and (mass) tourism, which has been perceived as negative in many cases.

The issue about tourists' self-perception is not new. In fact, in contributions dating back to the 1990s, some authors reported that many people - technically definable as "tourists"[57] - professed not to be tourists and to dislike ("other"?) visitors. Additionally, some affirmed to try not to act like tourists, even though perceived as foreigners by the local community (Nogués Pedregal 1996). Similar attitudes emerged through a market research involving a representative sample of 2,307 U.S.A. adult travellers and commissioned by Airbnb in 2015: 47% responded they were not happy to be considered tourists when visiting a destination, and 55% responded that they would appreciate to combine tourist

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[56] It is interesting to report here how the Airbnb value proposition was translated into other languages. For instance, the French claim was *"Réservez des logements uniques et vivez là-bas come des locaux"*, whereas the Italian one was *"Prenota case uniche e vivi come una persona del luogo"*. Overall, the concepts expressed are similar in all the three different languages, even though the English version seems to stress the accent also on the urban dimension. These value propositions were available in November 2017 at the following links: https://www.airbnb.co.uk/, https://www.airbnb.fr/ and https://www.airbnb.it/. However, it must be underlined that –as explained in following sections of this chapter- the Airbnb value proposition has changed in 2018, and it is now very much oriented on the experiential and global component. Since 2007, the slogans that have been used by the company on its website and app are various: *"Forget Hotels"* (2007), *"Book rooms with locals, rather than hotels"*, *"Travel like a human"* (2008-2009), *"Belong anywhere"* (2013-2014), *"Don't go there, live there"* (2016) (https://all-about-airbnb.com/post/143221488726/airbnb-brand-evolution-live-there, last accessed 1st September 2018).

[57] According to the definition provided by the United Nations, a visitor is classified as tourist (or overnight visitor) if her/his trip includes an overnight stay (United Nations and World Tourism Organisation 2010, p. 10). A visitor is defined as "a traveller taking a trip to a main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purpose) other than to be employed by a resident entity in the country or place visited", instead (United Nations and World Tourism Organisation 2010, p. 2008). However, even if these definitions are useful for statistic purposes, definitions of tourists are multiple. For a critical review of the concept of "tourist", see Ghanem 2017.

activities with local experiences[58]. The negative allure associated to tourism is frequently related to the downsides of mass tourism: if, on the one hand, mass tourism has been (and it still is) a source of economic growth and development, on the other hand it has led to exploitation and commodification of local resources (included cultural and built heritage), standardization of the experiences, travellers' dissatisfaction and pressure on urban and natural eco-systems. Additionally, it may also compromise the liveability of the place (negatively affecting the daily life of residents) and alter the physical and socio-cultural local environment; with particular regard to historic cities, it has also had effects on historic urban landscapes, which incorporate not only material and immaterial components, but also changing perceptions of the landscape itself (García-Hernández et al. 2017).

A classic example is represented for instance by the city of Venice (Italy), where both tourists and excursionists[59] tend to spend their time in the surroundings of the most famous attractions, creating congestion phenomena judged to be so unbearable that the local Municipality has temporarily installed turnstiles at key entry points of the city, as to control the access of tourists (Brunton 2018). Other countermeasures planned by the Municipality and presented in the recent *Project of territorial governance of tourism in Venice* (Città di Venezia 2017) include the implementation of promotional strategies capitalizing on the brand 'Venezia' to encourage the visit of the Venetian territory at large; the goal is to foster awareness on the local offer and to redirect part of the tourist flows towards the countryside and generally beyond the boundaries of the old city, where visitors could be welcomed in bed & breakfasts, rent rooms and apartments and basic hotels. As already pointed out in other studies (Di Maria et al. 2003), visiting patterns of the city are driven by "must see" attractions, and what seems to influence the attendance of other cultural heritage resources is not a pre-existing cultural motivation but the proximity of these resources to the most attended tourist paths; these considerations thus underline the importance of expanding the awareness about local heritage resources. Then, a further objective of the *Project* is the facilitation of residency inside the Municipality, since the number of inhabitants has generally declined due to the discomfort of the houses

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[58] For a summary of the main results, visit https://press.airbnb.com/airbnb-launches-new-products-to-inspire-people-to-live-there/ (last accessed on 1st September 2018).

[59] Excursionists are defined as people visiting a destination just for the day (without spending a night in the place). More precisely, they can be subdivided into "real excursionists" (i.e. visitors leaving from their place of residency in the morning and then going back home straight after the visit); "indirect excursionists" (i.e. people visiting a given destination just for the day, while spending their holyday in another location); "false excursionists" (i.e. people spending the night in nearby locations because the accommodation facilities of the destination to be visited are at capacity). In general terms, they greatly contribute to the pressure on city cores, since they take advantage of local resources without generating considerable revenues for the destination (Di Maria et al. 2003). Excursionists may be also defined as same-day visitors (United Nations and World Tourism Organisation 2010, p. 10).

but also to high prices and to the aftermaths of the economic crisis (Città di Venezia 2017).

This background has thus progressively induced various stakeholders to become ambassadors of new and more sustainable forms of tourism that entail the respect of the local milieu, interaction with the inhabitants and longer stays, which allow to delve into the peculiarities of the place and then may result into tangible economic outcomes for the local community. In fact, differentiation and multiplication of the stimuli imply less pressure on single hotspots, a more balanced distribution of economic benefits among a larger number of actors and the generation of greater economic value.

Airbnb has not only embraced this approach into its narrative, but it might be said that –with its diffusion and visibility- it is actually contributing to the spread of this tourism trend. The commitment towards this model has been communicated not only through slogans and the peer-to-peer accommodation system itself, but also through specific campaigns: an example is constituted by a recent cartoon-like video showing how to sustainably visit and live in a city such as -not surprisingly- Venice[60].

The spread of concepts encouraging *"temporary residency"* instead of *"tourism"* is reflected also by strategies recently implemented by some destination marketing organizations. For instance, the 2020 strategy freshly launched by *Wonderful Copenhagen* (the official tourism organization for the Capital Region of Denmark)[61] is significantly titled *"The end of tourism as we know it- Towards a new beginning of localhood"* (Wonderful Copenhagen 2017). This position paper defines the contemporary traveller as a *"temporary local"* seeking experiences and emotional connections, and the role played by inhabitants and local actors is crucial in delivering the destination experience. More specifically, the document envisions a *"future of hosts and guests"* and a *"shared experience of localhood", "with the ambition of co-creating sustainable and long-term value"* for the destination, together with the partners and the locals, *"both the temporary and the permanent ones"* (Wonderful Copenhagen 2017, p. 4). The paper explains that nowadays fewer and fewer want to be identified as tourists – as anticipated above-, and that new generations of travellers seek authentic destinations, desiring to live the experiences that make a destination unique; in this framework the harmonious interaction between visitors and locals is essential, but visitor growth should not mine the quality and liveability of the place; ideally, the interaction between visitors and locals should contribute to the liveability of the city, instead (Wonderful Copenhagen 2017).

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[60] The video, titled *"Live like a local in Venice"*, was uploaded on the web by Airbnb Citizen (https://www.airbnbcitizen.com/), which aims to foster a sense of community and to communicate the impact of Airbnb on local contexts and economies. The video can be watched at the following link: https://www.youtube.com/watch?v=pXvpfyfF_kg (last accessed 5th September 2018).

[61] For more information about the organization, please visit https://www.visitcopenhagen.com/wonderful-copenhagen/copenhagen/who-we-are (last accessed 5th September 2018).

According to figures reported by the company, the localness factor plays a very important role for Airbnb guests. In fact, it seems that 79% of guests chose Airbnb because they wanted to live like a local[62]; additionally, with specific reference to Italy, 76% of guests who responded to a survey chose Airbnb to better explore a given neighbourhood (Airbnb Citizen 2017).

In line with the attention devoted to authenticity and localness, Airbnb defines itself as an actor enabling a *"healthy form of tourism"* that creates a positive impact on destinations around the world and that can also benefit the local economies of the neighbourhoods in which the lodgings are located[63]. For instance, with reference to Italy, the above mentioned report (Airbnb Citizen, 2017) pointed out that the average amount of money spent by an Airbnb guest visiting Italy is 171 euros per day, distributed as following: 34% is allocated to food and beverage, 19% to shopping, 15% to transports, 15% to cultural activities, 10% to groceries and 6% to free time entertainments; a residual 1% covers other expenses. A particularly interesting percentage is the one describing the location in which Airbnb tourists spend their money: in fact, according to the report, 41% of the guests' daily expenditure is paid out in the neighbourhood in which the chosen Airbnb accommodation is located.

Savings made through the booking of an economically advantageous Airbnb accommodation seems to benefit the local economy too, since the company states that 53% of guests spent these savings in the neighbourhoods and cities they visited[64].

## 2.5 Conquering new users: market evolution and enabling factors

Initially, the aim of Airbnb was to favour the booking of economically advantageous accommodation (e.g. air-mattresses, sofas and shared rooms), but since 2009 the market has progressively evolved and the offer now even includes the temporary rent of castles, tree-houses, luxury apartments, villas and other attractive lodgings. If at the beginning of the business the favoured target was represented by young people willing to find a cheap accommodation when travelling, the evolution of the offer and the adoption of the platform by more differentiated potential guests has thus transformed and widened the market. The reasons behind the growth of the phenomenon are multiple, and it might be advanced that enabling conditions lie not only in the development of the technology itself, but especially in the new relationships occurring between

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[62] These data are available at https://www.airbnbcitizen.com/data/#/en/ (last accessed 5th September 2018).

[63] For these definitions, please visit: https://www.airbnbcitizen.com/data/#/en/ (last accessed 1st September 2018).

[64] These data are reported here: https://www.airbnbcitizen.com/data/#/en/ (last accessed 1st September 2018).

individuals and digital tools, in the ever evolving social and mental habits and in the current socio-economic background. For instance, G. Prayag and L.K. Ozanne (2018) have recently suggested to interpret the rise and spread of Airbnb in light of the multi-level perspective theory, i.e. a framework that has been particularly used to investigate socio-technical transformations and changes. According to this framework, transitions should be explored considering multiple levels of analysis, namely a macro-level (i.e. a landscape level including long-term economic, political, socio-cultural and technological developments), a meso-level (i.e. socio-technical regimes composed by social groups that respect a set of rules and populate a given industry) and a micro-level (i.e. innovative technologies and niche actors).

With reference to the digital dimension, it can be useful to recall here that the technology adoption process generally follows a particular cycle: if at an early stage only a marginal part of consumers (the *innovators*) use the new product, this percentage progressively increases (*early adopters*), until the *early majority* and then *late majority* of the market are conquered by the product; finally, *laggards* become consumer of the product, too (Rogers 1962) (Figure 11).
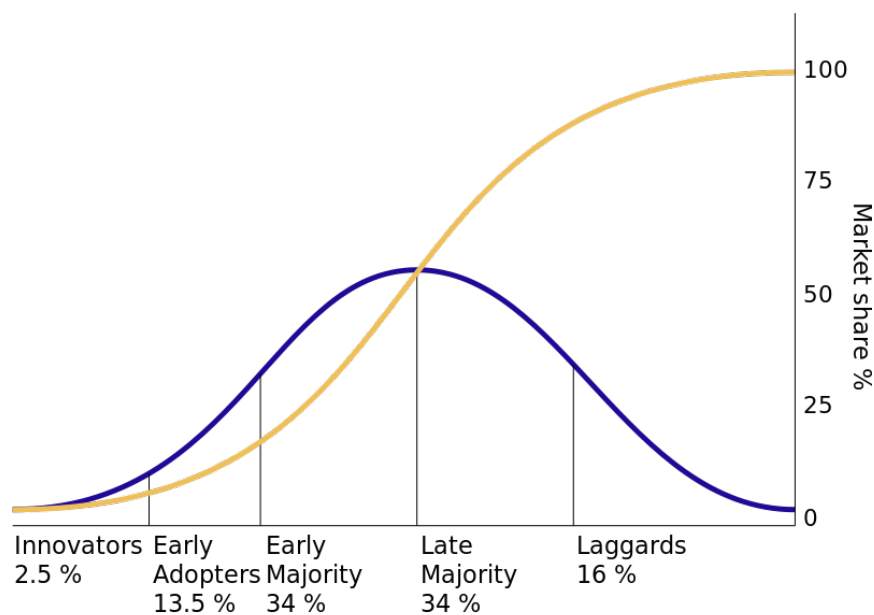


**Figure 11.** Technology adoption cycle.
The blue curve indicates the groups progressively adopting the innovation product, whereas the yellow curve illustrates the correspondent market share.
(*Source*: https://commons.wikimedia.org/w/index.php?curid=18525407,
Based on Rogers, E. (1962) Diffusion of innovations. Free Press, London, NY, USA,
Public Domain)

Even if Airbnb is not a technology in itself but a digitally-mediated service, a trend similar to the technology adoption cycle has been registered so far: in fact, when the platform was launched, Airbnb was used only by a niche of consumers,

mainly constituted by young people desiring to find a cheaper accommodation than hotels (guests) and by hosts desiring to meet new people and gain extra money through the temporary sharing of their under-used home space. Then, the number of adopters has undergone a steep increase (exceeding 300,000,000 guests in less than 10 years of activity), and the profile of guests has progressively changed. The results emerging from a recent study (Guttentag et al. 2018; Guttentag 2016) help shed light on the motivations and characteristics of current guests. In fact, an on-line survey has investigated the motivations, goals and consuming patterns of 844 users of Airbnb, also collecting participants' socio-demographic data and attitudes towards the brand[65]. The analysis of the data through cluster analysis techniques has allowed prof. D. Guttentag to identify 5 market segments of similar size, which have been defined as following: *Money savers*, *Home seekers*, *Collaborative consumers*, *Pragmatic novelty seekers* and *Interactive novelty seekers*. If *Money savers* are mainly young people (under 30) looking for an accommodation that does not need to be necessarily cheap but that is at least considered good value for money, *Home seekers* are families or adult groups (generally over 40 years old) that desire the typical comforts of a house (e.g. abundant space and house amenities) and that tend to use Airbnb with a frequency and for a duration that are usually higher than the average. *Collaborative consumers* are travellers especially motivated by the social and sharing components of the experience, and that have booked an Airbnb solution as an alternative to a bed&breakfast or a hostel; then, *pragmatic novelty seekers* and *interactive novelty seekers* both value the novelty and innovative characteristics of the service, but the latter segment is also attracted by the possibility to interact with local residents. Table 1 summarises participants' profiles and attitudes emerged through the survey.

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[65] D. Guttentag (2016) has particularly investigated the following aspects: purpose of the trip, performance of backpacking or not, selected type of accommodation, number of nights spent in the accommodation, number and type of accompanying guests, number of times the participant has chosen to utilise Airbnb, year of first use. The cumulative percentages that describe participants' answers are the following: purpose of the trip (leisure: 80%; visit of family/friends: 9%; conference or event: 5%; business: 4%); backpacking (yes: 18%; no: 82%); type of accommodation (entire home/apartment: 70%; private room: 28%; shared room: 2%); number of nights (1 night: 9%; 2 nights: 22%; 3 nights: 24%; 4 nights: 17%; 5 nights: 10%; 6 nights: 5%; 7 nights: 6%; 8-29 nights: 6%; 30 and more nights: 1%); number of accompanying guests (0: 11%; 1: 51%; 2: 12%; 3: 13%; 4: 6%; 5: 4%; 6 and more: 3%); type of accompanying guests –the selection of multiple options was allowed- (partner: 58%; children: 11%; friend/s: 31%; colleague/s: 2% ); number of times Airbnb has been used ( 1 time: 22%; 2 times: 17%; 3 times: 17%; 4 times: 11%; 5 times: 9%; 6 times: 6%; 7 times: 4%; 8-10 times: 7%; 11 times and more: 7%); year of first use (2008-2010: 4%; 2011: 6%; 2012: 13%; 2013: 19%; 2014: 32%; 2015: 26%). Then, the attitude towards the brand was investigated asking participants to express their level of agreement with the statement "Airbnb is consistent with how I see myself" (strongly agree: 16%; agree: 43%; somewhat agree : 34%; somewhat disagree/disagree/strongly disagree: 7%). The survey also highlighted that Airbnb is perceived as cooler than hotel chains such as Hilton and Holiday Inn.

|  | Money savers | Home seekers | Collaborative consumers | Pragmatic novelty seekers | Interactive novelty seekers |
|---|---|---|---|---|---|
| Age | Young people under 30 years old | Adults over 40 years of age | / | Adults under 40 years of age | / |
| Education level | / | HIGH | / | / | / |
| N. of accompanying guests | / | HIGH (2,3 vs average 1,8) | LOW (1,3 vs average 1,8) | / | / |
| Type of accompanying guests | NOT traveling with children | Traveling with the partner and/ or children | / | / | / |
| Length of the stay (nights) | / | LONG (5,6 vs average 4,2) | / | / | SHORT (3,4 vs average 4,2) |
| Type of accommodation | Entire homes/ apartments | Entire homes/ apartments | Shared with hosts | Entire homes/ apartments | Shared with hosts |
| Role played by saving | Saving is a key motivation | Saving is NOT a motivation | / | / | / |
| Perception of Airbnb as desirable and "cool" | LOW | / | HIGH | HIGH | HIGH |
| Level of self-congruity with Airbnb values | LOW | / | HIGH | / | / |
| Backpacking | / | NO | YES | / | YES |
| Frequency of use of Airbnb (times) | / | HIGH (5,8 vs average 4,6) | HIGH (5,4 vs average 4,6) | LIMITED (3,7 vs average 4,6) | LIMITED (3,4 vs average 4,6) |
| Airbnb as a substitute of a hostel | LIKELY | NOT LIKELY | LIKELY (also as a substitute of a B&B) | / | / |
| Airbnb as a substitute of a hotel | Airbnb NOT likely to substitute a MEDIUM level hotel | Airbnb likely to substitute a MEDIUM level hotel | Airbnb NOT likely to substitute a MEDIUM level hotel | Airbnb likely to substitute a HIGH level hotel | / |
| Satisfaction level | / | / | HIGH | / | / |
| Likelihood of recommending Airbnb | / | / | HIGH | / | / |
| Likelihood of using again Airbnb | / | / | HIGH | / | / |
| Interest towards interacting with locals | / | / | / | NOT interested | Interested |

**Table 1.** Airbnb users: segments identified by D. Guttentag.
(*Source*: author's elaboration on the basis of Guttentag 2016)

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Advertisement, word of mouth and e-wom (electronic word of mouth) undoubtedly contributed to the spread of the system, but facilitating conditions for the diffusion of Airbnb must be identified also in the socio-economic framework of the present time and of the last 10 years. In fact, work, holiday and travel habits have progressively evolved, making frequent escapism and peculiar experiences not only particularly desirable but also economically approachable for a certain part of society, especially thanks to low-cost transports (Eugenio-Martin and Inchausti-Sintes 2016). Additionally, the rise of a cosmopolitan consuming class valuing travelling as a form of self-expression and identity-building, together with the advancement of new forms of urban tourism in which visitors try to blend with the everyday life of residents have progressively contributed to aliment the phenomenon (Braun 2010; Füller and Michel 2014).

Then, effects of the 2008 financial crisis should be taken into account too; in fact, these include a worsening of the economic conditions of the middle class, which has started to take advantage of the peer-to-peer accommodation philosophy not only to possibly save money on vacation (demand side) but also as a source of additional income (offer side) (Hunt 2016).

According to figures reported by Airbnb, 43% of Airbnb hosting income is used to pay for regular household expenses, whereas 6% of hosts used the income resulting from their Airbnb activity to start a new business[66]. With special regard to Italy, it seems that 49% of hosts presents an annual income which is equal to or lower than the national average (Airbnb Italia 2017)[67].

## 2.6 A source of revenues or a contemporary form of *philoxenia*? Understanding hosts' benefits and profiles

In the Airbnb model fundamental stakeholders are hosts, i.e. the subjects willing to rent their residential space for short periods. The literature has underlined that the benefits generated by their activity can be various and multiple. Where a real sharing framework is present, altruistic motivations exist and hosts' benefits consist, for instance, in the pleasure of populating an under used residential space and in the satisfaction of seeing other people enjoy the same place where they live (Prayag and Ozanne 2018; Karlsson and Dolnicar 2016). Other benefits can stem from hosts interaction with guests and

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[66] For these figures, please visit https://www.airbnbcitizen.com/data/#/en/ (last accessed on 1st September 2018).

[67] According to the report, 24% of hosts declared a yearly income lower than 13,600 euros; 15% defined their income as being in the range 13,600-19,100 euros and 10% being between 19,101 and 22,200 euros. The other percentages are the following: 22,201-25,200 = 10%; 25,201-33,600 = 14%; more than 33,600 euros = 27%. However, it must be noted that the data collection methodology is not thoroughly explained in the text, and it is thus difficult to critically evaluate only on the basis of these figures the role played by Airbnb for the economy of hosts and their households.

consequently they can be defined as social (Karlsson and Dolnicar 2016), relational but also personal, since some hosts reported to be gratified when being considered "good hosts" (Lampinen and Cheshire 2016). Then, ancillary benefits enjoyed by hosts may be also represented by a greater appreciation of their own residential space and by the pleasure of inviting people in a clean and nice environment (Lampinen and Cheshire 2016). Further advantages that have not been considered by the literature concern self-improvement. In fact, it could be advanced that the rental activity could also foster both hosts' cultural development (e.g. acquisition of linguistic and informatics skills, in order to be able to better interact with the guests and manage bookings) and a deeper engagement in the life of the city (e.g. gaining more awareness about the events and the cultural offer of the city, in order to provide informed and valuable suggestions to their guests)[68].

However, since hosts charge guests for the use of their accommodation, an important goal for hosts is putting into value their under-used real estate properties and consequently gain revenues. More particularly, hosts may adopt different renting strategies depending on: a) the type of accommodation they are able to provide (e.g. single room, entire apartment, etc.); b) the availability of their accommodation through time (e.g. weekends only or selected months); c) management conditions (e.g. availability of time and/or people to be dedicated to rental-related activities); d) local regulations (e.g. taxation rules and limits concerning the number of days a property can be rent without a regular contract); e) location and characteristics of the neighborhood, such as proximity to public transports; f) demand trends; g) hosts' revenue objectives.

Depending on the goals and strategies implemented, authors have highlighted that, overall, hosts may rent residential space just to pay bills, earn money or even afford luxuries (Karlsson and Donicar 2016). For others, revenues can represent a "nice extra" that can be spent, for instance, for travelling (Ikkala and Lampinen 2015). A revenue-oriented behaviour is particularly evident for hosts managing more than one listing and for hosts offering accommodation for extended periods. The acquisition of residential units to be devoted to short-term rentals and the conversion of previously inhabited apartments into tourist flats (Schäfer and Braun 2016) are current realities that exemplify this revenue-oriented behaviour too.

In a true sharing economy framework, one could argue that Airbnb could be considered as a contemporary form of *philoxenia*. *Philoxenia* is a Greek term that indicates to offer friendship and hospitality and its etymology comes from *philos* (friend) and *xenos* (stranger, guest, or even enemy). In Homeric times *philoxenia*

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[68] These aspects are not very well evidenced by the literature and could represent a field of research in its own. It can not be excluded that the will to be more aware of the activities and of the cultural and entertaining offer of the city, together with the desire of having experienced the activities in first person, could also have certain economic effects on the local economy. Then, it is also possible to hypothesize that self-development and entrepreneurialism might increase with the current experience-oriented model pursued by the Airbnb company.

was typical of subjects linked by bonds of *philotes* (friendship) and implied a certain code of behaviour, together with mutual obligations (Zarkia 1996). In this relationship the host was considered as being in a superior position – since offering hospitality-, whereas the *xenos* was greatly honoured but nevertheless deemed in an inferior position, since receiving a favour. In contemporary times, peer-to-peer accommodation systems might thus be considered as a new form of *philoxenia* where on the one hand the host welcomes and takes care of the guests - trying to make unique their stay through interpersonal contact and the experience provided- and on the other one the guest shows respectful and grateful behaviours.

However, as shown in previous paragraphs, the component of economic gain is becoming substantial, and as already underlined for other forms of hospitality (Zarkia 1996), there is the risk that short-term rentals just become a business where the act of paying enables the guest to be in a superior position and interpersonal exchange is not particularly valued. In fact, as reported by T. Ikkala and A. Lampinen (2015), sociologist G. Simmel pointed out that the use of money as a means of exchange frees people from traditional and moral constraints, but at the same time it fosters social indifference and distance. Nevertheless, through interviews conducted with 12 hosts in Helsinki, authors pointed out that money and social exchange may to some extent coexist, even though the professionalization of the activity and other contextual conditions may affect the social dimension of this reality (Ikkala and Lampinen 2015). In other articles, A. Lampinen and other colleagues say that the exchange of money can even function as an ice-breaker facilitating social interaction (Lampinen and Cheshire 2016) and the fluency of the exchange process (Ikkala and Lampinen 2014).

Even though the sharing component is becoming less and less relevant, some authors have also underlined that making strangers live in private houses represents a form of commodification of private space implying the loss of privacy in the name of additional income and of the belonging to a community (Roelofsen and Minca 2018).

Even though hosts are fundamental actors, the number of studies focusing on their behaviours and profiles are still limited, and it is thus difficult both to make an identikit of a typical host and make generalised conclusions applicable to the entire Airbnb market. Up to now, studies have mainly investigated the influence of hosts' names (Edelman et al. 2016), gender (Ert et al. 2016), other demographic characteristics and personal photos (Kakar et al. 2017; Ert et al. 2016; Edelman and Luca 2014) on guests' booking choices and accommodation prices; other studies have also examined the effects of hosts' Airbnb online profiles – such as being a superhost (Wang and Nicolau 2017; Dogru and Pekin 2017; Liang et al. 2017; Teubner et al. 2017), being a multi-listing host (Xie and Mao 2017) or having already experienced the platform for some years (Teubner et al. 2017)- on listings performances.

In-depth studies focusing on hosts' personal characteristics would be useful instead, as to better understand the socio-economic framework enabled by Airbnb.

In this realm, only few authors have tried to pursue this goal, e.g. deducing hosts' characteristics from the socio-economic conditions of the zones where Airbnbs (i.e. Airbnb listings) are mostly present. For instance, in the case of London, S. Quattrone and colleagues (2017) have evidenced that in 2012 the first hosts were young people of different ethnicities and possibly characterized by a student status, whereas from 2013 onwards the peer-to-peer accommodation system model started to conquer adults aiming to integrate their income, too.

Other approaches could be represented by the analysis of texts and images published by hosts on their Airbnb profile. As for social media platforms, the role of the profile is to present the user to other members of the community; in this specific case, given the aims of Airbnb, it is plausible that the profile should contribute to make the property appealing for rent, e.g. fostering in the potential guest a sense of trust. As a consequence, if on the one hand the profile has the aim to reflect the host's identity, on the other one it is possible that elements of social desirability may be present. However, even if this is a possible bias that needs to be underlined, text and image analysis could be helpful to get an overview of the identity of the hosts, or at least of the identity that they project through the digital medium. Additionally, it must be noted that guests usually expect to meet the hosts they have contacted in the booking process, and that they can report in the post-stay review who actually manages the property they have visited and if they noticed some unattended discrepancies; the value put on transparency could therefore mitigate the above mentioned bias.

With reference to the existing literature, it is interesting to point out that a recent study has tried to make inferences about the age and expression of hosts analysing the photos of their Airbnb profile through Microsoft's Emotion API (Teubner et al. 2017): the authors found that hosts who posted a photo depicting their face presented an average estimated age of around 37 years, with a standard deviation of about 11 years[69]. On a scale from 0 to 1, the average assessed degree of smile was 0.277 instead, with a standard deviation of 0.368.

X. Ma and colleagues (2017) have coded and analysed the self-descriptions written by hosts on their own Airbnb profile, finding that the information disclosed by these actors mainly fall under the following categories: interests and tastes, life motto and values, work or education, family and personal relationships, personality, travel tastes and habits, motivations and feelings about hospitality. Authors found that hosts describing their origin of residence, their work or studies were perceived as more trustworthy than hosts writing about their personality, life motto and values, which can be more easily faked instead. However, even if the study is very stimulating since it offers a coding scheme and shows the relationships occurring between hosts' self descriptions, trust and guests' behaviour, it does not present a synthesis of hosts' characteristics.

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[69] The study was conducted by T. Teubner and colleagues (2017) on data concerning Airbnb hosts active in 86 German cities.

Finally, it must be underlined that the activity of hosts in the hospitality domain of the city is not neutral. In fact, on the one hand, hospitality services managed by non-professionals hosts might negatively influence visitors' perception of the city; on the other one, they might facilitate the establishment of personal and lasting connections with guests.

## 2.7 Investigating success: guests' preferences and favoured product attributes

According to the Airbnb narrative, the added value of the platform is thus represented by the possibility to live in unique homes and live in the destination as a local. In this framework, experimenting the everyday life of the place –e.g. staying in neighbourhoods usually less visited by tourists and sharing some moments with hosts- should represent not only one of the most valued components of the experience but also one of the reasons encouraging potential guests to use the platform. However, recent studies have questioned these assumptions.

According to Y. Chen and K. Xie (2017), the value of Airbnb consists in offering a range of possible accommodations, which should simply satisfy the basic needs of a temporary stay. Through the application of a hedonic price approach, authors have identified the characteristics more favoured by guests and their implicit prices, concluding that guests' decision-making seems mostly influenced by the functional characteristics of the accommodation. Then, prices per night seem determined by the characteristics and comforts of the house, and it is precisely for these characteristics and comforts that guest are ready to pay a higher price per night. Not surprisingly, basic characteristics determining higher prices are the following: number of bedrooms and bathrooms, type of accommodation (entire home/apartment, private/shared room) and nature of the residential unit. Interestingly, flats are valued more than houses; however, considering that houses are usually located in the outskirts of cities, the authors of the study advance the hypothesis that the added value actually consists in the location of the properties rather than in their nature. The article points out that also the services offered by the host in the booking phase have the power to influence prices: host's quickness of response, the number of procedures certifying hosts' identity and cancellation policies all have an impact on the paid rate. Additionally, reviews and ratings expressed by previous guests have an influence too. According to the research, social interaction plays a secondary role during the booking phase, instead. Y. Chen and Xie explain this last result noting that social exchange in an eventuality that may occur during the stay, and it can not thus be evaluated ex-ante. However, authors also note that the presence of professional/multi-listing hosts might negatively affect the social dimension.

A research on the attributes contributing to influence Airbnb prices was conducted by D. Wang and J.L. Nicolau (2017) too. The two authors analysed the listings scraped by Inside Airbnb with regard to 33 cities located in Europe, U.S.A., Canada and Australia[70]. The two authors found that the hosts' reputation and the information available on his/her identity are important, but also the status of superhost (i.e. a badge of quality) contributes to higher prices, especially for accommodations belonging to the lower categories of price; more particularly, the superhost status seems particularly influencing in France. The instant booking option is associated with lower prices, too; this phenomenon is interpreted by the authors as a specific strategy adopted by hosts that aim to maximise bookings and that consequently combine low prices with the possibility for the guest to book the accommodation automatically, i.e. without waiting confirmation from the host. For what concerns the characteristics of the house, the elements that contribute to higher prices are not only the number of bedrooms and bathrooms, but also services such as the availability of wireless internet connection and free parking. The study stresses that location is crucial: following a pattern already evidenced for hotels, Airbnb price per night decreases as the distance from the city centre increases; this effect is particularly emphasised for upscale accommodations, and authors have estimated the effect in – 0.59% per kilometre.

Even though the name "Airbnb" could recall the services offered by other hospitality facilities (e.g. bed & breakfasts), the study has evidenced that breakfast is actually served and/or provided only in 9% of the cases; additionally, the availability of breakfast seems not to affect prices of cheaper accommodations, whereas it seems to have a negative effect on listings belonging to the middle-high price segment[71]. According to D. Wang and J.L. Nicolau (2017), breakfast is provided only by hosts that want to take particular care of their guests and that consider this service a competitive advantage. A negative effect was registered also in association with the possibility to smoke inside the lodging: since an apartment where smoking is allowed may result less attractive for potential guests, hosts try to influence users' decision making through lower prices. Hosts requiring guests to identify themselves both through the platform and with a personal telephone number frequently set higher prices: this behaviour may be interpreted as a strategy pursued by hosts that want to safeguard both their property and themselves attracting only a certain type of customers, selected through a double identification procedure and higher prices. About this point, it must be underlined that a process of selectivity by the means of a price considered

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[70] However, it must be underlined that some places included in the analysis are not cities but wider areas, such as Trentino (Italy) and Santa Cruz County (California).

[71] The negative effect associated to breakfast was identified for all the countries considered, with the exception of Austria and France (Wang and Nicolau 2017, p. 130).

by the host above the average has also emerged through studies that have directly interviewed hosts (Ikkala and Lampinen 2015)[72].

Finally, a higher number of reviews per listing appears to be generally correlated –for the different categories of prices- with lower fares: lower fares seem thus to favour booking, coherently with the saving goals pursued by some customers using sharing economy services.

T. Dogru and O. Pekin (2017) have investigated the influence of different attributes on Airbnb accommodation prices focusing on the city of Boston (U.S.A.), instead. On the basis of data provided by the company Airdna (www.airdna.co), the two authors analysed the prices and attributes of 2,699 listings referring to the period 2015-2017[73]. Considering that entire homes/apartments and private rooms are considerably more expensive than shared rooms (+ 141% and +28% respectively), the authors noted that – even though Airbnb is presented as a sharing economy platform- privacy and space are the characteristics actually most valued by guests. For what concerns house supplies, prices per night are higher for accommodations suitable for disabled people (+10%), families (+ 11%) and events (+6%) or equipped with a washing machine (+6%) or a dryer (+10%). Accommodations offered by hosts with a superhost status present a premium price quantified in +5%, whereas a +11% fare applies when breakfast is provided[74]. Another factor particularly valued is cleanness: 70% of hosts apply a supplementary cleaning fee, and these listings are more expensive (+17) than the ones that do not apply an additional fare for the service. Coherently with results emerging from other studies (Wang and Nicolau 2017, Picascia et al. 2017), in Boston too prices tend to progressively decrease when the distance from the city centre increases. Additionally, accommodations tend to be located close to the city centre (within about 5 km, on average).

Also in the case of Boston a higher number of reviews (+1%) is associated with slightly lower prices (-0.4%), whereas the presence of a higher number of photos (+1%) is associated with a marginally higher price per night (+1%). This last result seems interesting in terms of marketing and communication strategies;

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[72] The interviews conducted by the two authors highlighted also other control strategies: for instance, some hosts applied relatively low prices in order to obtain more booking requests and then be able to select among them; others decided to apply relatively low prices at the beginning of their activity in order to make their accommodation particularly appealing, and then they hiked prices once gained a good reputation through guests' reviews (Ikkala and Lampinen 2015).

[73] The two authors included in the analysis only the listings that were already reviewed by guests. Since only guests that have really used the accommodation – or that have at least performed an economic transaction through Airbnb with reference to that specific accommodation- can rate their experience and leave a comment, reviews are frequently used in the literature as a proxy for occupation (see, for instance, Quattrone at al. 2017).

[74] The fact that a premium price is applied when breakfast is provided seems coherent with trends usually registered for hotels. On the one hand, this seems in contradiction with the results published by D. Wang and J.L. Nicolau (2017), but on the other hand it confirms what already underlined by the same two authors, i.e. that the serving of breakfast may play an ambiguous role. Overall, in Boston too the percentage of accommodations serving breakfast is rather low (6%).

however, one could argue whether numerous photos are associated to accommodations that are generally either in good or above average conditions. In fact, it is possible that hosts that are aware of the points of strength of their properties want to highlight them through dedicated pictures, especially with reference to characteristics that can not easily be communicated through text or lists (e.g. panoramic view, upscale building, quality and style of the furniture, atmosphere, etc.).

Additionally, it should be considered that the presence of a considerable number of photos allows the potential guest to better evaluate the accommodation in advance: it is thus possible that the transparency manifested by the host may firstly induce the potential guest to feel a higher degree of trust and then to his/her availability to pay more for the accommodation.

However, it must be underlined that the contributions that analyse product attributes tend not to consider the information implicitly communicated by the photos published by hosts to show their accommodation and guests' response to them. In fact, it can not be excluded that the perception of cleanness, freshness, level of refurbishment and modernisation, light and also a particular style of the furniture (e.g. contemporary, traditional, etc.) could influence guests' choices[75]. Additionally, the style and historicity of the building in which the accommodation is situated could be valued by some guests too. As a consequence, more studies on this topic could be developed, implementing methodologies that entail a certain degree of inter-rater agreement as to reduce the subjectivity of the judgement; then, text analysis could be implemented to identify historical buildings too.

Whereas some researchers have investigated consumers' preferences and the values assigned to specific attributes through the hedonic price approach, others have explored consumers' attitudes, opinions and behaviours mainly through the conduction of surveys. According to the available resources and to research goals, the approaches followed by scholars are various, and differences regard the number and type of the participants involved (e.g. users/non users of Airbnb, hotel clients, etc.), recruitment and administration methods (e.g. on-line, face-to-face, etc.). Overall, some of the main objectives of the studies devoted to the topic have been represented by the identification of the preferences of users and non-users, of the points of strength and weakness of the product (also in comparison with potential competitors), by the investigation of the attitude towards the use or re-use of the platform, by the identification of the motivations leading to the use/non

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[75] The analysis of 500,000 images concerning Airbnb listings of ten major cities pointed out that interiors of living rooms tend to present different degrees of dissimilarities, with Tokyo presenting the most plain interior styles (Rahimi et al. 2016); additionally, in a city such as San Francisco authors found that less decorated lodgings are located in very expensive areas, whereas in Tokyo and New York prices per night and level of ornateness seem to correlate positively. However, further studies on the topic are required.

use of Airbnb, but also by the study of the social, anagraphic and psychographic characteristics of users/non-users.

Apart from the guests' profiles identified by Guttentag (2016) and already presented in previous paragraphs, further studies have tried to analyse demand's segmentation, highlighting that users are heterogeneous and diverse, rather than uniform (Lutz and Newlands 2018). Nonetheless, through an online survey addressed to Airbnb users and qualitative content analysis of Airbnb listings descriptions, C. Lutz and G. Newlands (2018) found that the profiles of guests booking shared rooms and entire homes/apartments tend to be different. People choosing shared rooms are more likely to be male, with a low income, open to social interaction and with low concerns about cleanliness; they tend to travel alone or in large groups, whereas their education and age can be various. Users of entire homes/apartments usually travel in couple, they present high education and income, tend to feel uncomfortable with social interaction and they nor present concerns towards cleanliness of the place; age and gender can be various instead.

Overall, the analysis of the literature on the topic highlights that, even if Airbnb presents itself as a sharing economy platform allowing to experience destinations like a local, the platform has not been used in this way so far, neither by the offer nor by the demand side. In fact, in several urban contexts the highest concentration of listings is registered in proximity to city centres, and guests tend to book listings situated in convenient locations near the major focal points of the city, instead of choosing more peripheral neighbourhoods[76].

## 2.8 New business horizons and the experience economy framework

Up to now Airbnb has especially served the needs of leisure travellers: as a consequence, studies on the phenomenon are particularly appropriate to monitor the relationships between tourism and these new forms of digitally-enabled hospitality. Nevertheless, to be thorough, it must be noted that in the recent past the company has started to cater for business travellers too: in fact, hosts and guests can specify if they are respectively putting on offer or looking for a "business ready" accommodation[77], i.e. a space that presents a set of characteristics and facilities particularly suitable for people moving for work

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[76] D. Coyle and T.Y. Cheong Yeung (2016) have presented estimated occupancy rates concerning a selection of fourteen European cities. On the basis of maps showing the geolocation of listings registering occupancy rates of 75% or above, authors affirm that the maps seem to confirm Airbnb claims, i.e. that the system contributes to the economy of a variety of neighbourhoods, included the ones out of the city centre. However, authors do not provide data or maps concerning lower occupation rates: if, on the one hand, listings registering high occupancy rates are undoubtedly distributed throughout cities, on the other one it is nevertheless difficult to thoroughly interpret the maps and understand how different occupancy rates are distributed.

[77] For the specific section of the website devoted to "business ready" options, please visit https://www.airbnb.it/work (last accessed 1st September 2018).

reasons. Then, the Airbnb "Plus" section aims to conquer and satisfy a segment of potential guests identifiable with people desiring to stay in accommodation with high quality standards and verified by a staff member of the company[78]. However, the new business opportunity the company is currently concentrating on is represented by "experiences", i.e. activities facilitated by pro-active users of the platform (the "hosts") and offered either as stand-alone pastimes or in combination with hospitality. The slogan *"Book unique homes and experiences"*[79], which currently appears on the homepage of the Airbnb website - and that seems to put on the same level accommodation and activities-summarizes this new orientation. On the one hand, the provision of experiences reinforces the personalization and originality of the hospitality offer, it strengthens the role of locals and the interaction between hosts and guests, and it also contributes to the memorability of the stay; on the other one, it is particularly coherent with the *experience economy* framework spread in these decades and theoretically described by B. Pine and J.H. Gilmore in the late 1990s (Pine and Gilmore 1998). More precisely, in B. Pine and J.H. Gilmore's view, differentiation exactly represents an evolutionary stage of a business and experiences are defined as an advanced next step in the progression of the economic value (Figure 12). More particularly, the provision of an experience can represent a competitive advantage and transform the simple provision of goods or services.

According to the authors, fundamental components of an experience are the participation of the customer (who is actually defined as a "guest") and his/her connection (i.e. environmental relationship) with the context in which the experience occurs; participation can range from passive to active, and experiences can be classified into educational, escapist, aesthetic and entertaining. However, the overarching goal is to stimulate customers' senses, emotional engagement and ultimately foster memorability (Pine and Gilmore 1998).

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[78] The "Airbnb Plus" section is presented here: https://www.airbnb.it/plus (last accessed 1st September 2018).

[79] This version of the slogan was available at https://www.airbnb.co.uk/ in early September 2018 (last accessed 2nd September 2018). As evidenced in previous paragraphs, the company frequently changes its slogan/value propositions: it is therefore likely that new updates will occur in the future.
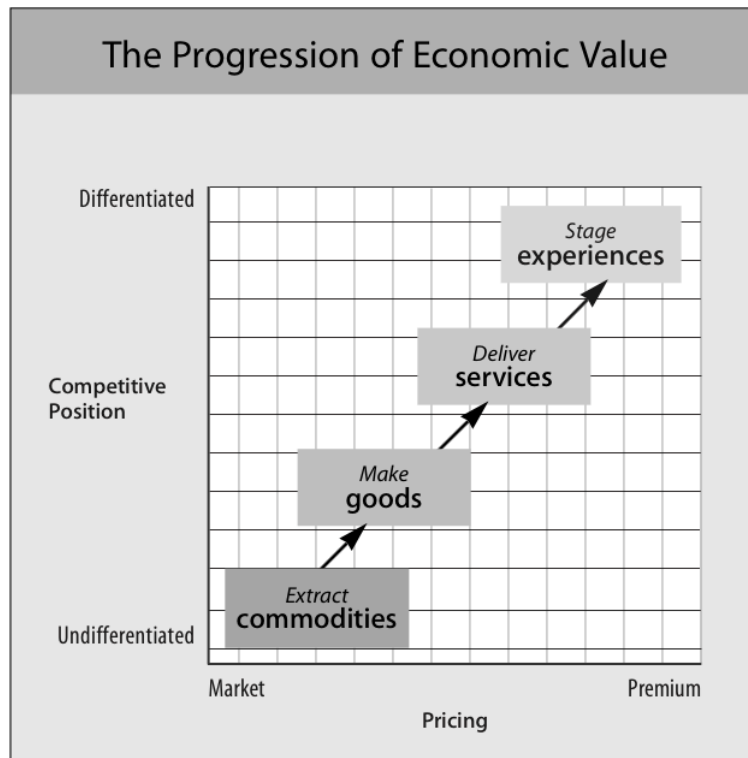
**Figure 12.** B. Pine and J.H. Gilmore's Progression of Economic Value
(*Source*: Pine and Gilmore 1998, p. 98)

Even if B. Pine and J.H. Gilmore's framework dates back to the 1990s, the Airbnb company has only recently embarked on the experience phase, and possible socio-economic consequences will require to be explored in the future.
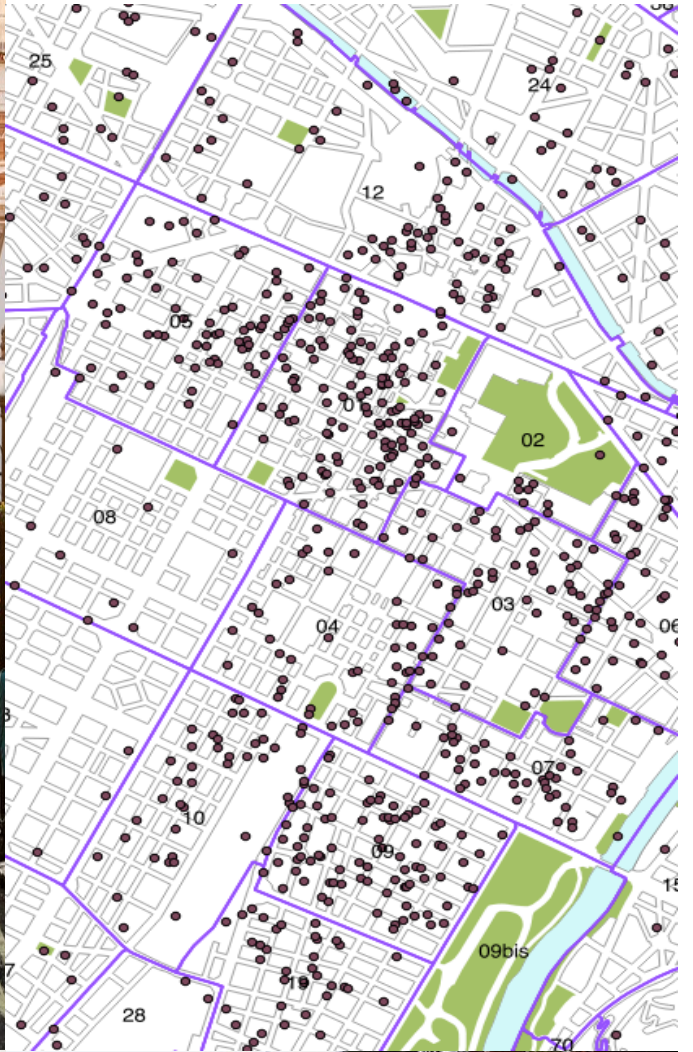
# Chapter 3

# Magnitude and distribution of the Airbnb market: the location factor

## 3.1 Airbnb in the world: global trends

As anticipated in previous paragraphs, Airbnb listings now amount to more than 5,000,000 units, with more than 190 countries involved and more than 300,000,000 people host overall. A study analysing the entire Airbnb marketplace evidenced that in 2016 Airbnb listings were globally distributed (Ke 2017), with a significant presence in Western Europe, North America, East Asia and the eastern coast of Australia (Figure 13). More precisely, the largest part of the market was represented by the U.S.A. (counting 15.29% of all listings), followed by France (11.82%), Italy (10.07%), Spain (6.16%) and United Kingdom (3.93%).
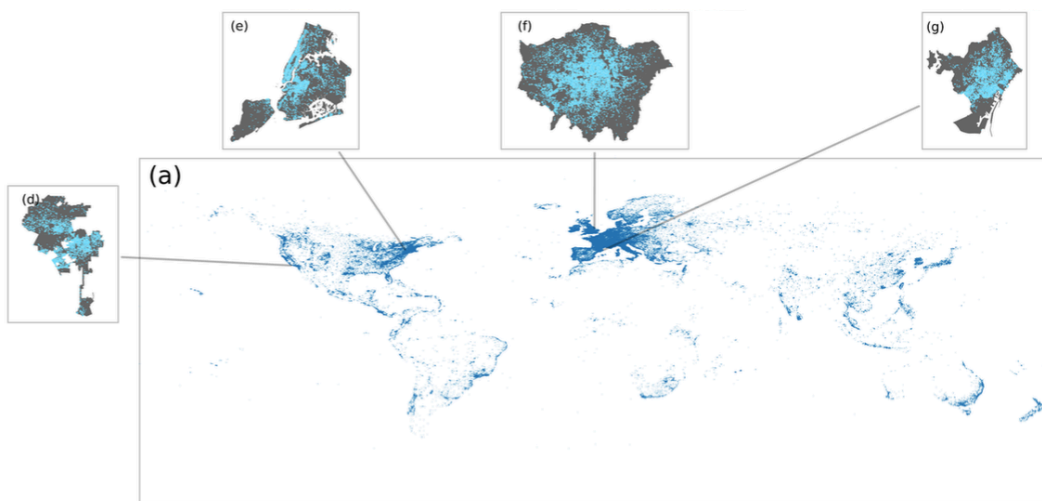


**Figure 13.** Geolocation of Airbnb listings, with a focus on the cities of Los Angeles (d), New York (e), London (f) and Barcelona (g).
(*Source*: Ke 2017, p. 133)

Concerning the type of accommodations, entire homes/apartments were 68.5% of the listings, whereas private rooms and shared rooms accounted to 29.8% and 1.7%, respectively (Ke 2017). These figures are particularly meaningful especially if we consider that in 2012 the percentage of Airbnb entire homes/apartments was definitely lower (57%), and that private rooms represented 41% of the listings instead (Guttentag 2015): in fact, these data seem to suggest that an evolution concerning the type of accommodations offered through the platform has occurred, progressively reducing the sharing-oriented concept. According to Q. Ke (2017), of the top 30 countries with the greatest amount of listings, only Taiwan, India and Ireland registered more private rooms than shared rooms (Figure 14).
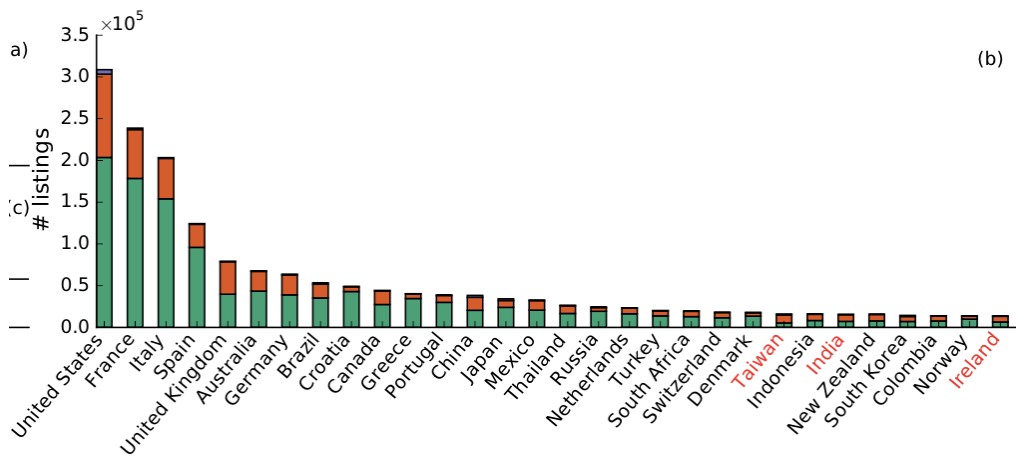


**Figure 14.** Airbnb top 30 markets: number and type of listings.
(*Source*: Ke 2017, p. 134)

The author of the paper also highlighted that 78.4% and 12.2% of hosts owned one and two listings respectively, and that the remaining 9.43% actually managed 33.16% of all listings, meaning that some professional hosts are present on the market. Additionally, the study pointed out that multi-listers joined the platform in an early phase, that their listings are entire homes and that they are mostly located in the U.S.A.

## 3.2 Airbnb in Europe: overview and comparative empirical analysis

The figures reported in the above paragraph highlighted that a considerable percentage of Airbnb listings are located in Europe. In order to better understand the magnitude and characteristics of this phenomenon, it was decided to conduct

first-hand research, capitalizing on open datasets freely made available online by independent sources[80]. Among the available datasets, databases updated to Spring 2017 were selected and .csv files[81] concerning single European cities counting more than 250,000 inhabitants were downloaded[82]. Descriptive statistics were thus elaborated for 31 cities.

On the basis of available data, it can be stated that the largest amount of Airbnb listings was found for capital cities such as Paris ($N = 65,581$), London ($N = 60,561$), Rome ($N = 26,206$), Berlin ($N = 20,405$), Copenhagen ($N = 20,008$), Barcelona ($N = 18,537$), Amsterdam ($N = 17,795$), Lisbon ($N = 13,232$) and Madrid ($N = 12,615$). Then, Nice -a French city well renowned for its seaside tourism- follows, with 11,193 units (Figure 15). The analysis of the type of accommodation highlights that in the vast majority of cities entire homes/apartments prevail, and that shared rooms are mostly marginal[83].

In order to better contextualize and interpret these information, data concerning the surface of selected cities and the number of inhabitants were accessed[84] and then analysed in combination with the number of the Airbnb listings previously downloaded (Figure 16 and 17). The graphs highlight that the number of Airbnb listings per 1,000 inhabitants may be particularly high for cities of different population sizes, and that Paris particularly registers a high peak in terms of number of Airbnbs per $Km^2$.

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[80] Data were downloaded in July 2017 from InsideAirbnb (www.insideairbnb.com) and Tom Slee's website (http://tomslee.net/category/airbnb-data). InsideAirbnb is a non-commercial platform that scrapes and analyses data publicly available on the Airbnb website; its goal is to provide information and contribute to the debate about the impact of Airbnb on cities and neighbourhoods. The platform allows to access both files reporting raw data (e.g. with .csv extension) and maps displaying georeferenced information. Tom Slee is an expert on sharing economy issues; he started to collect data in 2013 and then he decided to interrupt this activity in October 2017. Both websites have been used so far as sources for academic papers published in international journals and conference proceedings (see, for instance, Gurran and Phibbs 2017, Gutiérrez et al. 2017, Picascia et al. 2017).
[81] .csv files usually included the following fields: listing ID, host ID, coordinates (latitude and longitude) of the accommodation, type of accommodation, number of bedrooms, number of reviews, overall rating and price per night. Some files included also additional information such as name of the neighbourhood and/or borough, extended name of the listing, number of bathrooms and estimated occupancy.
[82] The cities included in the analysis ranged from "large" to "global" size. According to the definitions provided by the European Commission (European Commission 2013), cities can be classified according to their population size as following: Small (50,000-100,000 inhabitants), Medium (100,000-250,000), Large (250,000-500,000), Extra Large (500,000-1,000,000), XXL (1,000,000-5,000,000) and Global (more than 5,000,000 inhabitants).
[83] It is interesting to note that in an extra-European city such as São Paulo (Brasil) the percentage of private rooms represents 48% instead (Lobo 2017).
[84] Data concerning the surface, the number of inhabitants and population density of the selected cities were downloaded from https://www.citypopulation.de/ (last accessed on 10th July 2017). It must be noted that the results and graphs presented in the following pages could be different if data (e.g. number of inhabitants) about the metropolitan areas associated to some cities are considered.
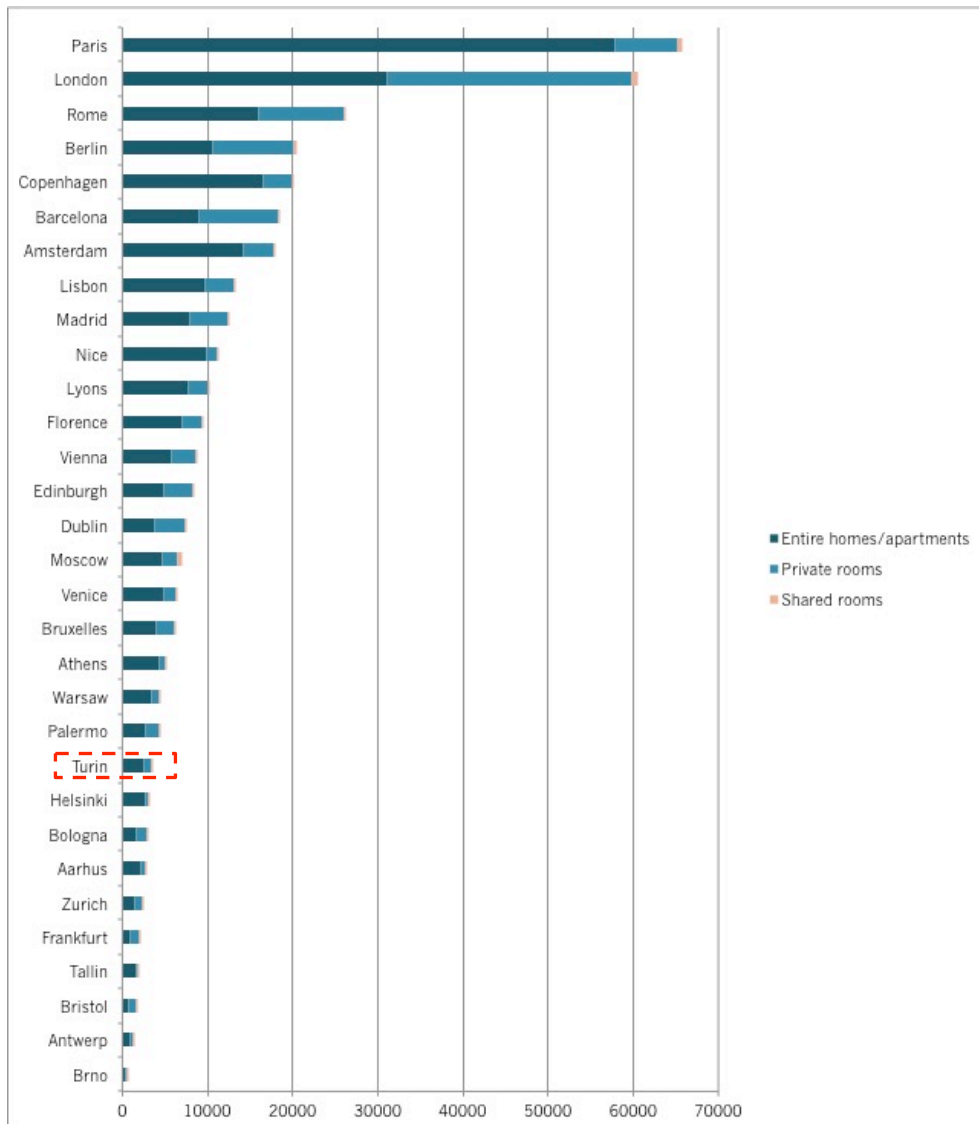
**Figure 15**. Number and type of Airbnb listings in a selection of European cities.
(*Source*: author's elaboration on InsideAirbnb and Tom Slee' s data)
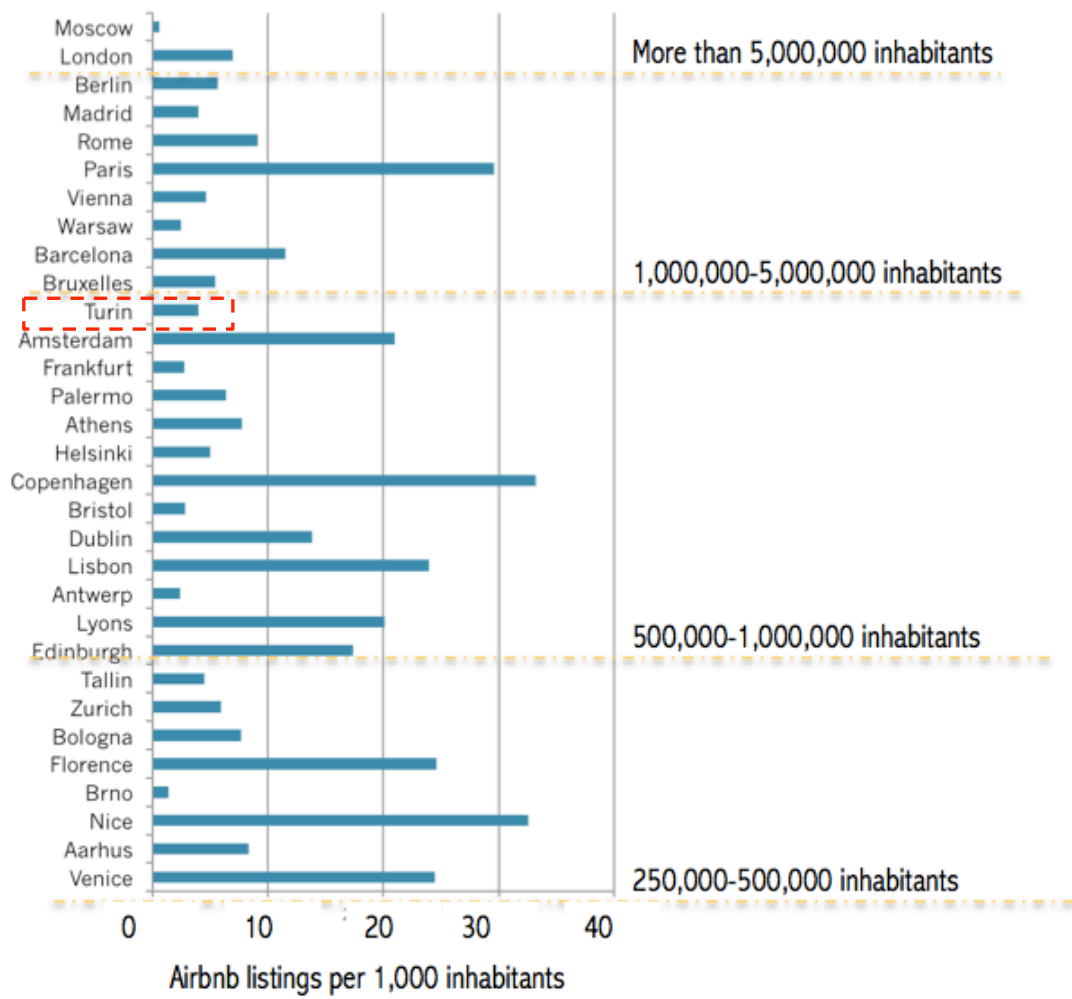
**Figure 16**. Number of Airbnb listings per 1,000 inhabitants
in a selection of European cities.
(*Source*: author's elaboration on InsideAirbnb, Tom Slee and
https://www.citypopulation.de/ data)
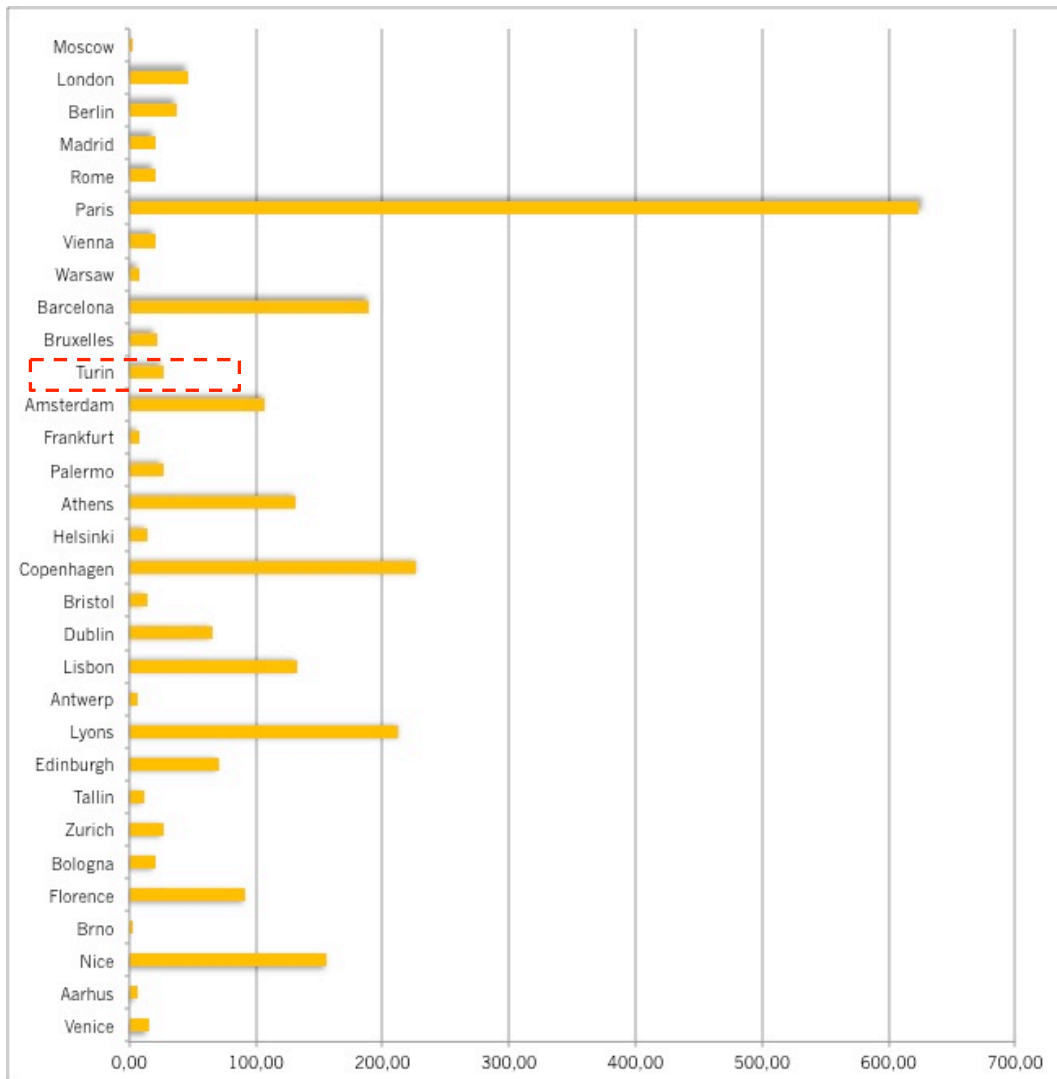
**Figure 17**. Number of Airbnb listings per Km$^2$
in a selection of European cities**.**
(*Source*: author's elaboration on InsideAirbnb, Tom Slee and
https://www.citypopulation.de/data)

C. Adamiak (2018) has recently published an analogous research focusing on European cities of over 100,000 inhabitants[85]; apart from taking into account active accommodations and number of Airbnb listings per 1,000 inhabitants[86], the author also estimated the number of beds currently offered by Airbnb in Europe

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[85] The article by C. Adamiak was published after first-hand research for this dissertation was conducted.

[86] Some of the figures reported by C. Adamiak (2018) are different from the ones obtained through first-hand research and described in the above paragraph. The discrepancies related to the number of listings are probably related to the different types of information reported by Inside Airbnb and Airdna. In fact, whereas the first provides the number of listings existing on Airbnb for a given city, Airdna provides the listings detected as active in a certain moment. Discrepancies concerning the number of listings per 1,000 inhabitants may be due to the population taken into account when considering big cities with metropolitan areas. In the previous paragraphs only the population living in the Municipality was taken into account, whereas C. Adamiak considered the population living in the whole metropolitan area.

and its ratio with regard to the hotel offer. The author quantified the present Airbnb maximum capacity in 3,000,000 versus 5,200,000 hotel beds (Figure 18).
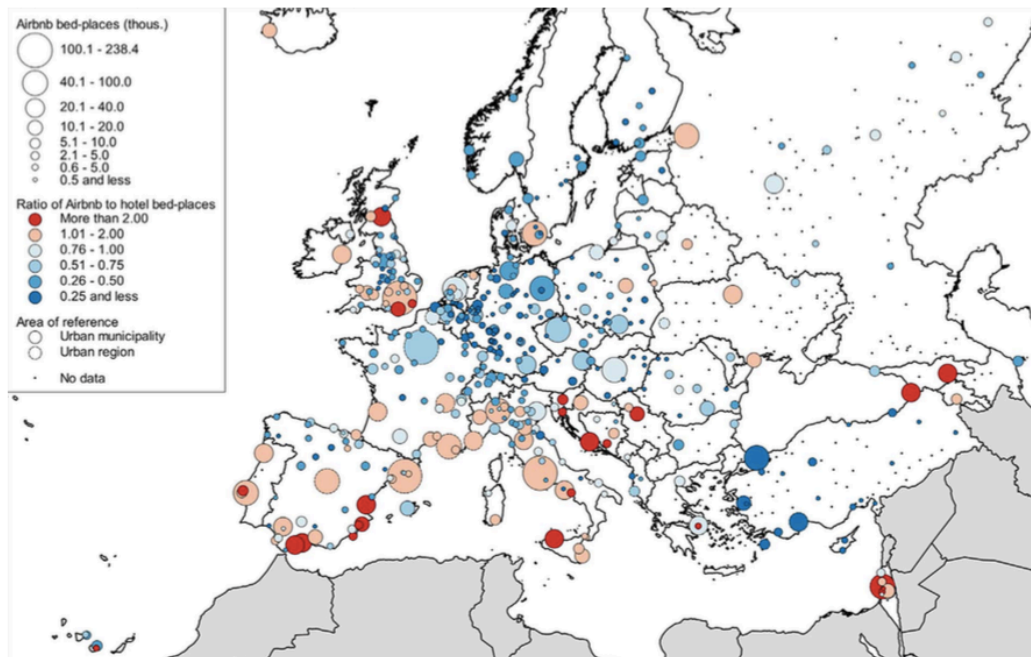


**Figure 18**. Airbnb beds and ratio Airbnb beds/ hotel beds: estimations.
(*Source*: Adamiak 2018, fig. 2)

The map highlights that, especially in Southern Europe, Airbnb beds exceed the hotel offer. Then, the author also explains that in many Mediterranean cities and in Central and Eastern Europe the Airbnb activity seems to be carried out as a profession, whereas in Germany Airbnb has maintained to a greater extent the original spirit of sharing economy. Then, some authors have highlighted that the Airbnb growth is highly correlated with the increase of tourists in urban contexts: in fact, the performance of a regression model taking into account the number of Airbnb listings in 2015 (dependent variable) and the number of tourists in the previous year (independent variable) highlighted that these two variables correlate almost perfectly, suggesting that tourist presence is probably the best predictor for the establishment of new short-term rentals (Picascia et al. 2017).

Overall, it must be underlined that analysing the phenomenon only with reference to descriptive statistics that do not take into account the spatial distribution of Airbnb accommodations also at the intra-city level may present some limits and even result to some extent misleading. In this sense, the empirical example of Venice can be explanatory. In fact, the Municipality of Venice extends on a surface of 412.53 Km$^2$ and – according to the data considered- it counts 6,410 Airbnb listings. The density of Airbnb listings (number of Airbnb listings/ Km$^2$) is thus 15.54, which seems relatively limited if compared to the one of other European tourist cities. However, the plotting of georeferenced Airbnb locations on a digital map helps better contextualize these data: in fact, it is evident that the

listings do not present a scattered distribution and that they particularly insist on the old city (Figure 19), thus possibly contributing to the pressure on the historic centre and to the limitation of permanent residency.
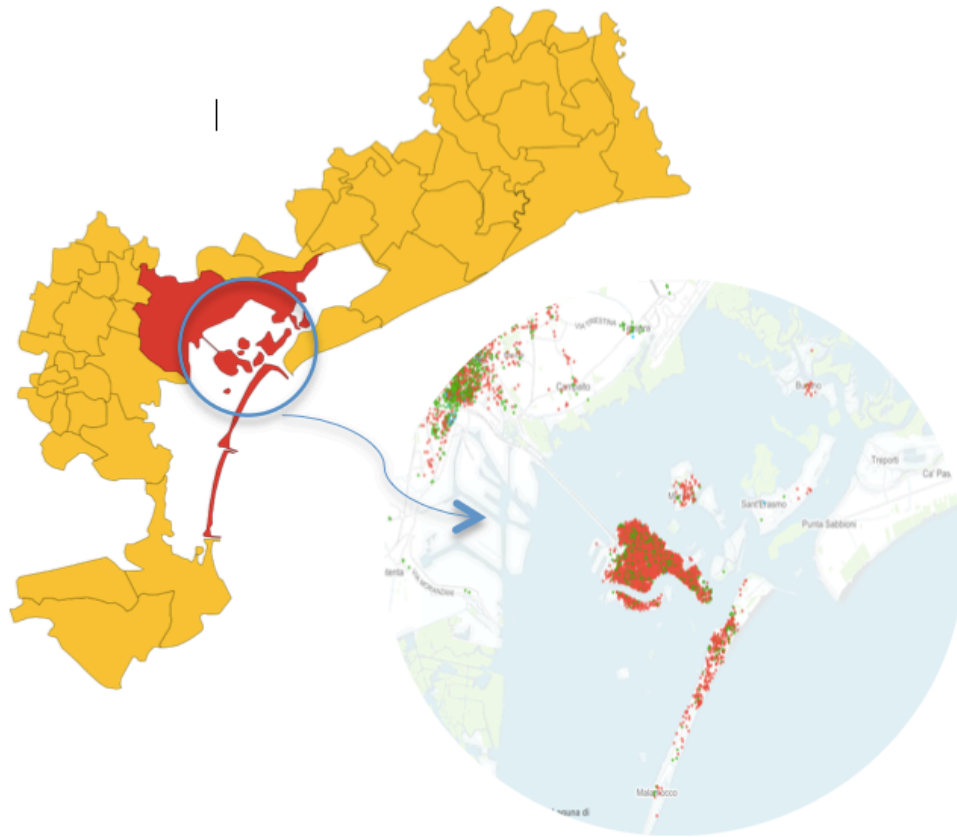


**Figure 19**. Extension of the Municipality of Venice (left) and concentration of Airbnb listings (right) in the historic centre.
(*Source*: Author's elaboration on Wikipedia and Inside Airbnb images)

Additionally, concentration on certain parts of cities may lead to particular socio-economical consequences, and spatial approaches to the analysis of the phenomenon have thus recently emerged and seem to represent a promising field of research.

## 3.3 The location factor: empowerment of the peripheries or increase of the tourist pressure on historic centres?

As described in Chapter 1 of this Section, Airbnb aims to facilitate a tourist experience focused on authenticity, localness and sustainability. However, the role played by Airbnb in truly favouring the visit and empowerment of urban areas out of the most beaten tracks has recently been questioned. Especially with regard to capital cities, the situation actually appears to be the opposite: in fact, Airbnb might even increase the pressure on historic centres and on the areas of the city where attractions are located, also indirectly confirming and underlying the attractive power exerted by built and urban heritage resources.

Some empirical examples have emerged throughout the years directly from the news: in Barcelona, residents have protested against the uncontrolled rise of the number of tourists enabled also by the spread of digital platforms such as Airbnb (Coldwell 2017); in Venice, short-term rentals have been interpreted by residents as a phenomenon contributing to the *touristification* of the city, and the excessive tourist pressure has led to the banning of new accommodations in historic areas (Coldwell 2017; Edwards 2017); in Amsterdam, Airbnb and other platforms are bringing more and more tourists right in the central areas of its urban realm (Van der Zee 2016).

Given this trend, scholars have thus recently started to investigate this phenomenon, paying particular attention not only to the magnitude of this emerging reality but also to the spatial distribution of accommodations. In fact, Airbnb has the potential to greatly affect historic centres because the basic condition to start a short-term rental activity is the availability of a room or of a spare residential unit; this means that Airbnb can potentially expand wherever houses and apartments already exist –historic centres included-, and that their impact can be even higher than hotels, which need whole buildings and permissions from local authorities to exist instead (Zervas et al. 2015; Gutiérrez et al. 2017).

### 3.3.1 Location as a competitive advantage and its influence on the urban tourism experience

Location in the nearby of the most central and/or attractive areas of the city can represent an important competitive advantage, since it is known that tourists prefer to stay in areas located at walking distance from the desired points of attraction (Arbel and Pizam 1977 in Gutiérrez et al. 2017). As a consequence, the presence of Airbnb accommodation in residential areas conveniently located in the nearby of historic centres could induce tourists to stay right in those zones, contributing to the pressure.

Overall, the importance of location in determining the presence and success of hospitality facilities is very well-known, and several studies have tried to model

where these structures are located, with particular regard to hotels. As summarized by some authors, hotels tend to be located in correspondence of transport hubs, in the vicinity of the city centre or - in the case of seaside and outdoor tourism- close to the beach or other natural/recreational areas (Wang and Nicolau 2017). With particular regard to the urban context, it is known that hotels registering high occupancy rates are frequently located within a walking distance from major attractions. In fact, consumer behaviour studies have underlined that location - together with price per night, characteristics of the room, hotel facilities, staff and service - has been deemed as one of the most important product attribute, and it thus plays a decisive role in the consumer's decision making process (Xiang and Krawczyk 2016).

Location is an essential factor not only in terms of accessibility, but also with regard to the quality of the surrounding environment and to the characteristics of the neighbourhood the accommodation is located in (Xiang and Krawczyk 2016). More particularly, some scholars have underlined that hotel location has the power to influence the activities and the experiences carried out by the visitor (Shoval et al. 2011), reasonably with possible consequences on the local economy and on tourists' perceptions of the place. About this point, a recent study (Xiang and Krawczyk 2016) has investigated tourists' perceptions of location applying text analysis techniques to 49,374 reviews posted on TripAdvisor.com by the customers of 59 3-4 and 5 stars hotels in Manhattan (New York, USA). Results highlighted that location emerged as the fifth most relevant aspect of the guest experience, with hotel service being the first. Additionally, among the most recurring terms, 20% were related to the relative location of the hotel - e.g. with respect to different points of reference-, to the surrounding environment and to facilities and landmarks existing in the nearby (e.g. "walking distance", "view", "central location", "restaurant", "subway"); moreover, these elements were frequently mentioned in co-occurrence, meaning that multiple aspects of location were valued by the same customers. Even if less common, culture-related places such as "museum" and "theatre" were present too, indicating that some customers made comments and valued the hotel also in relation to cultural focal points, especially when sited at specific sub-locations. Interestingly, the authors underline that the above mentioned results seem coherent with the ones emerged from traditional survey methods, with the exception of safety-related issues, which did not show a significant presence in online reviews[87].

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[87] However, about this last point, it must be underlined that Manhattan is one of the safest areas in New York City, and the lack of references to safety issues might depend on the area investigated by researchers: different results might emerge from the application of the method to other contexts. For the identification of the degree of safety attributed to neighbourhoods of USA cities - calculated on the basis of the number of crimes per 1,000 residents by precinct-, see https://streeteasy.com/blog/safest-areas-nyc/.

### 3.3.2 Understanding and modelling location patterns: learning from the literature on hotel distribution

The issue of hotel location has been explored so far by multiple disciplines. For instance, Y. Yang and colleagues (2014) categorize the models that have been developed to describe, explain and predict hotel location patterns into theoretical, empirical and operational models. Theoretical models are inspired by pre-existing theories - e.g. economic, geographical or marketing-related- and generally aim not only to explain location patterns but also to predict future hotel locations; empirical models start from the observation of specific case-studies and then possibly extrapolate a general rule; operational models inform the decision-making process regarding the establishment of new hotels and indicate how to apply pre-existing rules to a specific realm[88], instead.

***Theoretical models.*** The article of Y. Yang and colleagues (2014) includes among the theoretical models the tourist-historic city model, the mono-centric model, the agglomeration model and the multi-dimensional model. Whereas the first two analyse the absolute location of hotels in a given context (e.g. a city), the third takes into account the relative and reciprocal location of hotels and the fourth finally explains location patterns considering both the geographic position of the accommodation facilities and the strategies adopted to differentiate the product (namely a new hotel) in the hospitality market.

*The tourist-historic city model* identifies as fundamental components attractions, catering and accommodation. With regard to accommodation, the model hypothesizes six types of location clusters, each stemming from the responses of the hotel industry to factors such as accessibility, land values, environmental amenities, historic inertia and land-use planning controls (Ashworth and Tunbridge 2000, pp. 73-74). More specifically, the model proposes that hotels may especially cluster in correspondence of the following locations: A) traditional markets/city gates; B) railways/railway approach roads; C) main access roads. Additionally, these other three types of clustering - considering the size and nature of the hotels- are advanced: D) medium sized hotels in "nice" locations; E) large modern hotels in transition zones of the Central Business District (CBD) and/or of the so called historic city; F) large modern hotels in urban periphery on motorway and airport transport interchanges (Figure 20).

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[88] The literature review presented by Y. Yang and colleagues (2014) and summarized in the main text includes studies that concentrate on different scales, i.e. single cities, intra-metropolitan, intra-regional and inter-regional. However, given the scope of this piece of work, in the following paragraphs particular attention will be paid to the models that take into account the city and intra-metropolitan scale.
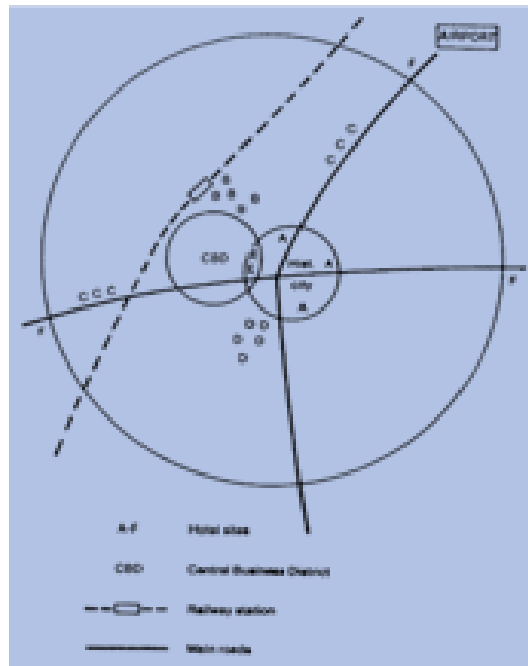
**Figure 20**. Typology of urban hotel locations.
Letters from A to F refer to the six types of clusters described in the main text.
(*Source*: Ashworth and Tunbridge 2010, p. 74)

The tourist-historic city model was developed with special regard to medium-sized Western European provincial towns, even if some researchers have found that the model fits also the ones of some Israelian (Shoval and Cohen-Hattab 2001), Indonesian (Timothy and Wall 1995), Chinese (Bégin 2000) and Malaysian (Oppermann et al. 1996) tourist cities. Interestingly, as in the case of a diachronic analysis of hotel locations in Jerusalem (Shoval and Cohen-Hattab 2001), the model has been used as a basis to be integrated with considerations regarding historical and political changes occurred in the city through the years.

*Mono-centric models* interpret the city in simplified terms and assume that the city has one single centre, exerting a centripetal force on upscale hotels and a centrifugal one on downscale hotels (Yang et al. 2014, p. 211). More specifically, these models describe the city as formed by concentric rings, where distance from the city centre determines values and land-use patterns. The theory underpinning this model is the *bid rent theory*, i.e. a geographic economic theory assuming that people compete for using the land close to the city centre/to the central business district, since it is easily accessible, it presents a high density of potential customers and thus results to be more profitable. This theory has been applied not only to the retail and business sector but also to the real estate one, including the special example of hotels (Figure 21). In this case, it is assumed that customers (and especially tourists) are open to pay more for easy access to the city centre, and that consequently hotels prefer to locate in the nearby of the centre in order to obtain higher revenues. In general terms, land values associated to a central

location are particularly high, and according to some authors especially 4-5 stars hotels - that set higher room rates and address the needs of upscale users- can cover these higher land values (Egan and Nield 2000): this would thus explain why they are frequently located in central areas (centripetal effect). Coherently with this statement, the same authors affirm that budget hotels tend to locate either at the edge of the city or in converted buildings at the edge of the city centre (centrifugal effect).
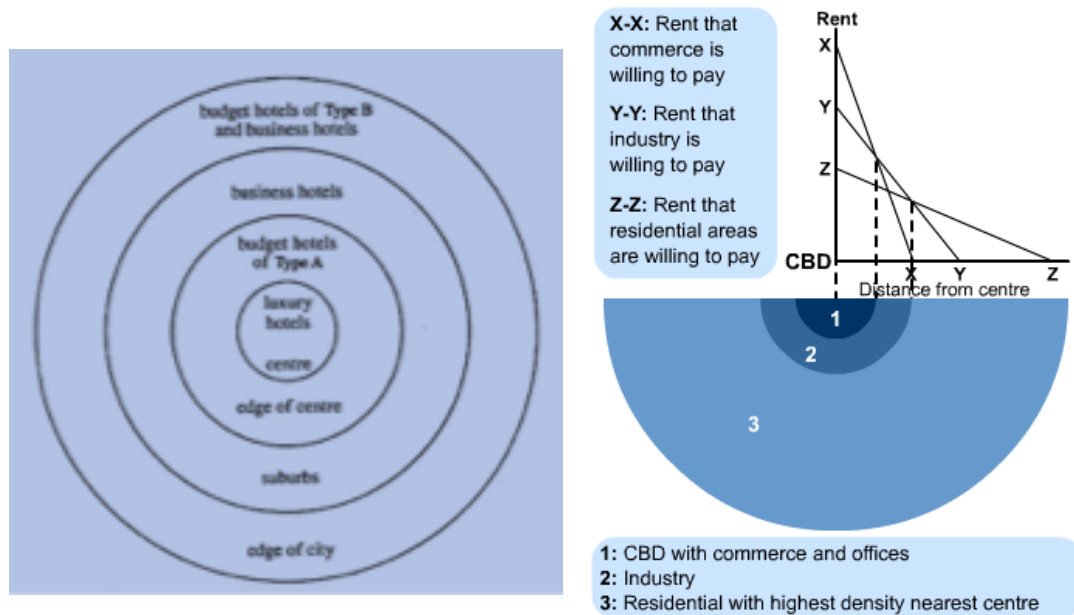


**Figure 21**. The mono-centric model: spatial hierarchy of hotel types and
bid rent theory
(*Source of left image*: Egan and Nield 2000, p. 612
*Source of right image*: http://fsherrenpgcesettlement.blogspot.com/2013/08/bid-rent-theory.html)

*Agglomeration models* affirm that hotels tend to cluster, either with homogeneous or heterogeneous hotels; the benefits stemming from agglomeration patterns vary according to product segments. For instance, whereas luxury hotels prefer to cluster where other types of hotels are not present, lower-scale hotels would ideally prefer to locate near luxury hotels, since in this case a premium price and higher revenues apply (Kalnins and Chung 2004). Another strategy is product differentiation, instead (Freedman and Kosova 2012). Then, multi-dimensional models mainly analyse hotels' market entry decisions, taking into account factors such as product attributes, different measures of distance (e.g. geographic, price and hotel size distance) and absolute location (Yang et al. 2014).

***Empirical and operational models: spatial statistics and regression approaches.***
Empirical models can entail a description of the location patterns observed[89], but also the implementation of statistical and mathematical approaches. A particular group of models is represented by the ones adopting the methods of *spatial statistics*. These approaches aim to analyse the dependence and relationship of hotel locations over space, and they can be subdivided into the following categories: a) approaches that treat each hotel location as a single point (point pattern analysis); b) approaches that take into account the aggregate number of hotels in a given area (areal spatial analysis). Point pattern analysis approaches are particularly useful to describe the distribution of hotels, and they can be also used to map distribution changes through time. For instance, they can be useful to identify the geographic mean centres of hotel distribution and the shifts that may occur diachronically (Broadway 1993 in Yang et al. 2014). Areal spatial analysis approaches allow to investigate the relationships occurring between the number of hotels present in given areas and other characteristics (namely variables) of these areas. The employment of these last methods to the study of hotel distribution is relatively new and their future application to specific case-studies has the potential to unveil relationships that could not be otherwise detected. Among the most recent contributions on the topic, K.H. Lee and colleagues (2018) have explored the spatial relationships occurring between the distribution patterns of hotels and amenities in the United States[90]. More particularly, researchers aimed at investigating: 1) whether hotels were spatially clustered; 2) whether a positive spatial relationship between clustered patterns of hotels and variables such as a) natural amenities; b) level of ruralisation; c) constructed amenities level; d) population density of USA counties was present. To answer to question 1, LISA (Local Indicators of Spatial Associations) techniques were applied, and the global Moran's I value - indicating the presence and degree of spatial autocorrelation of hotel positions- was calculated; then, local bivariate correlation analysis[91] was used to address question 2 a)-d)[92].

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[89] For instance, a descriptive analysis of the evolution of hotel distribution in different urban sectors was conducted by S. Bégin (2000), with an empirical application to the Chinese city of Xiamen.

[90] Even if the study conducted by K.H. Lee and colleagues (2018) considers an inter-regional, inter-state scale, nonetheless it shows how spatially-related research questions can be formulated and how areal spatial analysis can be applied: it seems thus worth-describing, since the research process and the methods followed can be employed at a city-level, intra-metropolitan scale too.

[91] Exploratory Spatial Data Analysis (ESDA) and Local Indicators of Spatial Associations (LISA) emerged thanks to the work of professor Luc Anselin. Seminal contributions are represented by articles appeared especially in the 1990s (see, for instance: Anselin and Getis 1992; Anselin 1995). A more detailed description of these approaches will be provided in the section devoted to the case-study of Turin.

[92] Overall, the study (Lee et al. 2018) highlighted that USA hotels are clustered, and High-High cluster patterns - meaning that one particular county and its adjacent counties presented a larger number of hotels than the mean across the country- were found in counties located in California, Florida and Texas. Local bivariate correlation analyses pointed out a positive spatial relationship between the number of hotels and natural amenities, and between the number of hotels

Then, other empirical and operational approaches include *regression models* that may consider - for instance- the number of hotels in a certain zone as the dependent variable, or that investigate the role of the location factor in relation with premium room rates, revenues, profitability and hotel failure rate.

### 3.3.3 Exploring and analysing Airbnb distribution patterns: goals, methodological issues and spatial analyses

Whereas the study of the distribution of hotels is a consolidated area of research - even if evolving and expanding-, the analysis of the relationships between Airbnb accommodations and the urban environment is still at an early stage. If the models elaborated to describe and explain the distribution of hotels in the urban environment (and other contexts) may be useful to provide methodological hints and orient the research about Airbnbs, it must be noted that these models might not necessarily fit the Airbnb phenomenon: in fact, both hotels and Airbnbs aim to offer temporary accommodations, but the differences among the two phenomena are multiple (Table 2).

Overall, Airbnb presents a higher degree of flexibility with respect to hotels. In fact, the establishment of hotels requires significant and long-term commitments - which naturally limits the number and types of people potentially involved in the operation-, it may be conditioned by various restrictions (e.g. formal, connected to the presence of competitors already satisfying the demand, related to the availability/unavailability of urban space and of appropriate existing buildings, linked to the possibility of making investments and having access to credit) and it may depend on the presence of a sufficient demand. The constraints to the launch of an Airbnb activity are theoretically represented only by the availability of spare residential space, by the openness to allow strangers to access private properties and by the possession of certain skills, instead. The enabling factors and the peculiarities linked to the Airbnb phenomenon may imply not only that the distribution of this kind of temporary accommodation may follow alternative location patterns, but also that these patterns may evolve at a higher speed, especially if we consider that listings can be easily activated/deactivated by hosts and that the amount of potential hosts is vast.

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and constructed amenities; then, a negative spatial relationship was found with respect to the level of ruralisation, and a very low positive spatial relationship was found with regard to the population density.

| | Hotels | Airbnbs |
|---|---|---|
| **Investments** | Very high to extremely high. They may constitute a family-business investment or even represent financial investments operated by multiple investors (depending on the type and size of the facility) | Low to moderate/high. In the case of true sharing economy examples (where the property is shared by the owner/tenant with guests) investments are low and may cover -for instance- refurbishment interventions. Investments may be higher in the event of under-used properties that are either exclusively or mostly rent to guests (e.g. structural renovation of the whole apartment). Investments can then be high in the event of the acquisition of one or more properties with the explicit end of renting the properties for short periods (e.g. professional hosts; this may represent an improper use of the Airbnb platform). |
| **Time-scale of the investments and of the accommodation activity** | Long-term | Variable. It may even include very short-terms (e.g. days, weeks) |
| **Operational times** | Seasonal/continual | Variable. Intermittent to seasonal to continual (when allowed) |
| **Characteristics of the owner/host** | One or more subjects interested in investing capital into the business to make profits from the activity | Anyone living in a house/apartment and having space to share (the host does not need to be a owner, where sub-renting is permitted). Anyone living or owning a house/apartment (where sub-renting is not permitted) |
| **Characteristics and dimensions of the real estate property/residential unit** | It may be represented by an entire building or by a significant portion of a building. Dimensions may vary coherently with the number of rooms accommodated and the services and facilities offered | Properties are usually represented by houses and apartments. Single rooms and/or portions of larger residential units may be involved in the phenomenon |
| **Constraints to the location of the real estate property/residential unit (urban context)** | Constraints may regard building concessions (in the event of new buildings), licenses (where applicable), competition with other hotels, high costs in certain neighbourhoods, availability of properties/urban space | Constraints are limited to the destination use (i.e. residential) of the unit |
| **Demand** | Variable. It depends on the product attributes sought by customers and by the overall services and experiences offered by the hotel | Variable. It is usually constituted by people pursuing at least one of the following aims: saving money, establishing new personal contacts, requiring space for a family or household facilities |

**Table 2.** Hotels and Airbnb accommodations in urban contexts:
comparative analysis
(*Source*: author's own elaboration)

If the distribution of Airbnbs has become the object of public debate and have led to the creation of dedicated platforms such as InsideAirbnb, few academic articles have been dedicated to this topic so far.

Under a methodological perspective, contributions can be subdivided into articles that adopt descriptive approaches (Vacirca and Barioglio 2016), articles that propose GIS-based exploratory visual methods (Dudás et al. 2017), articles that combine maps with the calculation of spatially-based indexes (Picascia et al. 2017; Quattrone et al. 2017) and articles that implement particularly robust analyses through the application of spatial statistics (Gutiérrez et al. 2017; Garcia-Ayllon 2018). Overall, these articles address the location issue considering either the distribution of Airbnb listings throughout the spatial extension of the city under study (Dudás et al. 2017) or the number/density of Airbnb listings in a certain spatial unit of analysis, which may vary according to the context and the goals of the research (Schäfer and Braun 2016; Picascia et al. 2017; Quattrone et al. 2017; Gutiérrez et al. 2017; Garcia-Ayllon 2018). In both cases georeferenced data concerning Airbnb listings can be analysed in combination with other information (being them georeferenced or associated to the selected spatial unit of analysis), as to answer specific research questions. Overall, academic articles have adopted these approaches mainly to:

a) understand whether this form of hospitality is facilitating temporary stays in neighbourhoods usually out of tourists' tracks – coherently with the Airbnb philosophy- or whether it is actually contributing to the pressure on city centres and other urban busy areas (Lutz and Newlands, 2018; Dudás et al. 2017; Gutiérrez et al. 2017);

 b) investigate the economic and social impacts of the phenomenon (Vacirca and Barioglio, 2016), e.g. identifying recurrent characteristics of hosts (Quattrone et al. 2017), describing repercussions on economic sectors related to tourism and hospitality and monitoring local liveability;

c) explore connections with the real estate and long-term rental markets (Schäfer and Braun 2016; Dudás et al. 2017; Horn and Merante, 2017; Garcia-Ayllon 2018).

***Spatial analyses: defining spatial units.*** Given the goals of the above mentioned contributions, authors have mainly analysed Airbnb distribution patterns in relation to pre-determined spatial units of analysis[93]. Apart from the advantages already mentioned above, the use of pre-determined geographic aggregations can particularly facilitate the comparison between the areas and the communication of the results (Curto et al. 2009). Up to now, the spatial units of analysis that have

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[93] In many cases these units do not present similar or equal extensions even in the same city, since the subdivision may be determined by administrative, statistical or geographical reasons. As a consequence, in some cases the definition *units presenting spatial features* (i.e. length of borders and most importantly area of their surface) would be preferable. However, given that the term *spatial unit* is commonly used in the literature (e.g. when referring to census zones and other territorial subdivisions), this term will be used throughout the text.

been adopted by scholars consist of neighbourhoods, wards and census tracts (Table 3).

| Authors & Year | City | Spatial unit |
|---|---|---|
| **Gutiérrez et al. 2017** | Barcelona | Census tract |
| **Horn and Merante 2017** | Boston | Census tract |
| **Picascia et al. 2017** | Italian cities | Census tract |
| **Schäfer and Braun 2016** | Berlin | Neighbourhood |
| **Garcia-Ayllon 2018** | Barcelona, Madrid, Palma de Mallorca | Neighbourhood |
| **Quattrone et al. 2017** | London | Ward |
| **Dudás et al. 2017** | Budapest | It does not consider areas but distances between points of interests |

**Table 3.** Airbnb distribution patterns and analysis:
spatial units adopted
in the literature
(*Source*: author's own elaboration)

Even if the choice of the spatial unit of analysis is frequently instrumental and suggested by research goals, the identification of the unit allowing the best explanation of a phenomenon represents a research-line in its own, and studies on this topic (applied to the Airbnb case-study) are definitely lacking.

However, when choosing the spatial unit of analysis to be adopted, further elements should be taken into account too. In fact, the size of spatial units should allow to collect a statistically significant number of data points, which could otherwise not be obtained with smaller geographic units. These recommendations are applied for instance by G. Quattrone and colleagues (2017), who declared to have selected wards – which are not totally homogeneous in terms of their characteristics- instead of Lower-layer Super Output Areas – i.e. small census areas counting around 1,500 inhabitants each- in order to overcome this issue[94].

The nature of the study and the phenomenon to be observed play a key role too. In fact, as noted by K. Horn and M. Merante (2017), real estate intra-urban studies usually adopt neighbourhoods as units of analysis; nevertheless, the authors report that in the literature some argue that neighbourhoods may be a too small unit, which might be unable to fully capture market changes (Glaeser and Ward 2009; Sinai and Waldfogel 2005). However, others have been able to capture market changes adopting census tracts (Piazzesi et al. 2015), and according to the scholars who conducted the study this might be due to the use of the web for home search, which allows to target very small and specific areas.

Additionally, especially when working with georeferenced data, positional accuracy should be taken into consideration too. This principle is particularly

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[94] London is subdivided into 625 wards (Quattrone et al. 2017).

important in the case of Airbnb data: in fact, the exact latitude and longitude characterizing Airbnb listings are not publicly displayed by the platform for privacy and security reasons, and the precise address of the accommodation is communicated to the guest only once the reservation is confirmed. The true location of a listing is located within 150-200 m[95] from the position displayed by the platform (and consequently scraped when collecting data for research on the topic)[96]. As a consequence, spatial units should be wide enough to absorb and mitigate the error.

Finally, a further approach of analysis that has been employed in the literature is represented by the use of GIS tools allowing the overlay of a even grid (fishnet) on georeferenced data. According to scholars, the advantage of this method is represented by the fact that squares are of equal size and thus offer comparable results; the main disadvantages are that the method has a strong generalising effect and that the grid has arbitrary boundaries, which may separate structurally caused effects (Brauckmann 2017) and may not take into account the structure of the city/geography of the place.

***Spatial analyses: methods to identify points of interest, determine distances and choose weight matrixes.*** When analysing the relationships occurring between Airbnb locations and historic centres/attractive areas of cities, authors have followed different methods. In this process, both the phase that regards the identification of the criteria informing the definition of historic centre/attractive area and the phase that concerns the definition of the spatial relationships occurring between units of analysis are fundamental.

In some cases the historic centre/attractive areas were defined a priori by authors; for instance, in their study about Airbnb accommodations in Budapest, Dudás and colleagues (2017) state that they consider as centre point of the city Deák Ferenc square, i.e. a place very popular among tourists, geographically located approximately in the centre of the city and representing a very important hub for local transports. The attractiveness of the areas is outlined considering the presence of points of interest falling under the categories "attractions", "eating and drinking", "sports and entertainment" and "retail" reported by OpenStreetMap instead.

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[95] Airbnb clearly states that location of listings is displayed with great accuracy, but that the exact point is not shown (https://www.airbnb.co.uk/help/article/2141/how-will-my-listing-s-location-be-shown-on-the-map). Inside Airbnb quantifies the location error in 0-150 m (http://insideairbnb.com/about.html), while others report that displayed coordinates are randomly assigned within a 200 m radius around the true position of the listing (http://airbnbvsberlin.com/).

[96] Location accuracy is a particularly sensitive topic in the real estate market: in order to provide a more exact property location, the company Airdna (www.airdna.co), which collects data from the Airbnb platform to monitor the short-term rental market and provide investment suggestions, provides to its clients georeferenced data that take the centre point of the average latitude and longitude coordinates displayed on the Airbnb website (https://www.airdna.co/methodology): this should improve the accuracy of coordinates.

Analysing Airbnb spatial patterns in Barcelona, J. Gutiérrez and colleagues (2017) consider Plaza de Cataluña as city centre and then originally identify attractive areas favoured by tourists through georeferenced pictures posted by users on the Panoramio platform.

S. Garcia-Ayllon (2018) identifies the centres of Barcelona, Madrid and Palma de Mallorca more vaguely – probably taking for granted the characteristics of these generally renowned urban contexts- and seems to use results emerging from spatial autocorrelation analysis to reinforce the concept of centrality itself.

The, general indications relying on visual maps and not specifying the methods followed to define centres/historical centres/central neighbourhoods are present in contributions that do not apply spatial statistics approaches (Schäfer and Braun 2016; Picascia et al. 2017).

Concerning distances, Dudás and colleagues (2017) calculate the distance between Airbnb locations and the centre of Budapest through Manhattan distance. J. Gutiérrez and colleagues (2017) consider a distance threshold of 1 km radius from the census tract centroid (i.e. corresponding to a 15-min walk), assigning a weight inversely proportional to the distance when determining weight matrixes.

It is important to underline that in some articles spatial statistics approaches were applied by authors, but spatial weight matrixes were not always specified (see, for instance, Garcia-Ayllon 2018). However, the description of the weight matrixes adopted for the analysis is very important instead, and it should be made explicit in the methods section of reports. In fact, awareness about weight matrixes allows to better understand results, to make analyses replicable and also to apply the same spatial criteria to other contexts. Additionally, the choices concerning the spatial criteria used for weights can lead to different results. For instance, in the case of contiguity matrixes, it is important to make clear which type has been adopted (i.e. rook, queen, bishop) and which order of contiguity has been applied (e.g. first, second…). Then, when defining proximity between units (i.e. what is near) important steps are, for instance, the determination of the distance that serves as discriminant to decide whether two units are near or not (e.g. distance threshold), and before that the choice of the methods that are used to calculate the distance (e.g. distance existing between the centroids of two polygons). Contiguity choices may be theoretically-informed but can nevertheless represent a specific area of research and be determined and tested after empirical analyses.

## 3.3.4 Airbnb spatial patterns identified by the literature: possible impacts on historic and city centres

The review of the articles focusing on Airbnb distribution and impacts on urban contexts allows to identify a variety of spatial patterns, especially with regard to European cities.

*Berlin*. On the basis of data updated to October 2014, P. Schäfer and N. Braun (2016) pointed out that in Berlin (Germany) short-term rental accommodations were mainly located in inner-city neighbourhoods; more specifically, 69% of the entire Airbnb market of the city was concentrated in five of the 81 neighbourhoods of Berlin[97]. These five neighbourhoods are positioned near traditional landmarks and sights, but also in areas of the city that used to be working-class districts and that now host the activities of the creative-class. According to authors, this spatial pattern is coherent with the trends of "new urban tourism", where the educated "cosmopolitan consuming class" moving through cities either to visit them or to temporarily live there is co-responsible of the transformation of certain inner-city neighbourhoods (Braun 2010; Füller and Michel 2014). Additionally, the concentration in central areas is particularly accentuated for entire homes/apartments and private rooms, whereas the shared room market is more limited and its distribution more irregular. Then, some authors seem to have found out that Airbnb accommodations are particularly located along certain streets of these areas[98].
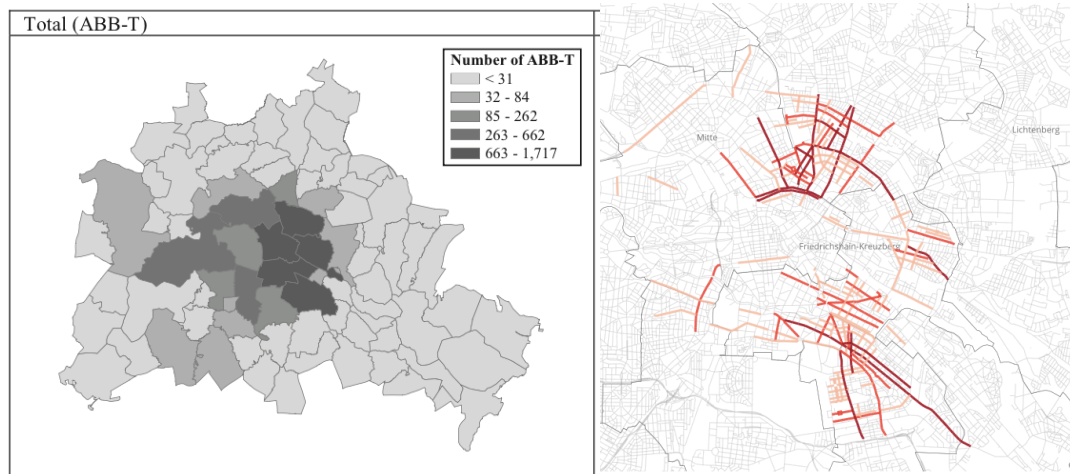


**Figure 22**. Airbnb spatial patterns in Berlin: neighbourhoods (left) and streets (right) more affected by the phenomenon.
(*Source of left image*: Schäfer and N. Braun 2016, p. 295;
*Source of right image*: http://airbnbvsberlin.com/#semantik-facts)

*London*. G. Quattrone and colleagues (2017) have pointed out that in London (years 2012-2015) Airbnb entire homes/apartments were mainly concentrated in central areas, even though they spread up to a radius of 16 Km. Airbnb rooms

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[97] P. Schäfer and N. Braun (2016) carried out their analysis on a total of 11,495 listings. The five neighbourhoods that registered the highest amount of listings were *Neukoelln* (1,717), *Mitte* (1,691), *Kreuzberg* (1,672), *Prenzlauer Berg* (1,550) and *Friedrichshain* (1,252).

[98] The website http://airbnbvsberlin.com/#semantik-facts is the output of a student project on visual journalism and it presents a map showing the streets that seem more affected by the Airbnb phenomenon. In "The Data" section, authors explain that the scraped Airbnb location may present some inaccuracies, but that nevertheless *"the assignment to streets is not affected"*. However, it is not clear why the assignment should not be considered affected. The identification of the streets more affected and the visual restitution of the data are nevertheless interesting, so the results and the map existing on the website are reported in the text.

were definitely present in central areas too, but in many cases with lower numbers; then, they covered an even greater surface, reaching suburbs too.

Overall, Airbnb distribution was thus different from the one registered for hotels, instead. In fact, hotels are overall more dispersed, with highest rates in central areas and near the airport of Heathrow (Figure 23).



(a) Hotels      (b) Airbnb houses      (c) Airbnb rooms
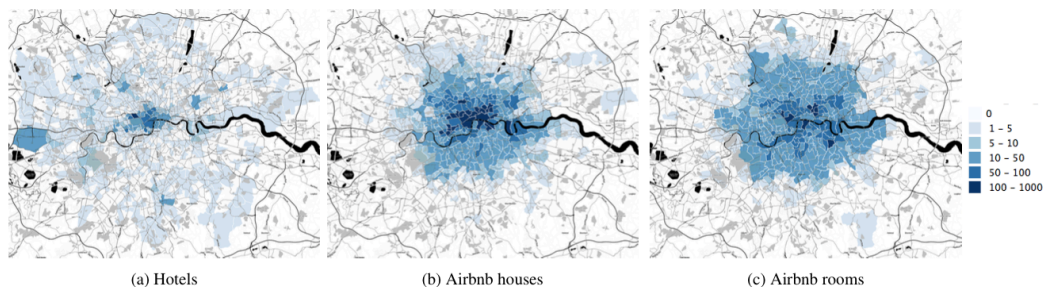
**Figure 23**. Number of hotels, Airbnb entire homes/apartments and rooms in London, by ward.
(*Source*: Quattrone et al. 2017, p. 1387)

Interestingly, authors also monitored the spread of Airbnb accommodations through the years. In order to identify not only the areas most affected by the phenomenon but also the socio-economic characteristics of these areas, scholars took into account the following groups of variables: socio-economic conditions (*diversity of ethnic groups*, *bohemian index*, *melting pot index*[99]*, score for income, ratio of the number of employees over the area's population, percentage of people with a higher degree of education*), attractiveness of the area (*number of FourSquare check-ins per km$^2$, score for accessibility to public transportation, number of attractions and entertainment places*), demographics (*number of people aged 20-34 years per km$^2$*), environment and housing conditions of the area (*score for environment conditions, percentage of green space over the total surface of the area, number of properties sold per km$^2$, median house price, percentage of owned properties, percentage of houses over houses plus flats, percentage of dwellings in council tax band F-H,* i.e. the band that presents the highest median house price), Airbnb offer and demand (*number of Airbnb properties per km$^2$, number of Airbnb reviews per km$^2$*)[100].

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[99] The *diversity of ethnic groups index* is defined as the probability for two individuals randomly selected in a given area to belong to a different ethnic group, and it is calculated as the Gini-Simpson diversity index; the *bohemian index* refer to the percentage of people working in the arts, recreation and entertainment sectors; the *melting pot index* is obtained dividing the number of people born outside UK by the total number of residents in a given area (Quattrone et al. 2017).

[100] As reported by G. Quattrone and colleagues (2017) all data and indexes were either extracted or calculated on the basis of census data. Exceptions are represented by data on Airbnb and Foursquare (scraped from the Airbnb website and Foursquare platform respectively), hotel offering and attractions (source: Ordnance Survey, i.e. the Britain's mapping agency). Under the variable "hotel" points of interest mapped by the Ordnance Survey as "hotel", "motel", "country houses and inns" were included. Points of interest defined by the Ordnance Survey as

Additionally, distance -calculated as the Euclidean distance from the geographic centre point of each ward to the geographic centre point of each of the 10 "centres" identified in the city[101]- was taken into account too.

Results emerging from the application of a linear regression model under the form of Ordinary Least Squares and tested for spatial autocorrelation highlighted that Airbnb accommodations are mainly located in zones particularly accessible by public transports and that are inhabited by young people born outside the U.K. and having a job. On the contrary, short-term rental accommodations tend not to be located in areas where more houses than flats are present (i.e. likely suburban areas) and where real estate owners prevail on tenants.

In an initial phase (2012), proximity to one of the various focal points existing in London represented the condition that mainly affected the emergence of Airbnb accommodations: hosts pioneering the market were young people of different ethnicities living in central areas and possibly characterized by a student status (given the negative correlation with employment). In 2013 the role of location begun to be less prominent, and since that year the phenomenon has started to interest adult real estate owners willing to integrate their income, too.

The use of the number of reviews as a proxy of demand allowed authors also to identify the areas most frequently booked by guests. Results pointed out that they are characterized by proximity to the touristic city centre, high population density and high levels of FourSquare check-ins. This means that, even though an Airbnb offer exists also in peripheral areas, these solutions are not favoured by visitors.

*Italian cities*. In their study about distribution of Airbnb accommodations in a selection of thirteen Italian cities, S. Picascia and colleagues (2017) have highlighted that different spatial patterns may exist. After scraping the Airbnb website, scholars have calculated the percentage of entire homes/apartments located in historical city centres[102], with reference to the years 2015-2016 (Table 4). Authors observed that the percentages of entire places located in historic centres is variable, but that there seems to be a tendency towards the spread of the *"Airbnb habit"* in areas other than city cores (Picascia et al. 2017, p. 6). With respect to the housing stock, the pressure appears to be particularly high in Florence and Matera.

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"attractions", "retail", "eating and drinking", "sports and entertainment" were included in the "attractions" variable instead. In order to work with comparable data, the number of the points of interest was normalized by the size of the area in $km^2$).

[101] London can be considered as a polycentric city. This concept was borrowed by G. Quattrone and colleagues (2017) from a contribution of C. Roth and colleagues (2011), in which authors found out that – on the basis of data concerning the use of the Oyster card, i.e. the local transports card- 10 centres exist in London.

[102] The results published by S. Picascia and colleagues (2017) are very stimulating. However, it must be underlined that their article does not provide a definition of "historical centre" and that the criteria followed to attribute a listing to the "historical centre" are not described. However, for some cities authors explicit which place should be considered as centre (e.g. the Town Hall in the case of Florence). The City Hall is considered as central point also in the examples of Milan and Rome.

| City | % of entire places in centre- 2015 | % of entire places in centre - 2016 | % housing stock in centre - 2015 | % housing stock in centre - 2016 |
|---|---|---|---|---|
| **Bari** | 33 | 27 | 0.80 | 1.00 |
| **Bologna** | 65 | 56 | 1.00 | 2.40 |
| **Catania** | 66 | 62 | 1.40 | 2.20 |
| **Florence** | 68 | 71 | 11.10 | 17.90 |
| **Genova** | 67 | 64 | 0.60 | 1.00 |
| **Matera** | 51 | 44 | 17.30 | 25.30 |
| **Milan** | 15 | 22 | 1.70 | 3.60 |
| **Naples** | 52 | 48 | 1.00 | 3.10 |
| **Rome** | 51 | 40 | 7.10 | 8.00 |
| **Siena** | 62 | 56 | 2.50 | 4.00 |
| **Turin** | 36 | 29 | 1.00 | 2.80 |
| **Venice** | N/A | 81 | 6.10 | 8.90 |
| **Verona** | 67 | 64 | 2.20 | 4.10 |

**Table 4.** Percentages of Airbnb entire homes/apartments located in the historic centre of 13 Italian cities and percentages of the housing stock existing in city centres listed as entire homes/apartments on Airbnb
(*Source*: Adapted from Picascia et al. 2017)


With specific reference to neighbourhoods, in the case of a tourist city such as Florence highest concentration rates were registered in the residential neighbourhoods located in the immediate vicinity of the historic centre. According to authors, the percentage of listings located inside the Medieval walls amount to 65%. Milan presents a more scattered distribution instead, with peaks in correspondence of the *Isola* and *Navigli* areas. Then, a mixed-model can be identified for Rome, with high density rates both in the central zones (*Municipio I,* where historic districts and wide archaeological sites are located) and in other particularly attractive areas of the city; these include zones situated near a part of the city particularly favoured by visitors (i.e. *the Vatican*), but also located in the nearby of transport hubs (i.e. area located East of the central railway station), in what has been defined as a student district (i.e. *San Lorenzo*) and in the residential district of *San Giovanni*, right to the South of the centre.

In order to estimate the pressure exerted on city centres not only by the offer but also by the demand side, S. Picascia and colleagues (2017) have also used the number of reviews written by guests as a proxy of demand[103]. On the basis of the aggregation of reviews per census tract, authors concluded that in cities such as

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[103] S. Picascia and colleagues (2017) also note that the number of tourists seem to be a very good predictor of the spread of Airbnb; in fact, the regression between the number of Airbnb accommodations existing in each city in 2015 and the number of tourists registered for the previous year highlighted an almost perfect correlation ($R^2 = 0.95$).

Florence, Milan and Rome accommodations located in the periphery were capable of attracting guests too, probably thanks to reduced prices.

***Barcelona***. The research conducted by J. Gutiérrez and colleagues (2017) and published on the international journal *Tourism Management* analysed the relationships occurring between Airbnb locations and urban attractions favoured by tourists applying spatial statistics, instead. Not surprisingly, the case study explored by these scholars is Barcelona (Spain), i.e. a city that –as previously described- has registered a significant and controversial increase of short-term rental accommodations. The research hypotheses outlined by the Spanish researchers were the following: 1) Airbnb contributes to the pressure on the city centre, since short-term rental accommodations may also be located in urban areas where hotels are not present; 2) Comparing to hotels, Airbnb accommodations are situated in areas which are closer to the main sightseeing spots, and that thus result to be more conveniently located by a tourist perspective; 3) The factors explaining Airbnb and hotel distribution patterns are different.

In order to verify these hypotheses, researchers firstly collected data from a variety of sources and then analysed them adopting GIS and spatial statistics tools. More precisely, scholars took into account the following data: geolocated data about Airbnb accommodations existing in Barcelona in October 2015 (source: Inside Airbnb); data on Barcelona hotels (source: Catalonia Tourism Registry); population data available for census tracts, updated to 2013 (source: Padrón del Instituto Nacional Estadística). Additionally, geolocated photographs posted by tourists on the online platform Panoramio were used to identify sightseeing hot spots. The visual exploration of the data (aggregated at the level of census section) pointed out that hotels are highly concentrated in the census sections facing the Ramblas-Paseo de Garcia axis, the coastal axis connecting the Barceloneta beach and the Forum, and the Diagonal main street (which has a finance and business connotation). Airbnb accommodations seem to follow a concentric scheme around Plaza de Cataluña – i.e. the central hub of the city-instead (Figure 24). Interestingly, authors refer that the area covered by Airbnb listings is greater than the one interested by hotels, and that it includes traditional city centre residential districts such as the Gothic Quarter, the area around the Sagrada Familia Church, El Reval, La Barceloneta and La Ribera: results seem thus to confirm that Airbnb increases the pressure on the city centre.
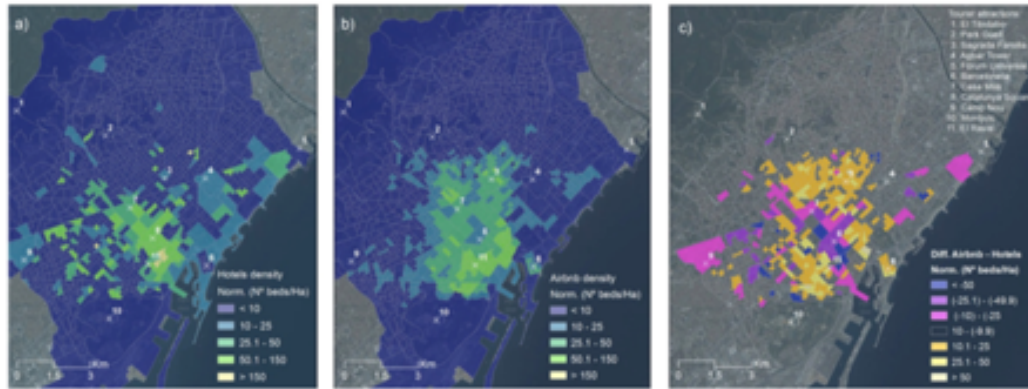
Fig. 4. Density of normalised distributions: a) hotels; b) Airbnb; c) differences.

**Figure 24**. Distribution and density of hotels and Airbnb accommodations in Barcelona.
(*Source*: Gutiérrez et al. 2017, p. 284)

The application of Exploratory Spatial Data Analysis (ESDA) approaches to the case study allowed authors to obtain further meaningful results. A strong positive spatial autocorrelation (Global Moran's Index) was found both for Airbnbs and hotels, with higher values registered for Airbnbs. Anselin Local Moran's I statistic stressed for both cases the presence of High-High clusters in the city centre and of Low-Low clusters in the periphery. However, the magnitude of the phenomenon is particularly high for Airbnb accommodations (Figure 25).
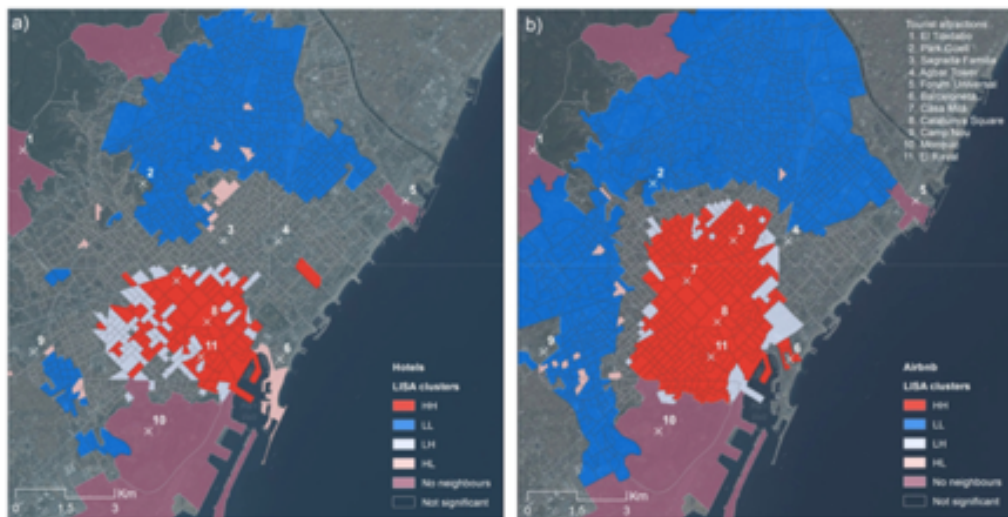


Fig. 5. Anselin Local Moran's I statistic (LISA): a) accommodation in hotels; b) accommodation in Airbnb. *No neighbours: Census sections larger than 2 km wide (without neighbours within 1 km from the centroid).

**Figure 25**. Hotel (a) and Airbnb accommodation (b) clusters in Barcelona.
(*Source*: Gutiérrez et al. 2017, p. 285)

Then, the computation of the bivariate Moran's I between the location of hotels/Airbnbs and the areas of the city most photographed (and thus presumably visited) by tourists pointed out a very strong positive spatial autocorrelation in both cases, with greater values being registered for Airbnbs. According to authors, this result indicates that Airbnb accommodations – with respect to the city's tourist attractions- are more conveniently located than hotels (Figure 26).
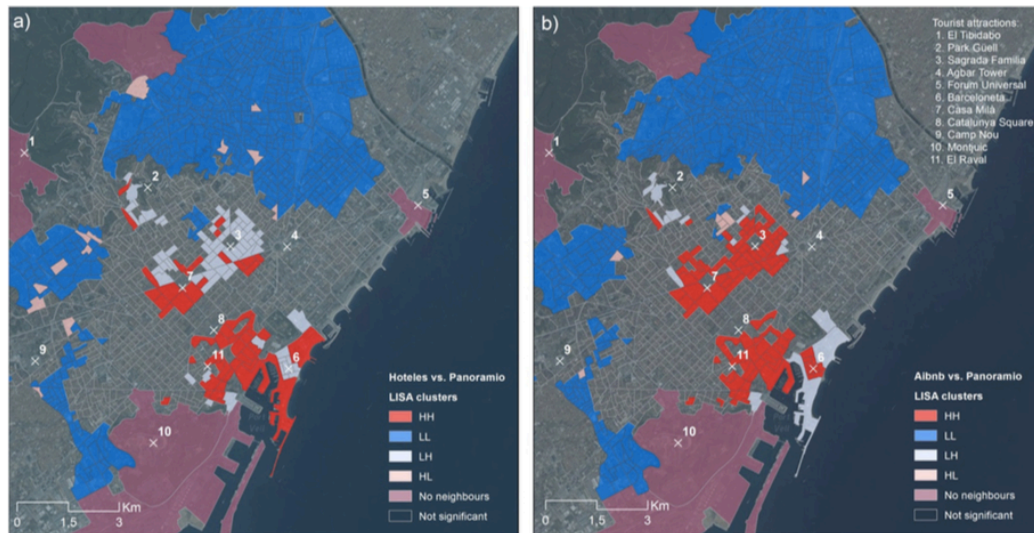


Fig. 9. Bivariate Anselin Local Moran's I statistic for hotels-Panoramio and Airbnb-Panoramio.

**Figure 26**. Bivariate Anselin Local Moran's I between hotel locations and tourist areas (a) and Airbnb accommodation and tourist areas (b)
(*Source*: Gutiérrez et al. 2017, p. 288)

Then, authors used the number of reviews obtained by single Airbnb accommodations as a proxy for the level of occupation, and found that lodgings located in the city centre received, on average, a greater number of reviews (1.48 vs 1.14). Overall, authors concluded that Airbnbs follow a centre-periphery pattern, whereas hotels are located in areas of the city characterized by different urban environments; moreover, their distribution is also influenced by the presence of offices and facilities related to leisure, entertainment and hospitality. If Airbnbs are associated with residential zones, the presence of offices or commercial activities seems not significant instead. Finally, according to the Spanish group, tourist pressure on residential areas and local population is shown by the rates of Airbnb and hotel beds per 1,000 inhabitants: in some areas this number is on the whole superior or even double than the number of inhabitants considered in the analysis. Considering only Airbnb beds, the maximum ratio is 391.7 beds/1,000 inhabitants, with a mean of 30.1. In this case, the pressure exerted by hotels is nevertheless higher (Max. = 1,796.1; M = 43.4).

*Budapest*. Considerations about the spatial relationships occurring between Airbnb accommodations, points of interest relevant for tourists and distance from the city centre have been outlined by G. Dudás and colleagues (2017) too. These authors explored the distribution of Airbnbs in Budapest (Hungary) using 3-band raster maps, and highlighted that also in this European capital high concentrations of Airbnb accommodations emerge in areas of the city characterized by services and elements of tourist attractiveness. Additionally, particularly high prices are registered in these areas (Figure 27).
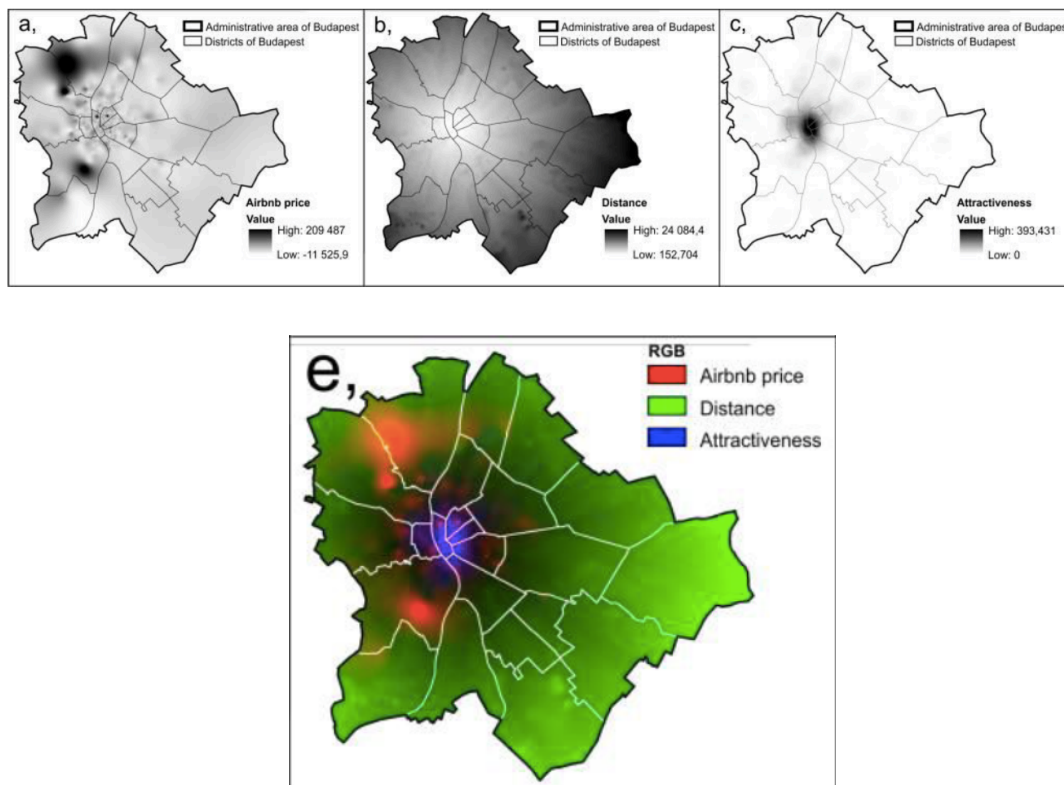




Figure 27. Airbnb in Budapest: Airbnb price (a), distance from the centre (b), attractiveness of the areas (c) and 3-band raster map (e) representing these variables.
(*Source*: Dudás et al. 2017, p. 25 and 27)

*Madrid, Barcelona and Palma de Mallorca*. S. Garcia-Ayllon (2018) has addressed the issue of Airbnb spatial distribution analysing spatiotemporal patterns of short-term rentals in three Spanish urban contexts, i.e. Madrid, Barcelona and Palma de Mallorca. His article mainly enriches the field of study for the comparative nature of the research, which is still broadly lacking in the literature.

The data considered for the analysis covered the period April 2015-February 2018 and consisted of the following: georeferenced data about Airbnb listings (*source*: Airbnb and Inside Airbnb); local hotel offer; values and data concerning the local real estate and lease markets (*source*: geocatalogues of local public administrations and website Idealista.com); number of references to social

conflicts related to tourism, per neighbourhood (*source*: online news identified through web search); number of house ownership transfer licenses (*source*: Official College of Property Registrars). Overall, the study aimed to: 1) verify the presence of spatial autocorrelation patterns for each city; 2) compare the obtained coefficients and values, as to detect differences and similarities across contexts. More specifically, the author focused on the calculation of what he called *static indicators* and *dynamic indicators*[104].

*Static indicators* aimed at analysing the most recent situation[105] and included the following:

a) *Global Tourist Saturation Index*: it is defined as the number of hotel beds plus the number of Airbnb beds in a given neighbourhood, normalised for the surface of the neighbourhood (expressed in Ha);

b) *Peer-to-peer Second Homes Index of Saturation*: it is calculated considering the number of Airbnb beds in a given neighbourhood, normalised for the surface of the neighbourhood itself (expressed in Ha);

c) *Tourist peer-to-peer Prevalence Rate*: it quantifies the prevalence of either hotel or Airbnb beds in a given neighbourhood; it is obtained subtracting the number of Airbnb beds from the number of hotel beds in a given neighbourhood, and then the result is divided for the Ha surface of the neighbourhood itself;

d) *Price Index of the Rental Market*: it is the mean value (expressed as €/m$^2$) of housing rental prices, per neighbourhood (calculated accessing the portal Idealista.com on 3$^{rd}$ May 2018).

*Dynamic indicators* aimed at describing the evolution of the phenomenon in the period April 2015-February 2018[106] and consisted of the following:

e) *Peer-to-peer Tourist Pressure Index*: it is calculated dividing the number of Airbnb beds in a given neighbourhood by the resident population registered by municipal census[107];

f) *Increase Rate of the Rental Real Estate Market*: it is obtained dividing *"the average rate variation of rental real estate market for a neighbourhood"* in a given period by the *"maximum average variation rate of a neighbourhood for this period"* (Garcia-Ayllon 2018, p. 6);

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[104] Given the novelty of this field of study, the indicators will be thoroughly described. In some cases authors' words are directly quoted in the text, as to allow the reader to give his/her own interpretation of the procedure followed by S. Garcia-Ayllon (2018) to calculate the index.

[105] The author says that static indicators are used to picture the *"current"* situation (Garcia-Ayllon 2018, p. 4); on the basis of the information provided through the text, it is plausible that this data thus refer to February 2018.

[106] The author of the article considered 3 periods: April 2015-February 2016, February 2016-February 2017 and February 2017-February 2018 (Garcia-Ayllon 2018, p. 11).

[107] The description of this index is not particularly clear in the text of the original article; the author states that the population considered is an *"average rate"* of 1,000 inhabitants (Garcia-Ayllon 2018, p. 5). The sentence probably means that results have been normalised on 1,000 inhabitants.

g) *Index of Social Conflict*: it is the number of news related to social conflicts linked to tourism, per neighbourhood;

h) *Urban Migration Index*: it is calculated dividing the *"total number of house ownership transfer licenses registered for a neighbourhood"* in a given period by the *"maximum number of houses ownership transfer licenses registered for a neighbourhood for this period"*, expressed under the form of percentage (Garcia-Ayllon 2018, p. 6).

The comparative analysis highlighted that in all cases Airbnb beds are mainly located in the centre of the three cities, thus potentially contributing to the pressure on these areas. Overall, they enrich accommodation opportunities provided by hotels (Figure 28), which result to be more geographically dispersed instead[108]. Overall, the values of dynamic indicators increased through time in all cases. It is interesting that the calculation of the Global Moran's I highlighted strong spatial autocorrelation patterns especially for the *Peer-to-peer Second Homes Index of Saturation* (Madrid: 0.71; Barcelona: 0.72; Palma de Mallorca: 0.75). Bivariate Global Moran's I statistics performed between e) and g) and e) and f) pointed out that HH clusters are present in central areas and LL clusters in the periphery of the three cities. A different behaviour is registered when considering the Bivariate Global Moran's I for e) and h) instead: in this case, the centre HH – periphery LL pattern is less apparent and it seems marginal in Palma de Mallorca. The interpretation advanced by S. Garcia-Ayllon is that the size of the city matters and that gentrification (i.e. expulsion of residents due to the increase of local prices) requires a minimum city size in terms of population in order to occur. However, considerations about the peculiarities of the environment (i.e. Mediterranean island), of the local economy and its dependence on tourism should probably be taken into account as well.
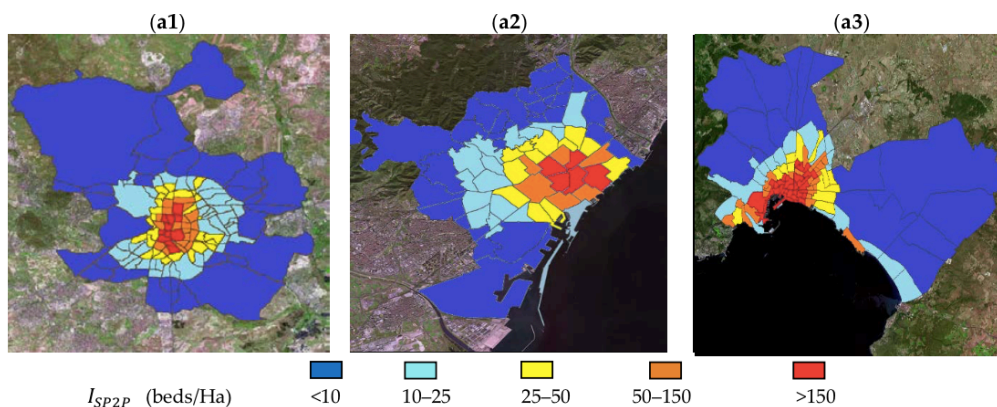


**Figure 28**. Airbnb beds in Madrid, Barcelona and Palma de Mallorca: density maps. (*Source*: Garcia-Ayllon 2018, p. 9)

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[108] Results concerning the real estate market (indexes d and f) will be discussed in the section devoted to the relationships occurring between Airbnb and the real estate market.

***Hamburg***. Finally, higher concentrations of Airbnb accommodations in central areas were found in the city of Hamburg (Germany). More particularly, S. Brauckmann (2017) found that listings are particularly concentrated in alternative and multicultural districts such as Hamburg Neustadt, St Georg, St Pauli and Altona/Ottensen. However, not all districts with these characteristics and most of all located in proximity of the city centre seem to be affected by the phenomenon.

However, on the basis of the literature review, it seems that no study has specifically analysed the relationship occurring between built heritage resources and the distribution of Airbnb accommodations in urban contexts so far. As a consequence, this research line will be thoroughly developed in Chapter 6 of this piece of work.

The next chapter will outline further impacts that may stem form the presence of Airbnb accommodations in the urban context, instead.

# Chapter 4

# The impacts of Airbnb in urban contexts: open issues and research questions of the work

## 4.1 Competitiveness of Airbnb with the real estate and the long-term rental markets

An issue that is currently emerging is that in some cities Airbnb accommodations are currently altering the real estate and long-term rental markets, since all the actors involved compete for the same properties (Chen and Xie, 2017; Gurran and Phibbs, 2017; Lee 2016). Overall, short-term rentals seem to influence the long-term rental and real estate market in the following ways:

1)      In cities that greatly attract visitors and tourists, real estate owners prefer to rent their properties for short periods rather than through regular long-term contracts because with this strategy they can obtain higher monthly revenues (Schäfer and Braun 2016; Sdino and Magoni 2018);

2)      Some residential units are subtracted from the regular rental market by real estate professionals who rent flats at relatively affordable market prices and then sub-let them to tourists for short periods (Mills 2017);

3)      Airbnb may cause the growth of real estate prices, since people are prepared to pay more for a flat if they can gain revenues by renting it out, as it has happened for instance in Amsterdam (Van der Zee 2016);

4)       The presence of flats rent to tourists generally increases real estate prices and monthly rents; this has socio-economic effects, since this phenomenon makes some areas unaffordable for parts of the population with lower incomes (VeneziaToday 2018; Croft 2015; Jessop 2017).

On the one hand it is thus evident that in high-demand cities short-term rentals have become an investment strategy (Schäfer and Braun 2016). On the other hand in some contexts Airbnb is nevertheless reducing permanent rental housing supply and increasing housing prices, at the expenses of lower-income citizens (VeneziaToday 2018; Gurran and Phibbs 2017; Jessop 2017; Horn and Merante 2017).

### 4.1.1 Profitability of short term vs long term rentals

With regard to the profitability of short-term rentals, the case of Berlin is emblematic: in fact, in this city the conversion of apartments previously rent for long-term periods into short-term rental accommodations allows hosts to obtain monthly revenues that – according to some estimations - can amount to even the quadruple of monthly leases (Schäfer and Braun 2016). Other examples of the profitability of short-term rentals come from Barcelona, where apartments rent at 950 euros per month are sold on Airbnb at 200 euros per night (Mills 2017; Jessop 2017): this makes clear that – in presence of a certain degree of demand- the operation is thus particularly advantageous for hosts. Then, other authors have firstly estimated the capitalization rates of real estate units allocated to short-term rentals in some Italian cities, and then they have compared them with the ones stemming from long-term rentals: results indicate that – on average- the former register a value of 6.2%, whereas the latter show a capitalization rate equal to 2.6% (Sdino and Magoni 2018). The following table highlights that capitalization rates stemming from Airbnb are particularly high for the city of Venice (Table 5).

| City | Capitalization rate: Airbnb (mean value) | Capitalization rate: traditional contracts (mean value) |
|---|---|---|
| Rome | 5.2% | 2.7% |
| Milan | 5.9% | 3.0% |
| Florence | 5.4% | 2.5% |
| Venice | 8.9% | 2.4% |
| Naples | 6.0% | 2.4% |
| Palermo | 5.9% | 2.7% |
| Turin | 5.9% | 2.9% |
| Bologna | 6.0% | 2.7% |

**Table 5.** Airbnb and traditional contracts: comparison of capitalization rates.
(*Source*: Adapted from Sdino and Magoni 2018, p. 249)

Additionally, the profitability of short-term rentals is not only stimulating owners to shift from long-term to short-term rentals but it is also encouraging the acquisition of new residential units to be offered on the short-term rental market.

Even though it does not provide a clear comparison with average monthly rents, the study conducted by D. Coyle and T.Y. Cheong Yeung (2016) on data extracted from the company Airdna on fourteen European cities gives an overview of estimated annual revenues generated from the Airbnb activity of hosts[109] (Table 6).

| Table 2 | Average Annual Revenue US$ | Proportion of Listings with an annual revenue | | |
|---|---|---|---|---|
| City | | Under US$1,000 | Under US$10,000 | Over US$30,000 |
| London | 7928.88 | 23.48% | 72.86% | 5.73% |
| Amsterdam | 7792.49 | 15.26% | 73.00% | 4.34% |
| Edinburgh | 6714.75 | 19.35% | 76.67% | 2.82% |
| Paris | 6535.50 | 26.82% | 79.47% | 3.39% |
| Glasgow | 6268.78 | 22.44% | 78.41% | 2.33% |
| Barcelona | 6163.10 | 26.11% | 78.66% | 2.40% |
| Manchester | 5594.82 | 29.64% | 80.41% | 2.42% |
| Berlin | 3858.84 | 40.10% | 88.44% | 1.02% |
| Munich | 3754.48 | 36.59% | 89.71% | 1.03% |
| Toulouse | 3731.30 | 29.22% | 90.92% | 0.22% |
| Frankfurt | 3207.95 | 34.57% | 93.28% | 0.33% |
| Cologne | 3149.16 | 39.10% | 93.34% | 0.27% |
| Nantes | 2798.53 | 38.75% | 94.59% | 0.00% |
| Strasbourg | 2663.29 | 43.84% | 94.89% | 0.07% |

**Table 6.** Airbnb activity in 14 European cities: estimated annual revenues per listing. (*Source*: Coyle and Cheong Yeung 2016, Table 2)

If the table actually only highlights that revenues are unevenly distributed, it might not be excluded that the annual income generated by a listing might be higher or comparable to the one stemming from a long-term rental activity[110].

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[109] As specified by authors, data refer to April 2016 (Coyle and Cheong Yeung 2016).

[110] In order to verify this hypothesis, data concerning average monthly rates would be needed. Additionally, it must be considered that the table presents calculations considering all types of listings (i.e. entire homes/apartments, shared rooms and private rooms): as a consequence, it would probably be more fruitful to make comparisons considering entire homes/apartments only.

## 4.1.2 Properties most affected by the Airbnb phenomenon and association between Airbnb and rental growths

In their article on the effects of Airbnb on the housing market of the German capital city, P. Schäfer and N. Braun (2017) expand further their analysis and note that flats rent for short periods in some cases are actually misused, since they are not just occasionally offered on the market and they thus violate local regulations[111]. Through the monitoring of accommodations rent through Airbnb, the two authors found out that the units rent for two consecutive months[112] represented 75% of the total amount of accommodations offered through the platform. Among these "misused" flats, 67% were located in *Mitte, Neukollen, Prenzlauer Berg, Kreuzberg* and *Friedrichshain*, i.e. in neighbourhoods that– as seen in previous paragraphs- represent rather central areas where the tourist and housing pressure is particularly high. Then, the comparison between the most frequent characteristics of Berlin Airbnb accommodations and the local housing stock[113] highlighted that competition mostly exists for small flats with one or two rooms and located in the above mentioned areas. According to the authors, misused apartments in Berlin are only the 0.3% and 1.39% of the one/two-rooms segment[114], but this percentage is higher for the five neighbourhoods mentioned above (3.62%) and reach 7.04% in *Mitte*. Then, the analysis of location highlighted that where percentages of misused flats are higher, rental growths are higher too. According to P. Schäfer and N. Braun these results do not directly confirm the positions of the ones who claim that Airbnb is causing an increase of long-term rentals – since it is not possible to clearly demonstrate a cause-effect relationship- but nevertheless they show that the two phenomena occur in the same areas.

Similar conclusions were outlined by K. Horn and M. Merante (2017) in their study about Boston (U.S.A.) too: in fact, authors stated that an increase of Airbnb density in census tracts (defined as the number of Airbnb listings by census tract

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[111] P. Schäfer and N. Braun (2016) particularly refer to the "Zweckentfremdungsverbot", i.e. the law issued in 2013 to limit the misuse of flats and safeguard the supply of residential living space for the population. As recalled by authors, one form of misuse takes place when residential living space is used for repeated daily or weekly letting as a holiday flat or tourist accommodation. In order to use the residential space in this way, permission by the responsible district authority is required instead.

[112] Considering that the "Zweckentfremdungsverbot" does not establish with precision the minimum number of days a living unit should be offered to tourists to be considered misused, authors explicitly declare that the two-months period should be considered as an arbitrary research choice. The months monitored by the two researchers were December 2014-January 2015 and included 11,495 listings (Schäfer and Braun 2016).

[113] As reported by the two authors, Berlin presented 1,826,196 residential units, with a number of rooms each ranging from 1 to 7. Flats with 3-4 rooms are the most frequent type (33.31% and 27.19% respectively), followed by 2 rooms (17.87%) and one room (3.94%) apartments. Smallest flats are mostly located in inner-city neighbourhoods and they represent one of the most desired segment of the real estate market (Schäfer and Braun 2016, p. 297).

[114] The authors of the article consider these percentages quite low, especially if it is taken into account that in 2014 the percentage of residential units not occupied in the city was 1.50%.

divided by the number of housing units in that census tract) was associated with an increase in rents too.

Then, examples from the news report that in Barcelona, in neighbourhoods such as *La Barceloneta*, apartments that were rent at 300-400 euros per month have recently reached 600-700 euros (Croft 2015).

S. Garcia-Ayllon (2018) have proposed some considerations regarding the relationships occurring between the presence of Airbnb accommodations and the rental market of Madrid, Barcelona and Palma de Mallorca, taking into account the mean value (€/m$^2$) of housing rental prices (calculated accessing the portal Idealista.com on 3$^{rd}$ May 2018) and the increase rate of the rental real estate market at the neighbourhood level. Through the application of GIS and spatial statistics tools, the author found that Airbnb accommodations tend to be located in areas in which rental prices are higher; additionally, he also found some clusters in which both the peer-to-peer tourist pressure index and the increase rate of the real estate market were high[115].



$I_{TP} - I_{REM}$
**(a1)**

HH  LL  LH  HL
**(a2)**                 **(a3)**
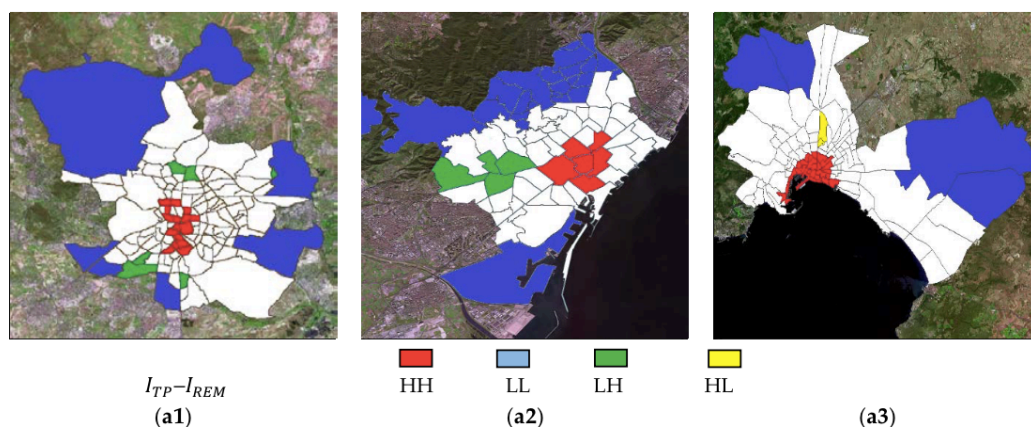
**Figure 29**. Bivariate Anselin Local Moran's I between the peer-to-peer tourist pressure index and the increase rate of the rental real estate market: Madrid, Barcelona and Palma de Mallorca.
(*Source*: Garcia-Ayllon 2018, p. 14)

### 4.1.3 Airbnb as profession and investment: the phenomenon of multi-listing hosts

The magnitude of professional hosts or of real estate agencies operating on the Airbnb market has been generally estimated through the monitoring of the number (or percentage) of hosts managing more than one listing (*multi-listing*

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[115] For a more detailed description and analysis of these indexes, please see paragraph 3.3.4 of this piece of work.

*hosts*) and through the percentage of accommodations managed by a single host. As anticipated in previous chapters, Q. Ke (2017) found that, globally, in 2016 78.4% and 12.2% of hosts owned one and two listings respectively, and that the remaining 9.43% actually managed 33.16% of all listings. With reference to specific cities, it is possible to report here the data collected with first-hand research by the Inside Airbnb platform (Table 7):

| City | % of single listings | % of multi-listings | Year |
|---|---|---|---|
| Amsterdam | 78.7% | 21.3% | 2018 |
| Antwerp | 67.2% | 32.8% | 2017 |
| Athens | 56.2% | 43.8% | 2017 |
| Barcelona | 41.3% | 58.7% | 2018 |
| Bergamo | 52.9% | 47.1% | 2016 |
| Berlin | 77.6% | 22.4% | 2018 |
| Bologna | 51.4% | 48.6% | 2018 |
| Bordeaux | 75.3% | 24.7% | 2018 |
| Brussels | 64.0% | 36.0% | 2017 |
| Copenhagen | 87.4% | 12.6% | 2017 |
| Dublin | 56.2% | 43.8% | 2017 |
| Florence | 35.9% | 64.1% | 2018 |
| Geneva | 66.7% | 33.3% | 2018 |
| Istanbul | 44.9% | 55.1% | 2016 |
| Lisbon | 33.7% | 66.3% | 2018 |
| London | 59.1% | 40.9% | 2016 |
| Lyon | 79.6% | 20.4% | 2018 |
| Madrid | 47.0% | 53.0% | 2018 |
| Milan | 60.7% | 39.3% | 2018 |
| Naples | 41.9% | 58.1% | 2018 |
| Paris | 80.5% | 19.5% | 2018 |
| Porto | 34.7% | 65.3% | 2018 |
| Rome | 39.3% | 60.7% | 2017 |
| Stockholm | 88.9% | 11.1% | 2016 |
| Venice | 31.8% | 68.2% | 2018 |
| Vienna | 57.3% | 42.7% | 2018 |

**Table 7.** Percentages of listings published by a host managing one or more listings in some European cities
(*Source*: Author's elaboration on Inside Airbnb data.
http://insideairbnb.com/get-the-data.html)

The table shows that percentages are very variable, but it is interesting to note that percentages of listings published by a host managing more than one listing exceed 50% in some European capitals (e.g. Lisbon, Porto, Barcelona, Istanbul, Madrid) but also in many Italian cities, such as Venice, Florence, Naples and

Rome. Table 8 displays more detailed percentages of Airbnb accommodations managed by multi-listing hosts in some Italian cities.

| City | % of listings with host managing a single listing | % of listings with host managing 2-4 listings | % of listings with host managing 5-10 listings | % of listings with host managing more than 10 listings |
|---|---|---|---|---|
| Rome | 36.5% | 36.7% | 16.4% | 10.3% |
| Milan | 56.9% | 26.9% | 8.4% | 7.9% |
| Florence | 35.9% | 32.9% | 15.8% | 15.3% |
| Venice | 29.1% | 33.1% | 16.1% | 21.7% |
| Naples | 40.0% | 40.0% | 16.2% | 3.8% |
| Palermo | 38.8% | 43.1% | 13.2% | 4.9% |
| Turin | 57.9% | 31.6% | 6.3% | 4.2% |
| Bologna | 53.6% | 34.0% | 7.6% | 4.7% |

**Table 8.** Percentages of listings published by a host managing one or more listings in some European cities.
(*Source*: Adapted from Federalberghi 2016)

On the basis of the data provided by the report published by Federalberghi (2016), the Italian cities that seem to be less interested by the multi-listing phenomenon are Turin, Milan and Bologna, whereas in tourist-oriented cities such as Venice, Florence and Rome the percentages of listings characterized by a host managing more than 10 listings are the highest.

## 4.2 To what extent does Airbnb really compete with the hotel sector?

Chapter 2 has underlined that in many urban contexts Airbnbs and hotels follow different distribution patterns, with hotels being generally more dispersed than short-term domestic accommodations. If on the one hand it can be stated that the location, characteristics, attributes and experiences distinguishing these two forms of hospitality may attract different targets, on the other one the irruption of Airbnb on the market has been defined as disruptive, since it has altered hospitality dynamics. More precisely, professionals operating in the hotel sector and trade associations have frequently accused Airbnb of being an unfair competitor (Federalberghi 2016; Schäfer and Braun 2016). According to these voices, the elements of unfairness are multiple. Firstly, the majority of listings is constituted by entire residential units and many accommodations are owned/managed by the same host, which is often a company or a real estate agency; additionally, several listings are available for rent for the whole year: these conditions imply that Airbnb is not a sharing economy platform and that in

many circumstances the rental activity is practiced as a profession. Secondly, it happens that Airbnb accommodations are offered at relatively low prices, which can be attractive at least for some targets; then, prices can appear particularly advantageous also because the tourist tax does not apply in all cities for short-term rentals users and because the taxation of revenues collected by hosts are not always fiscally regulated. This would mean that hosts have economic advantages if compared to hoteliers, and that these advantages have an effect on final prices and possible consumers' choices too, thus increasing competition. Thirdly and finally, the digital nature of the platform complicates taxation of the revenues made by the Airbnb company and in each country the significant earnings of the San Francisco giant may be subject to tax regulations more favourable than the ones applied to hotels.

However, as stressed in previous paragraphs, it must be recalled here that Airbnb accommodations present peculiar characteristics that can enrich and differentiate the hospitality offer: as a consequence, the existence of competition with the hotel sector needs to be contextualized and systematically analysed. Additionally, it might also occur that competition may vary from context to context. Given this framework, some scholars have thus started to investigate to what extent Airbnb is influencing the hotel sector and can be considered a competitor. Up to now, the main research questions that have guided scholars are the following:

- a) To what extent and how the presence of Airbnb accommodations can influence hotel prices and attendance?
- b) Do hotels influence Airbnbs' performances too?
- c) Can hotels and Airbnb accommodations be considered competitors, in terms of experiences provided and of consumers' profiles and perceptions?

Overall, the co-existence of hotels and Airbnbs in the same areas appears to be not neutral. For instance, according to Zervas et al. (2016), Airbnb may weaken the market performance of hotels. More particularly, according to these authors Airbnb seems to negatively affect the price per night set by middle and lower category hotels, thus reducing their revenues.

I. Blal and colleagues (2018) found that in San Francisco (U.S.A.) Airbnb affects the hotel market, since satisfaction with Airbnb seems negatively associated with hotel performance patterns, thus suggesting that Airbnb does not only supplement the hotel offer, but it may also represent a substitute for hotels.

Chen and Xie (2017) have applied the hedonic price approach to estimate the implicit prices of the attributes of Airbnb listings valued by guests, instead. In the framework of their study, authors have investigated if the presence of hotels and

Airbnb accommodations in the same areas in Austin (Texas)[116] fostered competition among actors, thus influencing hospitality market prices. Through the analysis of a data-set consisting of 5,779 listings and referring to the period September 2008-November 2015, authors concluded that guests particularly valued the functionality of the accommodations – as it happens for hotels- and that Airbnb prices were negatively affected by the number of hotels existing in the areas. According to authors, this result suggests that, by a customer perspective, the presence of hotels diminishes the value of Airbnb accommodations.

Then, Xie and Kwok (2017) monitored hotel and Airbnb prices during the first years of diffusion of the short-term rental model (2008-2011) in Austin (Texas), finding that hotel prices per night remained more or less constant throughout the years, whereas Airbnb prices decreased from 300 to 200 dollars per night. However, it must be underlined that in those years Airbnb prices were very variable, since autonomously decided by hosts, who might have followed personal logics rather than rational ones; as a consequence, authors concluded that, if a hotel is located in an area in which Airbnb prices are either definitely higher then hotel prices or present fluctuations, hotels will register better performances.

The competition between Airbnbs and hotels has been explored not only with reference to prices, services and revenues, but also in experiential terms. Through an online survey addressed to 315 hotel clients and 315 Airbnb guests, M.A. Mody and colleagues (2017) pointed out that both hotels and Airbnbs are able to foster positive experiences with regard not only to the four dimensions identified by B.J. Pine and J. Gilmore (1998) as characterizing the experience economy framework – i.e. education, aesthetic, escapism and entertainment – but also to dimensions typical of the sharing economy realm, such as serendipity, localness, community and personalization. However, Airbnb resulted to outperform hotels with regard to all these dimensions, whereas hotels were valued more in terms of hygiene, security and sure quality.

Then, other authors found that some non-users of Airbnb do not exclude to use this service in the future, and that thus competition will probably increase (Varma et al. 2016). Authors also found that non-users of Airbnb were in part not even aware of the existence of this platform, and that they usually prefer standardized and professional services when travelling; additionally, they also consider hotels as offering a larger variety of services (Varma et al. 2016).

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[116] In this study, Chen and Xie (2017) identified the different areas of Austin (Texas) through zip codes.

## 4.3 Socio-economic consequences, gentrification and alteration of urban landscapes

Considering that, as shown in previous paragraphs, in many cities short-term rental accommodations are mainly located in the nearby of the city centre, the claim of Airbnb to be able to promote the exploration and the economy of neighbourhoods out of the beaten track could be to some extent questioned.

A market research commissioned by Airbnb pointed out that *"76% of guests choose Airbnb to thoroughly explore a specific neighbourhood"* (Airbnb Citizen 2017): however, since the report does not specify the characteristics and prevalent end-use of the neighbourhoods in which guests included into the analysis rent their accommodation, it is hard to deduce whether Airbnb was effective in stimulating the exploration of neighbourhoods usually less visited by tourists. Then, considering that many accommodations are located in the nearby of the areas with the highest concentration of attractions, this statement could actually indicate that tourists chose Airbnb to visit the most attractive neighbourhoods of the city. Location emerged as a very important factor also at the global level, since 89% of guests consulted by Airbnb stated that they chose Airbnb because *"it was more conveniently located throughout the city than hotels"*[117]. Then, A. Varma and colleagues (2016) found that convenient location is particularly highly valued by Airbnb users, and interviews conducted by E. Sthapit and J. Jiménez Barreto (2018) to Airbnb highlighted that they tend to stay in proximity of major sights and urban attractions.

In light of these results, the fact that Airbnb declares that 41% of the guests' daily expenditure is paid out in the neighbourhood in which the chosen accommodation is located (Airbnb Citizen 2017) could be controversial too: in fact, this does not necessarily mean that economic effects are homogeneous throughout the city and that they involve peripheral neighbourhoods maybe characterized by weak socio-economic conditions; on the contrary, this could actually mean that economic effects interest the most attractive and central neighbourhoods.

As evidenced by the case of London (Quattrone et al. 2017), the socio-economic characteristics of hosts may vary through time, and the conduction of studies that relate the presence and attendance of Airbnb accommodations in certain urban areas and their socio-economic conditions could shed light on the socio-economic effects of the phenomenon. However, the phenomenon of multi-listings should be considered too, since the presence of Airbnb accommodations in certain areas could not be the economic expression of residents in the area (especially given that the most part of the listings are entire residential units), but rather the investment strategy of fewer actors.

Finally, rental growths registered in the same areas where Airbnb are mostly present could progressively make these areas unaffordable for inhabitants with

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[117] This statement is a quote extracted from the following webpage: https://www.airbnbcitizen.com/data/#/en (last accessed 1st September 2018).

lower incomes and expel them, as it has happened in the past during gentrification processes. About this point it must be noted that these phenomena are becoming frequent (Lee 2016; Oskam and Boswijk 2016) and that the term "touristification" has entered the current literature on the topic (Brauckmann 2017; García-Hernández et al. 2017).

Then, gentrification process and the alteration of the social fabric could also lead to the alteration of the urban landscape as a whole, even though these effects might take place and be visible in the middle-long run. In this framework, the presence and role of imitative processes typical of gentrification (Curto et al. 2009) should be studied too.

## 4.4 Taxation and regulations of the short-term rental market

On the one hand, the spread of Airbnb may represent an important opportunity for local growth, especially in cities that are trying to expand their appeal for tourists and that do not present a satisfactory or sufficiently diversified hospitality offer yet. On the other hand, its novelty represents a challenge in terms of management and regulation, and in several countries public bodies are currently looking for the solutions that may better balance local development, the liveability of the neighbourhoods and a fair taxation. For instance, in cities that represent worldwide-known tourism destinations and that usually manifest a lack of housing space – such as Los Angeles, New York, San Francisco, Amsterdam-, local authorities have established a cap regarding the number of days per year an accommodation can be put on the short-term rental market. In order to facilitate the multi-dimensional sustainability of the phenomenon, some scholars have proposed to implement regulations that take into account seasonality and the location of the listings, as to contain the excessive concentration of Airbnb accommodations in a limited number of urban areas and thus avoid the depletion of the social fabric established by residents throughout the years (Quattrone et al. 2017). As evidenced by G. Prayag and L.K. Ozanne (2017), other authors have advanced that regulations should aim to minimize negative externalities (e.g. through the collection of taxes), but at the same time other measures should be implemented (e.g. limitation of the number of days an accommodation can be rent for short periods every year; definition of the types of properties that can be put on the market; annual registration to local authorities of the owners that want to rent their properties for short periods).

In some cases local authorities have also adopted measures in order to collect daily tourist taxes form Airbnb guests, as it is usually done for people spending the night in traditional hospitality venues such as hotels, pensions and bed and breakfasts. Additionally, in a country such as Italy, some measures have also recently been taken to collect taxes from hosts getting revenues from their hospitality activity (Agenzia delle Entrate 2017). From a fiscal perspective, the Decree Law n. 50/2017 currently applies in Italy. This Decree has introduced

specific fiscal regulations for the so called *"locazioni brevi"*[118], i.e. for rentals of residential units lasting no more than 30 days and stipulated from 1st June 2017 (Agenzia delle Entrate 2017). According to the Decree – which applies when contracts are directly stipulated between the lessor and the lessee but also when they are fulfilled through intermediaries- the lessor can choose between the ordinary taxation and the so called *"cedolare secca"*. Whereas the former implies the payment of IRPEF and of the regional and municipal surtaxes, the latter establishes a substitute tax (amounting to the 21% of the revenue generated by the short-term rental activity)[119].

However, considering that short-term rentals mediated by digital platforms may be still considered as an emerging and growing phenomenon, the regulation scenario seems to have just started to be widely considered, and the systematic analysis of data by national and local authorities could better inform taxation and regulation policies in the future.

## 4.5 Exploring relationships between peer-to-peer accommodation systems, built heritage and urban contexts: research questions and approaches of this piece of work

As evidenced by the literature review and by the description of the open issues inspiring the current debate, the challenges arising from the development and spread of the digital economy are multifaceted, and both the questions and research approaches that can be followed are indeed multiple. Coherently with the framework presented in Chapter 1, the goal of this dissertation is to explore the relationships occurring between urban built heritage resources and the development of peer-to-peer accommodation systems, analysing Turin (Italy) as a case study. More specifically, the research questions that will be addressed in this dissertation are the following:

a) *Is it possible to identify correspondences and correlation patterns between Turin's built heritage resources and the presence of Airbnb accommodations in the city? Which are the other physical and socio-*

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[118] The Decree Law n.50/2017 applies also when the contract entails services such as the cleaning of the premises, the provision of linen and access to the wi-fi; it does not apply when the lessor provides additional services such as the serving of food, beverages and breakfast, the renting of vehicles, the conduction of tourist guides, etc., which are considered as business activities even if practiced only occasionally (Agenzia delle Entrate 2017, p.3). Since Airbnb business strategies are more and more oriented towards the combination of hospitality and the provision of experiences, it will be interesting to monitor whether the legislation will evolve in order to simplify the taxation of these new forms of hospitality combined with an experiential dimension.

[119] If the contract is stipulated through an intermediary that does not only connect the offer and demand but also makes and/or collect payments– being it a digital platform or not- the 21% tax is retained and deposited by the intermediary itself. In this case the intermediary is required to communicate to *Agenzia delle Entrate* the information and details concerning short-term rentals stipulated since 1st June 2017 onwards (Agenzia delle Entrate 2017, p. 8).

*economic characteristics of the areas most affected by the Airbnb phenomenon?* These questions allow to explore the offer side of the phenomenon and they enable to make considerations not only about the role played by local built heritage resources but also about the socio-economic actors more interested by this new form of economic activity, shedding light on possible relationships occurring between tradition (built heritage) and innovation (digitally-enabled economy);

b) *Does the vicinity to areas with high densities of built heritage resources affect occupation rates of Airbnb accommodations and their prices per night?* This question aims to explore the demand side, trying to deduce from empirical data and behaviours visitors' preferences and consumption patterns, especially with regard to the possible influence exerted by the built heritage component. Results also allow to make estimations about the amount of revenues generated by Airbnb listings for hosts and to make hypotheses about the subjects that mostly benefit from the short-term rental activity;

c) *What are the possible consequences related to the presence of Airbnb accommodations in areas with high densities of built heritage resources and other urban amenities? Are short-term rentals a particularly profitable solution able to interfere with the traditional real estate/rental market? Can Airbnb be considered as a catalyst of new and/or on-going gentrification processes?* These questions aim at exploring the possible socio-economic consequences linked to the massive presence of Airbnb accommodations in areas located in the vicinity of the historic city core, with special regard to the real-estate market and to gentrification processes, i.e. two areas that have been traditionally affected by the presence of built heritage resources and that may be altered in their usual patterns by the digital economy framework.

Given the novelty of this theme and its evolving nature, this thesis will adopt an exploratory and grounded-research theory approach. In fact, even though some recurrent trends are currently emerging in the literature, it can not be excluded that other patterns may be present in different contexts, especially when the size, the socio-economic characteristics, the urban structure and also the tourist vocation of the cities are different. Coherently with the current stage of the research at the global level and with the consequent exploratory nature of this study, qualitative descriptions of the phenomenon in Turin will be accompanied – thanks to the georeferentiation of available data- with the application of *ESDA-exploratory spatial data analysis* techniques and spatial statistics approaches, included *LISA-local indicators of spatial association* techniques; in this framework, the hypothesis-testing approach pursued in studies following traditional experimental methods will be implemented through the performance of a certain number of permutations testing whether possible spatial associations are casual (null-hypothesis) or not.

The questions presented in point *a)* will take advantage of geo-referenced data and GIS resources, and will be answered through the application of ESDA techniques (including LISA) but also through qualitative considerations taking into account the special characteristics of the urban form and of Turin's built heritage history. More particularly, the calculation of the global Moran's Index will allow to identify whether spatial autocorrelation patterns of the variables under study (e.g. built heritage resources, Airbnb accommodations…) exist, and whether their distribution is clustered or dispersed. Then, the calculation of the Local Moran's I will allow to identify whether and where spatial clusters with given characteristics (e.g. High-High, Low-Low…) exist. Finally, the calculation of Bivariate Local Moran's Indexes will enable to make considerations about spatial relationships occurring between a variable and an additional spatially lagged variable. These calculations will be performed considering two types of areal units, i.e. the Microzones and the Statistical Zones, depending on the specific research questions addressed. At this stage, considerations about the evolution of the phenomenon up to the end of 2017 will be performed too, and descriptive statistics will be integrated with heat-maps displaying the spatial distribution of the phenomenon throughout the years. The qualitative description of the relationships possibly occurring between the distribution patterns of Airbnb listings and specific areas of the city will take advantage of the fundamental studies carried out in the late 1980s-early 1990s by the so called *"Scuola di Torino"* - working at the Polytechnic of Turin and collaborating with the Municipality for the establishment of a new *Piano Regolatore Generale*- and focusing on the historic development of the city, of its urban form and of its built heritage. In this case, considerations will be made considering single urban elements, such as street axes, squares and buildings.

Questions presented in point *b)* will be firstly addressed through the performance of descriptive statistics, which will be combined with map-visualisations enabled by GIS software. Then, regression analyses trying to best describe and explain the phenomenon will be performed, as to identify to what extent different characteristics of the accommodations (included their location and its vicinity to the historic city core) contribute to occupancy rates and prices per night. The underlying assumption to the implementation of the hedonic price approach (and of regression analyses) is Lancaster's micro-economics theory.

Questions listed in point *c)* will be firstly addressed making estimations about the higher/lower profitability of short-term rentals in comparison with other revenue-generation strategies such as long-term rentals. At this stage, considerations about the physical characteristics of the properties listed on Airbnb will be made too, as to better contextualise the Airbnb phenomenon in the wider real estate framework. For comparability reasons, the spatial unit of analysis adopted will be the Homogeneous Zone, which is commonly used in Turin when dealing with concurred annual rentals (*affitti convenzionati)*. Then, the questions will also be addressed in a descriptive way, trying to contextualize and interpret

the patterns observed for the city of Turin in light of more general theories elaborated with respect to gentrification processes facilitated by proximity with restored/well preserved built heritage resources.

The results stemming from the specific case study will be then compared with the findings recently emerged in the literature, as to identify similarities and/or differences. Potential peculiarities of the specific case-study will then be used to provide hints for the formation of a future theory, which will require to be confirmed through the conduction of further case-studies.

# Chapter 5

# Turin between tourism, cultural heritage resources, hospitality and real estate trends: an overview

## 5.1 Turin as an attractive destination? An analysis of presences and arrivals in the last fifteen years

Turin is a city located in the North-West of Italy, spreading over a surface of around 130 square kilometers (Urban Center Metropolitano 2016) and counting – on 1st January 2018- a population of 882,523 inhabitants (ISTAT 2018). By an administrative point of view, Turin is the capital city of the Piedmont region, and according to official figures the economy of the city and of its province – with an estimated GDP of 68,173 million euros- is ranked third at the national level (Camera di Commercio 2017). In the last few years the number of companies operating in the province of Torino has slightly shrunk: for instance, in 2016 a - 0.8% with respect to the previous year was registered; nevertheless, in the same period the services sector displayed a growth, especially with regard to services fulfilling public and welfare functions (+1.8%) and linked to tourism (+0.3%) (Camera di Commercio 2017).

In the 20th century Torino represented a typical Fordist one-company town, in this case related to FIAT's car manufacturing activities: after some decades dominated by economical, urban and residential growth, a phase of industrial stagnation followed, then resulting into a socio-economic crisis begun in the 1980s (Vanolo 2015a; Vanolo 2015b). The city has subsequently undergone a deep transformation process in the early 2000s, when private actors and then local governments progressively implemented a series of actions finalised to reinvent the city, change its internal and external perception and ultimately help Torino shift from being a Fordist ecosystem to becoming a culture and events-oriented centre (Vanolo 2008; Vanolo 2015b). In this context a watershed moment

occurred with the Winter Olympic Games[120] host in the city and in the nearby mountain areas in 2006: the international projection obtained through the winter games was in fact combined with the building and the renovation of local infrastructures, the establishment of events focused on culture, publishing (e.g. Salone del Libro) and food (e.g Salone del Gusto and Terra Madre), investments on museums and the development of new city branding strategies focusing on the communication of Torino as a beating and evolving city (as shown by slogans such as *Passion lives here* and *Always on the move*) (Vanolo 2008). More recently, especially after the 2008 global economic crisis, the city has further changed its city branding narrative, trying to affirm itself as a "smart city" at the internal level – in order to promote optimism at the local scale-, and as a destination offering eno-gastronomic excellence at the external one (Vanolo 2015a).

Even though the limits of considering only the figures reported for official hospitality facilities has been already underlined in the first chapthers of this dissertation, a first approach that can be adopted to estimate the attractiveness of Torino throughout the years (especially for the periods in which digital economy patterns were not present yet) is the monitoring of the arrivals and presences reported by the Regional Observatory of Tourism (Osservatorio Turistico Regionale del Piemonte).

Overall, the figures published by the Osservatorio Turistico Regionale del Piemonte[121] suggest that the attractiveness of Torino has progressively increased throughout the years: in fact, the total number of arrivals has more than doubled from 2002 to 2017 (Figure 30). Apart from few exceptions (e.g. 2016), from 2008 onwards the total number of arrivals has progressively increased; in general, arrivals from Italy constitute the largest share of the market (M = 74.3%; SD = 8.4%; Min = 63.5% in 2005; Max = 87.2% in 2009), whereas arrivals from other countries amount on average to one quarter of the city's accommodation market (M = 25.7%; SD = 8.4%; Min = 12.8% in 2009; Max = 36.5% in 2005).

The comparison between the arrivals originated by Italy and by other countries shows that arrivals trends are different (Figure 31): from 2004 onwards the number of national arrivals has manifested a progressive growth (with the exception of the years 2012 and 2015), whereas the tendency of foreigners'

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[120] The debate about whether Olympic Games and mega-events in general are worth the cost is still open (Hiller 2012, p.152); however, even though the economic issue and the economic outcomes potentially stemming from international exposition remain extremely important, recent studies have pointed out that soft legacies such as civic pride, conviviality, the creation of shared memories and the generation of a feel-good environment especially among local citizens all represent positive soft-legacies (Hiller 2012). As a consequence, even though it is not only difficult to evaluate, measure and quantify these qualitative outcomes but also to relate them to fiscal aspects, scholars (Hiller 2012) suggest to include them into evaluations. Additionally, recent trends propose to include public opinion and attitudes towards the Games also in the phase of evaluation of the bids by the International Olympic Committee (Hiller and Wanner 2018).

[121] Annual reports presenting the number of presences and arrivals in single municipalities of Piedmont (included Turin) are available online at: http://www.piemonte-turismo.it/documenti/market-research-statistics/rapporti-statistici-dei-flussi-turistici-in-piemonte/.

arrivals has been more fluctuating, with 2015, 2016 and 2017 exhibiting the highest absolute numbers (420.680, 342.821 and 335.964 arrivals respectively). The data thus show that, whereas the actions undertaken by the local administration in the early 2000s to transform the image of the city have contributed to affirm Torino as a destination for people living in Italy, the capital of Piedmont is not enduringly on foreign visitors' map yet. Even though new models that describe tourist trends considering the multiple dimensions of sustainable tourism – which include not only the environmental one (Butler 1999)- should be developed, the comparison of Turin's arrivals trends to the classic Tourist Area Life Cycle model elaborated by R.W. Butler (Butler 1980 in Weaver and Lawton 2006, p. 307) seems to indicate that this destination is overall developing/consolidating on the market.
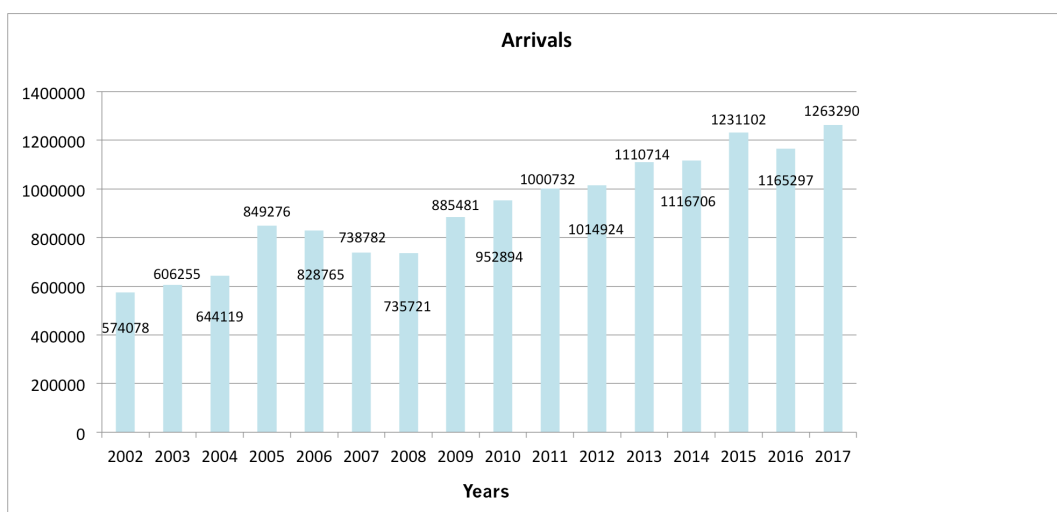


**Figure 30**. The attractiveness of Torino: number of arrivals in 2002-2017.
(*Source:* author's elaboration on Osservatorio Turistico Regione Piemonte's data)
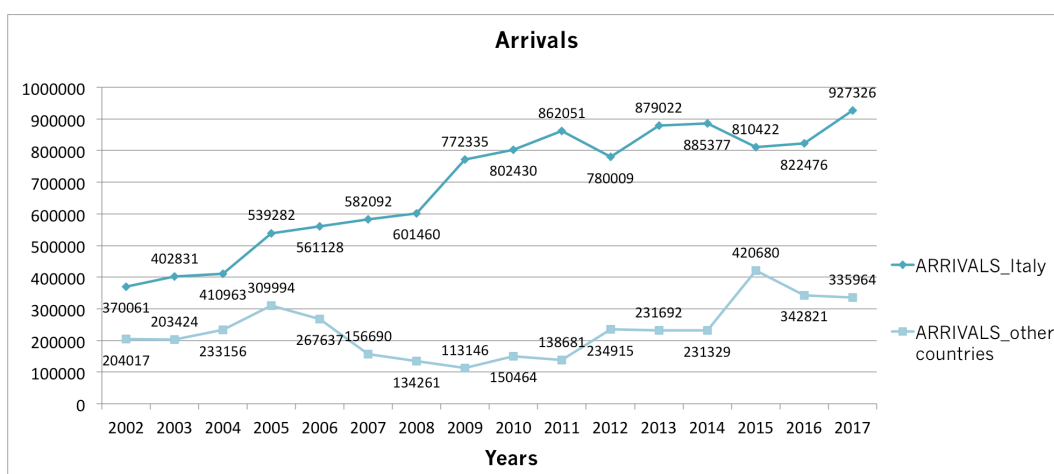


**Figure 31.** Total number of arrivals in Torino (2002-2017),
subdivided by origin of arrivals.
(*Source:* author's elaboration on Osservatorio Turistico Regionale's data)

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Considering that the average number of nights spent by each visitor in the accommodation facilities of the city (i.e. *average stay;* defined as "tempo medio di permanenza" in Italian) in the period 2002-2017 has been usually higher for people coming from countries other than Italy (Other countries: M = 3.03; Italy: M = 2.85) (Figure 32), the contribution of foreigners to total presences (M = 26.6%; Min = 14.3% in 2011; Max = 36.7% in 2006) is overall higher than the contribution of foreigners to arrivals (Figure 33).
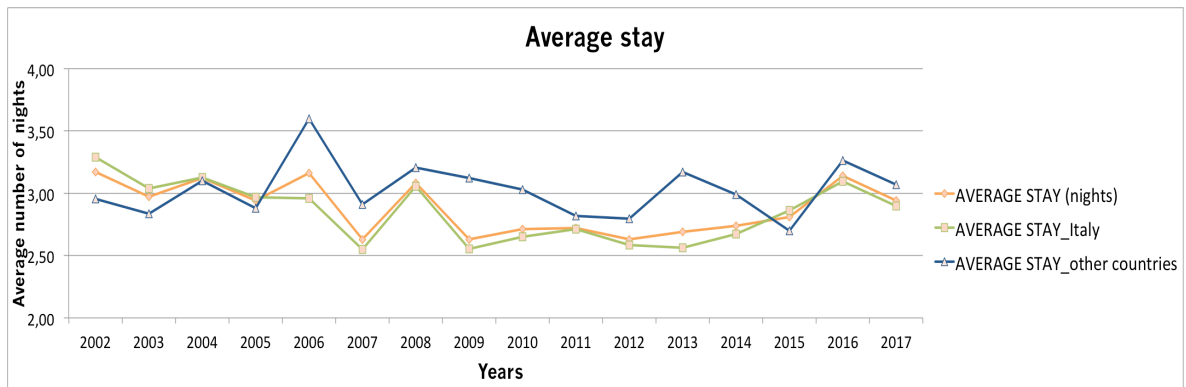


**Figure 32**. Average stay (i.e. "tempo medio di permanenza") in the years 2002-2017, by origin of arrivals.
(*Source:* author's elaboration on Osservatorio Turistico Regionale's data)
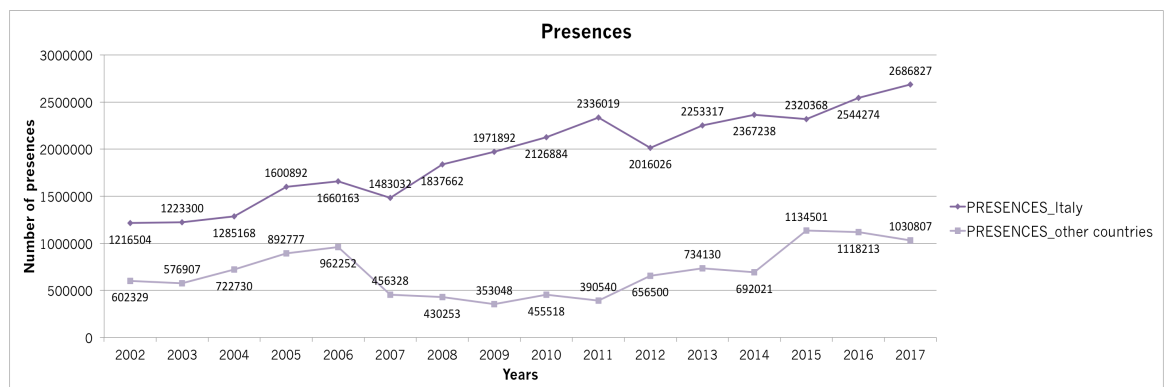


**Figure 33**. Total presences registered in Torino (2002-2017), by origin.
(*Source:* author's elaboration on Osservatorio Turistico Regionale's data)

Table 9 provides an overview of arrivals and presences concerning the city of Turin in the period 2002-2017.

| YEAR | Arrivals Italy | Presences Italy | Arrivals OC | Presences OC | Arrivals Total | Presences Total | Average stay (n. of nights) | Av. stay Italy | Av. stay OC | Arrivals Italy % | Arrivals OC % | Presences Italy % | Presences OC % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2002 | 370,061 | 1,216,504 | 204,017 | 602,329 | 574,078 | 1,818,833 | 3.17 | 3.29 | 2.95 | 64.5 | 35.5 | 66.9 | 33.1 |
| 2003 | 402,831 | 1,223,300 | 203,424 | 576,907 | 606,255 | 1,800,207 | 2.97 | 3.04 | 2.84 | 66.4 | 33.6 | 68.0 | 32.0 |
| 2004 | 410,963 | 1,285,168 | 233,156 | 722,730 | 644,119 | 2,007,898 | 3.12 | 3.13 | 3.10 | 63.8 | 36.2 | 64.0 | 36.0 |
| 2005 | 539,282 | 1,600,892 | 309,994 | 892,777 | 849,276 | 2,493,669 | 2.94 | 2.97 | 2.88 | 63.5 | 36.5 | 64.2 | 35.8 |
| 2006 | 561,128 | 1,660,163 | 267,637 | 962,252 | 828,765 | 2,622,415 | 3.16 | 2.96 | 3.60 | 67.7 | 32.3 | 63.3 | 36.7 |
| 2007 | 582,092 | 1,483,032 | 156,690 | 456,328 | 738,782 | 1,939,360 | 2.63 | 2.55 | 2.91 | 78.8 | 21.2 | 76.5 | 23.5 |
| 2008 | 601,460 | 1,837,662 | 134,261 | 430,253 | 735,721 | 2,267,915 | 3.08 | 3.06 | 3.20 | 81.8 | 18.2 | 81.0 | 19.0 |
| 2009 | 772,335 | 1,971,892 | 113,146 | 353,048 | 885,481 | 2,324,940 | 2.63 | 2.55 | 3.12 | 87.2 | 12.8 | 84.8 | 15.2 |
| 2010 | 802,430 | 2,126,884 | 150,464 | 455,518 | 952,894 | 2,582,402 | 2.71 | 2.65 | 3.03 | 84.2 | 15.8 | 82.4 | 17.6 |
| 2011 | 862,051 | 2,336,019 | 138,681 | 390,540 | 1,000,732 | 2,726,559 | 2.72 | 2.71 | 2.82 | 86.1 | 13.9 | 85.7 | 14.3 |
| 2012 | 780,009 | 2,016,026 | 234,915 | 656,500 | 1,014,924 | 2,672,526 | 2.63 | 2.58 | 2.79 | 76.9 | 23.1 | 75.4 | 24.6 |
| 2013 | 879,022 | 2,253,317 | 231,692 | 734,130 | 1,110,714 | 2,987,447 | 2.69 | 2.56 | 3.17 | 79.1 | 20.9 | 75.4 | 24.6 |
| 2014 | 885,377 | 2,367,238 | 231,329 | 692,021 | 1,116,706 | 3,059,259 | 2.74 | 2.67 | 2.99 | 79.3 | 20.7 | 77.4 | 22.6 |
| 2015 | 810,422 | 2,320,368 | 420,680 | 1,134,501 | 1,231,102 | 3,454,869 | 2.81 | 2.86 | 2.70 | 65.8 | 34.2 | 67.2 | 32.8 |
| 2016 | 822,476 | 2,544,274 | 342,821 | 1,118,213 | 1,165,297 | 3,662,487 | 3.14 | 3.09 | 3.26 | 70.6 | 29.4 | 69.5 | 30.5 |
| 2017 | 927,326 | 2,686,827 | 335,964 | 1,030,807 | 1,263,290 | 3,717,634 | 2.94 | 2.90 | 3.07 | 73.4 | 26.6 | 72.3 | 27.7 |
| M | 688,079 | 1,933,098 | 231,804 | 700,553 | 919,884 | 2,633,651 | 2.88 | 2.85 | 3.03 | 74.3 | 25.7 | 73.4 | 26.6 |
| Mdn | 776,172 | 1,993,959 | 231,511 | 674,261 | 919,188 | 2,602,409 | 2.88 | 2.88 | 3.01 | 75.1 | 24.9 | 73.8 | 26.2 |
| SD | 189,884 | 477,813 | 86,549 | 260,185 | 222,411 | 616,871 | 0.21 | 0.24 | 0.22 | 8.4 | 8.4 | 7.6 | 7.6 |
| Min | 370,061 | 1,216,504 | 113,146 | 353,048 | 574,078 | 1,800,207 | 2.63 | 2.55 | 2.70 | 63.5 | 12.8 | 63.3 | 14.3 |
| Max | 927,326 | 2,686,827 | 420,680 | 1,134,501 | 1,263,290 | 3,717,634 | 3.17 | 3.29 | 3.60 | 87.2 | 36.5 | 85.7 | 36.7 |

**Table 9.** Arrivals and presences in Turin (2002-2006).
*(Source:* author's elaboration on Osservatorio Turistico Regionale's data)

According to the most updated data available on the ISTAT portal (ISTAT 2017), in 2016 Turin was the 10th Italian location registering the highest number of annual presences in official accommodation facilities; excluding coastal centres, with 3,662,487 presences Turin only came after attractive cities such as Rome (25,191,580 presences), Milan (10,976,244), Venice (10,511,788) and Florence (9,334,085). According to the same data set, the cities that followed Turin in 2016 were Naples (3,292,057 presences), Bologna (2,587,122), Verona (2,085,845) and Genova (1,767,704), instead. The following table (Table 10) highlights that in the period 2006-2016 the growth of the number of presences registered for Turin amounted to + 39.7%. This city thus manifested a relative growth higher than the one evidenced for Rome, Venice Florence and Genova, but lower than the one of Verona, Bologna and particularly Naples and Milan (Table 10). Then, if we consider the number of presences registered in Turin in 2002 (pre-olympic period) and in 2017, it is evident that the growth has been very intense (+ 104%); additionally, the increased attractiveness of the city in the post-olympic period was highlighted by the great increase identified for arrivals too (+120% in 2017 respect to 2002). Overall, the growth of annual presences that has interested Turin in the last decade seems thus coherent with a more general trend that highlights an increase of the attractiveness of urban contexts.

| City | Presences- 2006 | Presences-2016 | Variation 2006-2016 |
|---|---|---|---|
| Rome | 18,262,339 | 25,191,580 | +37.9% |
| Milan | 7,044,503 | 10,976,244 | +55.8% |
| Venice | 8,245,154 | 10,511,788 | +27.5% |
| Florence | 7,094,799 | 9,334,085 | +31.6% |
| Turin | 2,622,415 | 3,662,487 | +39.7% |
| Naples | 2,104,376 | 3,292,057 | +56.4% |
| Bologna | 1,793,382 | 2,587,122 | +44.3% |
| Verona | 1,490,065 | 2,085,845 | +40.0% |
| Genova | 1,355,614 | 1,767,704 | +30.4% |

**Table 10.** Total presences registered in some Italian cities (2006-2016).
(*Source:* author's elaboration on multiple data sources)[122]

Finally, with regard to the period December 2016- November 2017, a recent research (Centro Einaudi 2018) reporting data communicated by Airbnb highlighted that the number of "tourists" who spent the night in an Airbnb amounted to 140,800 (i.e. about 11% of arrivals in Turin), and that the average stay was 3.1 nights (i.e. similar to the mean of stays in official facilities).

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[122] The source for all 2016 data is ISTAT (ISTAT 2017); the sources accessed to obtain figures for 2006 were the following instead: Comune di Roma 2007 (Rome), Provincia di Milano 2008 (Milan), Comune di Venezia 2017 (Venice), Regione Toscana 2009 (Florence), Osservatorio Turistico Regione Piemonte (2007), Comune di Napoli 2007 (Naples), Regione Emilia-Romagna 2007 (Bologna), Provincia di Verona 2007 (Verona) and Comune di Genova 2008 (Genova).

## 5.2 The hospitality offer in Turin: characteristics, goals, and differentiation strategies

The accommodation supply of Turin is formed both by hotels of different categories (ranging from 2 to 5 stars hotels) and by accommodation facilities of other types, such as bed & breakfasts, pensions, residences and apartments. More precisely, in 2017 the number of hospitality facilities providing accommodation inside the municipality of Turin amounted to 549 (Osservatorio Turistico Regione Piemonte 2018). Figure 34 shows that the number of accommodation facilities has increased in the period 2002-2006; then, a contraction was registered in 2007 (- 2.7% compared to the previous year) and in 2008 (- 2.5% respect to the previous year), and since then the number of facilities has always increased. Overall, in the period 2002-2017 a +91.3% in the number of accommodation facilities was registered, with the highest rates of annual growth being performed in 2006 (+12.2%), 2010 (+ 6.9%) and 2015 (+9.6%).
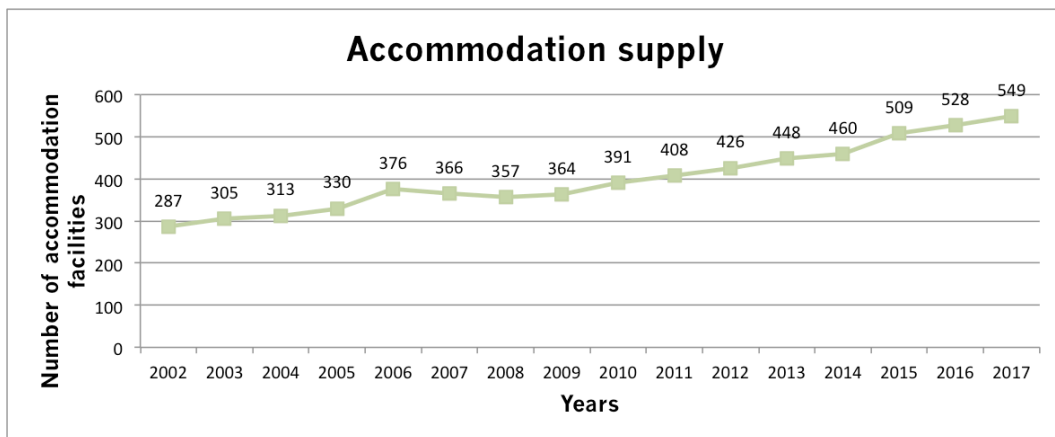


**Figure 34**. Accommodation supply in Torino: number of accommodation facilities in 2002-2017.
(*Source:* author's elaboration on Osservatorio Turistico Regionale's data)
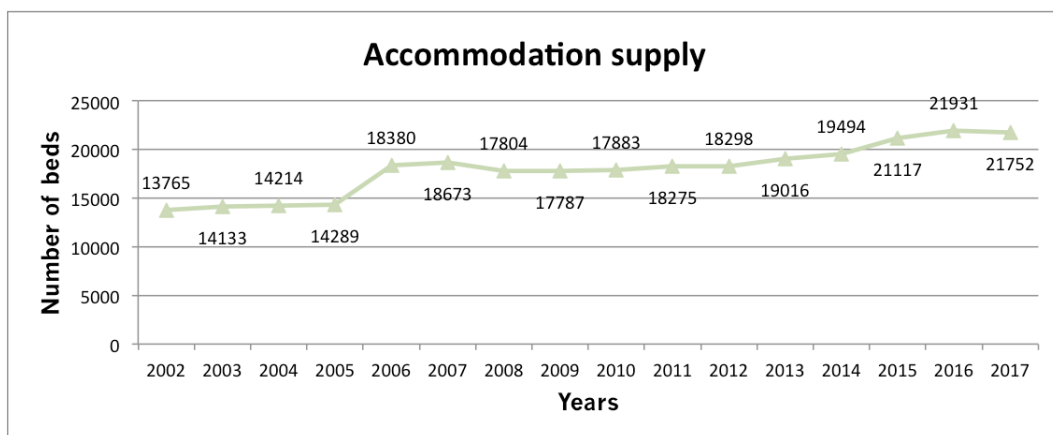


**Figure 35**. Accommodation supply in Torino: number of beds in 2002-2017.
(*Source:* author's elaboration on Osservatorio Turistico Regionale's data)

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Similarly, the total number of beds available on the market has shown a steep growth in 2006 and then it has regularly increased between 2009 and 2016, although registering a slight reduction in 2017 (Figure 35).

## 5.2.1 The hotel demand and offer in Turin: some data

In order to provide a deeper level of detail concerning hotels in Turin and better interpret and contextualise the Airbnb market, it has been deemed useful to conduct a first-hand empirical analysis focusing on hotel facilities available in the city. Given that Airbnb is a web platform that allows to make bookings exclusively online (and that it is therefore addressed to a specific target of users, i.e. travellers performing bookings directly through the web), for comparability reasons it was decided to consider only the hotels that could be booked through a direct online system. Coherently, all the hotels available on Booking.com - i.e. one of the leading firms operating in the online booking sector[123]- at the beginning of 2017 were firstly identified and then relevant data were manually collected, coded and analysed[124].

The analysis was carried out considering more than 100 accommodation facilities (N = 107) classified by Booking.com as located in Turin – which thus represent nearly 20% of all the accommodation facilities existing in the Municipality in 2017-. The performance of descriptive statistics highlighted that, at the time of the study, the hotels available on the Booking.com platform mainly belonged to middle and high level categories: 56% was constituted by 3-stars hotels, 25% by 4-stars hotels and 2% by 5-stars hotels; lower range hotels amounted to 17% of the overall supply, instead (1 star: 9%; 2 stars: 8%). 76.6% of the hotels listed on the platform did not present any information about the historic period in which the building was erected, and this kind of information was missing especially for 3 stars hotels (85%). Among the hotels reporting some information about the historical period and the architectural style of the buildings, 16% generally defined the hotel as an "historical building"; 12% were defined as "modern" and 12% as "new" or "recently redesigned". Another 60% of the above

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[123] Booking.com is one of the leading firms operating in the online booking sector, and it counts more than 28 millions accommodation facilities of different types worldwide; it can be accessed at the following link: https://www.booking.com/index.it.html.

[124] Basic data collection was performed at the beginning of 2017 by students attending Master programmes in Architecture at Politecnico di Torino (course taught by prof. Rocco Curto, ICAR/22); the original data base (including the name and location of the hotel, together with variables such as number of rooms, price per double room per night, hotel category according to number of stars, customers' overall valuation, distance from the closest metro station, distance from the city centre, presence/absence of internet connection, air conditioning, parking, restaurant and gym) was then enriched with additional variables (i.e. belonging to a hotel chain, name of hotel chain, historic period of the building, presence/absence of a terrace or garden, presence/absence of a spa, interior design style, zip code, Microzone). Data analysis was entirely performed as part of personal first-hand research, instead.

mentioned sub-set reported more specific information about historical periods instead (17$^{th}$ century: 8%; 18$^{th}$ century: 8%; 19$^{th}$ century: 40%; 20$^{th}$ century: 4%).

Concerning interior design styles, 31% of hotels were coded as manifesting a "classic" style, 26% a "modern" style, 19% a "basic" style, 14% a "refined" style and 10% a "luxurious" style[125] (Figure 36).
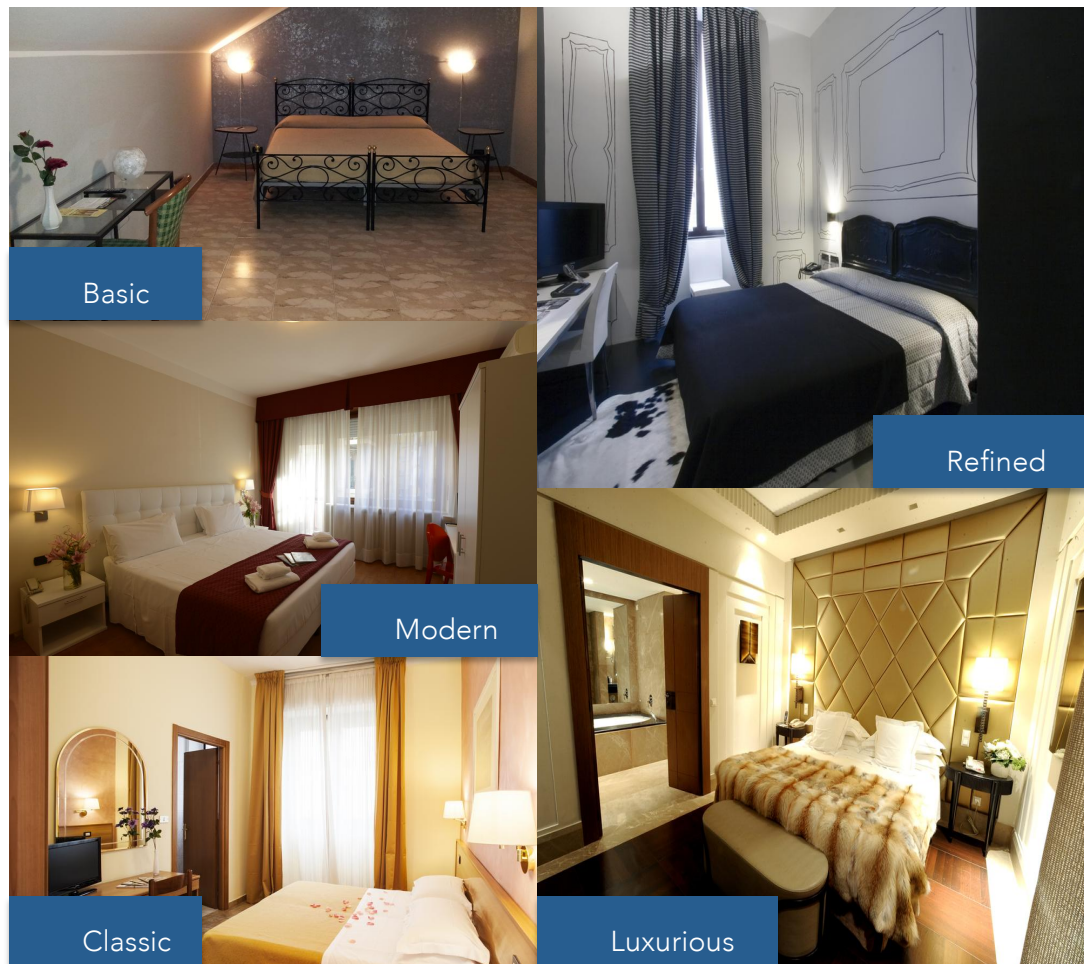


**Figure 36**. Hotels in Turin: examples of interior design styles.
(*Source:* author's elaboration of photos available on Booking.com)

24% of hotels belong to a hotel chain; whereas 1 star and 2 stars hotels do not belong to any hotel chain, all the 5 stars hotels and more than half of 4 stars hotels belong to a hotel chain (51.9%); the percentage of 3 stars hotels satisfying this condition is 13.3% instead.

With regard to specific services, 34% of the observed hotels present an open space (i.e. garden or terrace) accessible to guests, with higher percentages registered for higher level hotels; spas are characteristic of 5 stars hotels, even if a certain percentage of 4 stars hotels (25.9%) and of 3 stars hotels (5%) present this

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[125] The coding was performed on the basis of the "look and feel" of the pictures of the hotel rooms available on Booking.com. In order to reach a greater degree of objectivity, the coding process could be performed by multiple researchers, until an acceptable degree of inter-rater reliability is reached.

facility too. The gym is a peculiarity of 5 stars hotels too, and only 13.1% of the hotels overall provided this service. Internet connection is available in all the hotels considered (even though in some cases wi-fi is not provided in rooms but only in common spaces), and only 9% does not offer air conditioning. Parking lots are available for guests in 83.2% of the cases (even though a fare may apply), whereas a restaurant service is present in 22.4% of the facilities included in the analysis.

Overall, the experience provided by Turin's hotels met customers' expectations: in fact, hotels generally received high ratings (M = 8.0 on a 0-10 scale), with 1-star and 3-stars hotels showing a 7.8 rate on average and 5 stars hotels manifesting a mean of 8.8. The good quality of the offer is highlighted also by the overall values attributed to single facilities, which are above 6 for all the categories (with the exception of a 3-stars hotel).

The analysis of the location of hotels included in the study highlighted that these facilities are located in 31 of the 40 Microzones in which the city is subdivided (Figure 37).
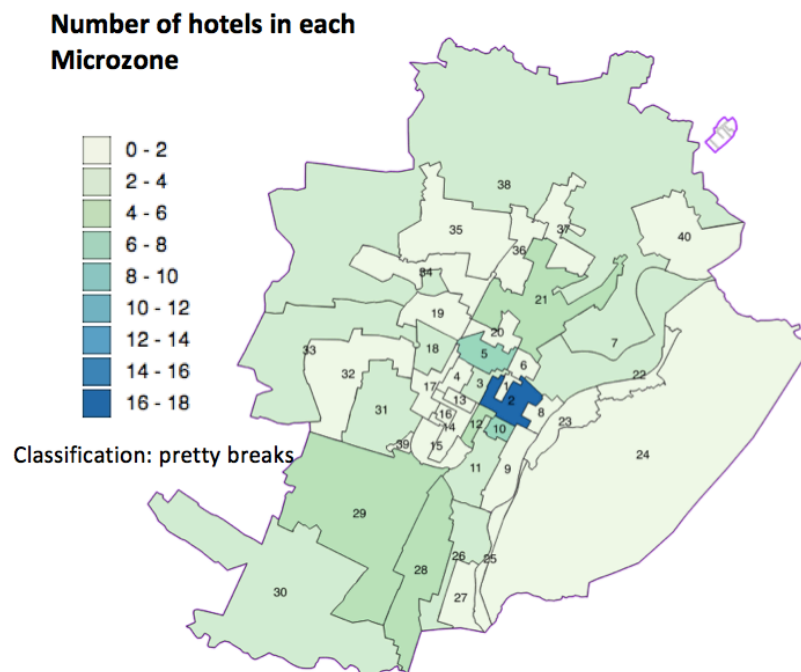


**Figure 37**. Number of Turin's hotels available on Booking.com, per Microzone.
(*Source:* author's elaboration on self-collected data)

More precisely, the Microzones that present the highest number of hotels are 2-Carlo Emanuele II (n = 18), 5-Garibaldi (n = 7) and 10-San Salvario (n =7). The Microzone 2-Carlo Emanuele II is a central area presenting buildings with historic-artistic characteristics; the Microzone 5-Garibaldi is a central area too, presenting not only buildings with historic-artistic characteristics but also an urban fabric that dates back to the 17th-18th century, with buildings that have been

recently restored. The Microzone 10-San Salvario is a semi-central area up to now mainly devoted to residential and commercial uses, instead[126]. Considering the price (euros/m$^2$) of the real estate market of each Microzone (used segment, year 2016), hotels are distributed as following: 40% in Microzones with a price between 1,000 and 2,000 euros/m$^2$; 34% in Microzones with a price between 2,001 and 3,000 euros/m$^2$; 24% in Microzones ranging from 3,001 to 4,000 euros/m$^2$, and 2% in Microzones costing more than 4,000 euros/m$^2$ (Figure 38).
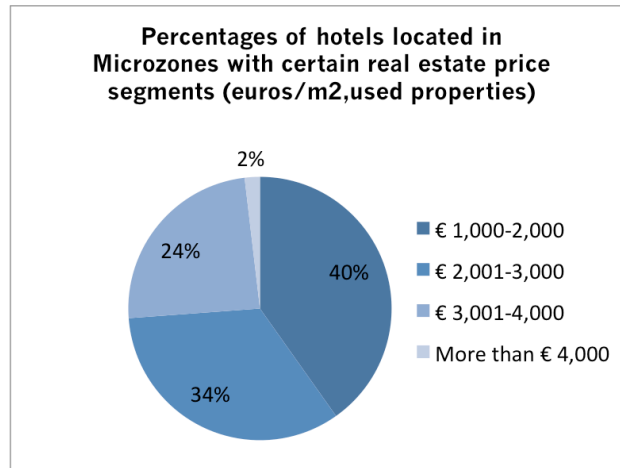


**Figure 38**. Percentages of hotels in Microzones displaying different price segments.
(*Source:* author's elaboration on self-collected data)

Interestingly – and coherently with the spatial models presented in Chapter 3 of this thesis-, the two 5-stars hotels included in the analysis are located in Microzones presenting the highest prices/m$^2$ (Figure 39).
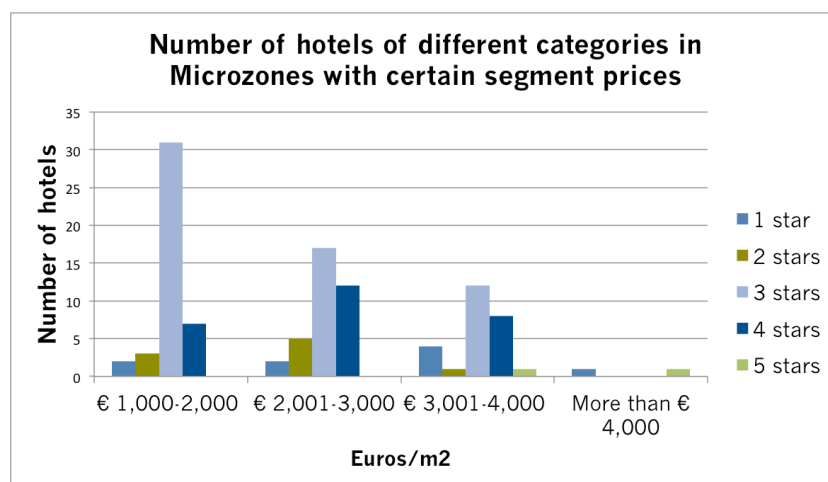


**Figure 39**. Number of hotels in Microzones displaying different price segments (euros/m$^2$).
(*Source:* author's elaboration on self-collected data)

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Then, some scholars applied the hedonic price method to the Turin's hotel supply and they found out that in this city the location of hotels in either the leisure district ("Piazza Castello area") or in the business district ("Lingotto" area) has an average impact on price level of 13%; the distance from the main railway station resulted not to be related to a premium price instead (Abrate et al. 2011).

Concerning the hotel demand, data recently shared by the local Chamber of Commerce highlighted that in 2017 a total of 871,437 rooms was overall sold by Turin's hotels, registering a slight increase (+0.4%) with respect to the previous year and a slight decrease (-0.9%) of the average price per night (M = 85.32 euros). The analysis of hotels' performance carried out by the Chamber of Commerce (Camera di Commercio di Torino 2018a) also pointed out that in 2017 the occupation rate amounted to 65.3% (+ 1.1% if compared to 2016) and that the revenue per room remained stable (around 55 euros). Monthly data indicate that the highest occupation rates were registered in September (78.2%), October (74.8%), May (72.8%), April (72.7%) and November (72.3%); lower rates emerged for the months of January (55.0%), December (57.4%), and especially August (43.5%) instead (Camera di Commercio di Torino 2018b). The analysis of the online sentiment underlined that Turin is highly appreciated by visitors, especially for its tourist attractions and the courteousness and competence of the staff working in local accommodation facilities (Camera di Commercio di Torino 2018b).

## 5.2.2 The potentialities of Airbnb for Turin's local development and accommodation strategies

Some reflections about the hospitality offer of Turin and, more generally, of its province, have recently been performed by a series of local agencies. For instance, the evolution of the dynamics related to the tourism sector and the need for the implementation of new strategies able to capitalize on current - and prospective- mobility patterns of citizens have been recently acknowledged by the Istituto di Ricerche Economico Sociali del Piemonte (IRES Piemonte)[127]. As underlined by IRES Piemonte (2018), the Fordist-era was characterized by a specific kind of mass tourism, with large amount of people moving all together in selected times of the year (especially August) towards mountain or seaside destinations: this phenomenon was associated with the development of mighty hospitality facilities counting on economies of scale and characterized by a certain degree of integrated services. Current trends imply a more fragmented and diversified demand instead: trips are experienced throughout the year, they are significantly shorter and any place has basically the potential to become a

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[127] For a more detailed overview of the research activities performed by IRES Piemonte, please visit https://www.ires.piemonte.it/index.php.

destination, since motivations for traveling are multiple (e.g. related to sports, culture, eno-gastronomy, etc.). In this realm, IRES Piemonte has advocated for the rise and development of flexible and scattered forms of hospitality, included solutions such as the ones offered through Airbnb and other similar platforms. More specifically, in the last IRES annual report it is underlined that it will not be feasible to apply to these emerging forms of accommodations criteria that were implemented for the Fordist-era context; on the contrary, the characteristics that make these new forms of hospitality successful (e.g. flexibility) should be extended for instance to the hotel domain, facilitating the process through specific training initiatives and simplified certification procedures. Additionally, the report also recommends to better differentiate the accommodation offer and to overcome traditional classifications - e.g. through the creation of high-quality, flexible and scattered bed and breakfast facilities- (IRES Piemonte 2018).

As outlined in previous paragraphs, the strategic plans developed in 2000 (Torino Internazionale 2000) and 2006 (Torino Internazionale 2006) set the guidelines aiming to transform Torino from a city relying on a Fordist model to a city investing on culture, events, tourism and sport. The actions undertaken to achieve this goal were overall successful[128], but nevertheless some objectives were not completely fulfilled. As underlined by the yearly report elaborated by the research centre Centro Einaudi (Centro Einaudi 2015), in 2013 the main limits were represented by the difficulty of attracting and retaining foreign tourists, extending the number of nights spent in the urban area (M = 2.5 nights/per tourist) and differentiating the hospitality offer. Whereas the 2006 strategic plan recommended a growth in the number of hospitality facilities other than hotels, in 2006-2013 the contribution of the beds deriving from them actually decreased (-2.0%) and in 2013 only 42.9% of local beds was distributed among bed & breakfasts, agritourisms, campings and camper areas (Centro Einaudi 2015, p. 221).

If the Torino's hospitality offer will not be able to evolve, its limits could particularly emerge in the near future: in fact, the 2015 strategic plan (Torino Internazionale 2015) has set among its objective the transformation of Torino into a "city of experiences", where it is possible to combine culture, sport, food and beverage encounters, work-related activities, solidarity and outdoor practices (Centro Einaudi 2015, p. 216).

With the 2015 strategic plan the will to attract different targets thus appears to be reinforced, and the differentiation of the hospitality offer could assume not only a strategic but even a fundamental role. In this perspective, Airbnb could thus represent one of the vehicles allowing at the same time both to increase the number of beds offered and to differentiate the hospitality supply.

The awareness and sensitivity towards the Airbnb phenomenon have recently

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[128] The increase in the number of tourists visiting the entire province of Turin between 1999 and 2013 amounted to +114.6% (Centro Einaudi 2015).

led to the signature of a 3-year agreement between Regione Piemonte and Airbnb (Regione Piemonte, 2017). The agreement overall aims to promote collaboration at the local level, as to: a) encourage the conduction of both monitoring activities and studies finalised to better understand the economical patterns enabled by the so called "sharing economy"; b) build communication campaigns addressed to hosts – as to explain them the rules and legislation frameworks to be respected, to help them promoting their hospitality activity and make them promoters of local resources-; c) make considerations on present regulations and propose amendments –including the simplification of fiscal obligations and bureaucracy - if needed.

### 5.2.3 National regulation and local taxation

At this point it might be useful to highlight that at the national level some measures have recently been taken to collect taxes from hosts getting revenues from their hospitality activity (Agenzia delle Entrate 2017). From a fiscal perspective, the Decree Law n. 50/2017 currently applies in Italy. This Decree has introduced specific fiscal regulations for the so called *"locazioni brevi"*[129], i.e. for rentals of residential units lasting no more than 30 days and stipulated from 1st June 2017 (Agenzia delle Entrate 2017). According to the Decree – which applies when contracts are directly stipulated between the lessor and the lessee but also when they are fulfilled through intermediaries- the lessor can choose between the ordinary taxation and the so called *"cedolare secca"*. Whereas the former implies the payment of IRPEF and of the regional and municipal surtaxes, the latter establishes a substitute tax (amounting to the 21% of the revenue generated by the short-term rental activity)[130].

Then, the Municipality of Turin has recently established the extension of the daily tourist tax – which is already paid by visitors staying in local hotels, bed & breakfasts, etc.- to Airbnb guests too. The amount of the daily tourist tax applied to visitors staying in Airbnbs and accommodation facilities different from hotels is now set to 2.30 euros, which corresponds to the daily tourist tax concerning

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[129] The Decree Law n.50/2017 applies also when the contract entails services such as the cleaning of the premises, the provision of linen and access to the wi-fi; it does not apply when the lessor provides additional services such as the serving of food, beverages and breakfast, the renting of vehicles, the conduction of tourist guides, etc., which are considered as business activities even if practiced only occasionally (Agenzia delle Entrate 2017, p.3). Since Airbnb business strategies are more and more oriented towards the combination of hospitality and the provision of experiences, it will be interesting to monitor whether the legislation will evolve in order to simplify the taxation of these new forms of hospitality combined with an experiential dimension.

[130] If the contract is stipulated through an intermediary that does not only connect the offer and demand but also makes and/or collect payments– being it a digital platform or not- the 21% tax is retained and deposited by the intermediary itself. In this case the intermediary is required to communicate to *Agenzia delle Entrate* the information and details concerning short-term rentals stipulated since 1st June 2017 onwards (Agenzia delle Entrate 2017, p. 8).

people spending the night in 1-2 stars hotels (Penna 2018)[131]. According to estimations reported by the local press and calculated on the basis of recent tourist flows and the short-term rental facilities supply, the extension of the daily tourist tax to Airbnb guests would mean for Turin an additional income of more than 3 million euros per year (Penna 2018). Additionally, according to Alberto Sacco (Council member reporting on Tourism) and Sergio Rolando (Council member taking care of finances) this measure allows to make the competition between professional hoteliers and non-professional hosts more equal and economically fairer (Penna 2018).

## 5.3 Estimating the attractiveness of Turin museums and built heritage resources

As described in previous paragraphs, motivations encouraging people to visit a given city and, in this case, Turin, can be multiple and only in part related to cultural tourism. However, as previously mentioned, one of the most appreciated aspect of Turin is represented by its "tourist attractions" (Camera di Commercio di Torino 2018b); even though the term "tourist attractions" can have a broad meaning, it seems reasonable to interpret it as a set of cultural and leisure-related services.

A study conducted in the spring-summer of 2010 (Regione Piemonte 2010) and involving a sample of 656 visitors (485 tourists and 171 excursionists) interviewed in different strategic cultural points of the city highlighted that the general visit of the city represented the main motivation in around 80% of the cases, followed by the visit of local museums and exhibitions (40.5%). More specifically, respondents were especially keen on visiting more than one museum in 66.2% of the cases, with 19.7% declaring to have visited/to intend to visit one museum and 14.2% to have visited/to intend to visit none.

Coherently with the motivations listed above, the study pointed out that the activities mainly performed by respondents were the following: walking in the city centre (92.1%), visiting museums, exhibitions and other cultural heritage resources (84.5%), relaxing in local parks (34.1%), doing shopping (27.6%) and spending time with various entertainments (13.7%).

Additionally, the adjectives freely associated to the city by respondents pointed out that Turin was mainly perceived as "beautiful" and "elegant", "welcoming", "renovated", "historic", "royal" and "monumental".

Even though it is difficult to understand whether the cultural and historic aspects of Turin still constitute the main reason of visiting the city, its museums, urban structure and architecture may nevertheless represent not only the main

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[131] A daily tourist tax of 2.80 euros is applied to clients of 3 stars hotels instead; the daily tourist tax applied to customers of 4 stars and 5 stars hotels is 3.70 euros and 5 euros respectively (Penna 2018).

reason to visit the city but also an element that may enrich the stay (e.g. when the main purpose of the visit is attending a specific event, a conference, and so on), extend the permanence and encourage future trips.

An estimation of the cultural attractiveness of the city can also be performed analysing museum attendance and identifying the most popular attractions through the monitoring of online platforms addressed to travellers and reviewing urban spots.

### 5.3.1 The visitors of the Turin's Metropolitan Museum System and of Piedmont cultural heritage sites

Figures concerning the number of visitors attending museums and cultural heritage sites located in Turin have been annually monitored and published by the Osservatorio Culturale del Piemonte (OCP)[132] since 1998.

The number of museums existing in the city and choosing to adhere to the annual monitoring has overall increased throughout the years, and in 2017 49 museums were overall observed, for a total of 5,324,071 visitors registered (Osservatorio Culturale del Piemonte 2018). Considering that in 2017 around 80% of the visits recorded in the museums and cultural heritage sites of the Region were concentrated in the institutions belonging to the metropolitan museum system (Osservatorio Culturale del Piemonte 2018), it can be affirmed that the museums of the capital city of Piedmont generally represent an important cultural hub at the local level. More particularly, available data indicate that three main cultural attractors are present in the city and its immediate surroundings: in fact, in 2017 20% of the visits were related to the royal residence La Venaria Reale (1,048,834 visits), 16% to Museo Egizio (850,465 visits) and 13% to Museo Nazionale del Cinema (720,657 visits).

Estimating the evolution of cultural consumption throughout the years may not be straightforward due to the changes occurred in the cultural realm in the last 15 years (e.g. restorations of buildings, renovations of displays, new openings, increase of the number of museums included in the monitoring), but in order to better contextualise the above mentioned data it might be useful to recall that in 2002 the number of visitors registered by OCP was 1,919,771. Then, if we compare the attendance of the Museo Egizio and of the Museo Nazionale del Cinema in 2002 and in 2017, it is possible to estimate that the increase of the attendance of these museums has been approximately of +181% and +133% respectively; a comparison concerning La Venaria Reale is not possible instead, since in 2002 the complex was not open under its actual form.

Further considerations about museum attendance by different targets can be made considering the data of "Abbonamento Musei Torino Piemonte" (AMTP)

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[132] The reports published by the Osservatorio Culturale del Piemonte are freely available at http://www.ocp.piemonte.it/report_annuali.html.

and of the "Torino+Piemonte Card" (TPC). AMTP is a card that allows to freely visit for 365 continuous days the museums and cultural heritage sites located in Piedmont and adhering to the network; temporary exhibitions are usually included in the offer too, and interestingly they can play the role of attractors (Coscia et al. 2016), together with institutions such as Museo Egizio, Palazzo Madama and Palazzo Reale (Coscia et al. 2018). The card has a cost ranging from 20 to 52 euros (depending whether discounts and special fares apply)[133] and it currently guarantees access to more than 220 cultural spots. The AMTP was firstly released in 1995 and the number of annual cards sold throughout the years has progressively increased (Osservatorio Culturale del Piemonte 2018; Dal Pozzolo et al. 2015; Coscia et al. 2016): if in 2007 the number of visits and cards sold was 364,145 and 51,819 respectively, in 2017 it was 897,464 and 136,063 instead, with a even higher peak of visits occurred in 2016 (Osservatorio Culturale del Piemonte 2018). The AMTP has been conceived as an instrument of cultural welfare and audience engagement and the rational principle at the basis of the card is the economic convenience that – considering the price of regular single tickets- arises just after the first few visits (Dal Pozzolo et al. 2015); however, considering that recent studies have pointed out that a percentage of card-holders uses the AMTP under the level of convenience (Dal Pozzolo et al. 2015), symbolical and identity-related motivations may lay at the basis of the annual acquisition of AMTP. The target of the AMTP is mainly people living in Piedmont, and in 2017 the visits performed with the card amounted to 14% of the overall visits (Osservatorio Culturale del Piemonte 2018). TPC is specifically addressed to tourists instead and its formula has changed throughout the years: at present it is offered under a variety of conditions depending on the number of days of validity (one day: 25.00 euros; two days: 35.00 euros; 3 days: 42.00 euros; 5 days: 51.00 euros) and of the age of the card-holder (2 days under 18 years: 15.00 euros; 3 days under 18 years: 19.00 euros); additionally, the purchasing of the card can be associated to discounted public transports tickets and passes for tourist services; specific tourist cards addressed to people fond of contemporary art and royal residences are present on the market as well[134]. According to figures reported by OCP (Osservatorio Culturale del Piemonte 2018), the number of visits (2007: 151,706; 2017: 248,841) and TPC cards sold (2007: 44,851; 2017: 54,026) has progressively increased in absolute numbers, and the percentage of museum visits occurred in Piedmont in 2017 with various types of TPC amounted to 4%, with slight variations recorded in different months. Thanks to data provided on courtesy of Cristina Cerutti (Tourism Monitor Officer for Promotion and Markets Development at Turismo Torino e Provincia) and Francesca Sibilla (Urban and

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[133] A thorough description of the fares and discounts applied to specific targets is available on the Abbonamento Musei Torino Piemonte's website (https://piemonte.abbonamentomusei.it/L-Abbonamento/Tariffe).

[134] For more details on fares and conditions, please visit the Turismo Torino e Provincia's official website: https://www.turismotorino.org/en/your-trip/our-cards/torinopiemonte-card/tariffs.

Cultural Tourism Officer at Turismo Torino e Provincia), it is then possible to affirm that, for instance, in 2016 the months that registered the highest number of cards sold were August (5,578), April (5,536) and March (5,503), whereas in 2017 the months were April (10,487), December (5,476) and August (5,066). More specifically, the extraordinary peak of tourists of April 2017 was noticed and covered also by local media, which devoted specific articles to this phenomenon – which was particularly related to the Easter break of that year- (Penna 2017). Even though the purchasing of a TPC may depend not only on the main motivations at the basis of the visit of the city, but also on tourists' awareness of the card and on accessibility of purchasing channels, it is possible to note that tourists highly committed to the visit of cultural venues explored the city in the above mentioned months. Then, available data allow to calculate that the average number of visits per card was 4.3 in 2016 and 4.6 in 2017; the comparison of 2016 and 2017 monthly figures suggests that in both years particularly culturally-motivated travellers visited the city in January (2016: M = 5.1; 2017: M = 5.5) and June (2016: M = 4.9; 2017: M = 5.5); high averages were then registered for September in 2016 and 2017 (2016: M = 4.8; 2017: M = 5.0) and for August in 2017 (M = 5.3).

## 5.4 Turin's housing stock, real estate market and the 40 Microzones

At the core of the Airbnb phenomenon lies the rental of private housing space: as a consequence, it is important to provide an overview of the housing stock and of the real estate market of the city, as to better understand the context in which this new reality is taking place.

### 5.4.1 Overview of the housing stock

According to figures available in the literature, it can be stated that the majority of the building stock of Turin is residential (56.71%), whereas lower percentages are registered for industrial buildings (5.20%) and unused space (1.76%) (Barreca et al. 2018): as a consequence, the residential segment represents a very important part of the local real estate market.

On the basis of cadastre data published by Città di Torino, it is possible to state that the residential units belonging to cadastre category A amount to 501,028 (Città di Torino 2017). The economic type (cat. A03) is the most frequent (67%), followed by the so called *abitazioni di tipo civile* (cat. A02, 21%), the popular and ultra-popular type (cat. A04-A05, 11%) and finally the A01-upscale type (0.4%). By a spatial perspective, available data describe the distribution of the different types on the basis of the so called *Circoscrizioni*, which subdivide the city into eight macro-zones. The economic type is present throughout the whole municipality, even though it is less frequent in central areas and in the

South/South-East. The category A02 is well represented especially in central areas and in Circoscrizione 3-Cenisia-Pozzo Strada-S.Paolo (i.e. Semicentral-West part of the city), whereas a relatively low amount of this type of units exists in the Northern parts. As underlined by the report elaborated by Città di Torino, the popular and ultra-popular units are especially located not in peripheric areas –as one would probably expect- but rather in central and semi-central areas. Finally, the upscale type is mainly found in Circoscrizione 8-Borgo Po-Cavoretto-San Salvario, i.e. in Eastern areas approximately located in the nearby of the Po river and in hillside areas[135]. According to the report, in 2016 around 50% of the residential units of the city was represented by first homes, whereas the other 50% was constituted by second homes. Additionally, figures available for that year indicate that 56% of the 447.663 households lived in a residential unit personally owned; these figures highlight not only the degree of diffusion of house property among residents, but also that a discrepancy between the existing number of residential units and households exists, meaning that some residential units are actually vacant.

## 5.4.2 Overview of the real estate market in the 40 Microzones

A description of the general trends concerning the real estate market of the main Italian cities – included Turin- is yearly provided by the *Osservatorio del Mercato Immobiliare*, managed by *Agenzia delle Entrate*. According to recent reports, in 2016 Turin registered an increase of the exchanges of real estate residential units exceeding – with respect to the previous year- 20%, as in the cases of Milan, Genova and Bologna (Osservatorio del Mercato Immobiliare 2017). In that year, the residential units sold and bought in Turin were –on average- the ones that at the national level manifested the smallest dimensions (86 square meters), with the exception of Milan, which registered even smaller figures (84.7 square meters). According to the report, the most frequent type of residential unit exchanged on the market of Turin, Milan and Rome was represented by small apartments; in the case of Turin, small units represented 41.8%, the small-medium type 24.4%, the medium type 19.3% and the large type 5.4%; studios amounted to 9.1% instead, thus making the number of small units exchanged on the local market even higher. If compared to the figures of other Italian cities, in 2016 Turin manifested not only the highest percentage of small units, but also the highest cumulative percentage of studios, small and small-medium units (75.3% overall).

Similar trends were registered also with regard to 2017: in that year the average surface of the residential units exchanged remained small (85 square meters), and it was confirmed that the most frequent type of residential unit traded

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[135] For a graphical representation of the most frequent types of units in the different Circoscrizioni, please see the report published by Città di Torino (2016). Maps are not presented here since Circoscrizioni are macro-areas and this type of subdivision of the city is not used throughout this piece of work.

on the market is small. If units with a surface of 50-85 square meters amounted to 46.4%, the type 85-115 square meters amounted to 23.4% and the 115-145 one to 9.1%; residential units up to 50 square meters and above 145 square meters corresponded to 13.9% and 7.2% (Osservatorio del Mercato Immobiliare 2018)[136]. Among the cities analysed in the report, Turin manifested the highest cumulative percentage of the first three types of units in 2017 as well: in this case the percentage amounted to 83.7%, and an increase was registered also for the other major Italian cities[137].

The real estate market of Turin is then regularly monitored by TREMO-Turin's Real Estate Market Observatory (*OICT-Osservatorio Immobiliare Città di Torino*), which provides updated statistics on real-estate list prices on a six-months basis. More particularly, descriptive statistics of list prices (i.e. min., max, mean, median and standard deviation values)[138] are supplied with reference to the 40 Microzones (MZs) that have been identified by the Observatory in coherence with what established by the DPR 138/98 and by the Regulations issued by the Ministry of Finance. According to these documents, the Microzones are defined as partitions of the city that present a homogenous urban fabric and that constitute specific segments of the local real estate market. As specified by TREMO, in order to be considered as distinct MZs, differences between the minimum and maximum listing prices of each one need to be no more than double or, in some cases, triple[139]. MZs were approved by Turin's Municipal Council in 1999, and since then TREMO and the Department of Architecture and Design of the Politecnico di Torino[140] have monitored, mapped and critically analysed the trends progressively emerging. Through analyses taking into account real estate market dynamics, demand and offer patterns, price ranges, but also socio-economic characteristics of buyers and peculiarities of dwellings (e.g. dimension,

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[136] Whereas the report concerning 2016 data (Osservatorio del Mercato Immobiliare 2017) defines units in a descriptive way, the document elaborated to illustrate 2017 data (Osservatorio del Mercato Immobiliare 2018) subdivides the units explicitly according to their extension. It is reasonable that the correspondence is the following: studios = up to 50 m$^2$; small = 50-85 m$^2$; small-medium = 85-115 m$^2$; medium = 115-145 m$^2$; large = above 145 m$^2$.

[137] A first-hand analysis of the percentages concerning the dimensions of the residential units traded on the Turin's real estate market between 2008 and 2017 (see data at https://www.agenziaentrate.gov.it/wps/content/nsilib/nsi/schede/fabbricatiterreni/omi/pubblicazion i/rapporti+immobiliari+residenziali/archivio+rapporti+immobiliari+residenziali) highlighted that in that period the cumulative percentage of studios and small units was always above 55%, but that in 2017 it jumped to 60.3%; the cumulative percentage of stusios, small and small.medium units registered between 2008 and 2017 was always above 75%, but in 2017 it reached 83.7%: considering that- as pointed out by the literature- residential units of small dimensions are the most desired, it will be interesting to monitor whether in future years this trend will be confirmed, and whether this phenomenon will be linked to investment strategies aiming at adapting these units into holiday lodgings.

[138] TREMO elaborates different statistics for two different segments of the market, i.e. the residential-used (RU) and the residential-new/completely renovated (RN) ones.

[139] On this topic, see the descriptions provided by TREMO on its specific website: http://www.oict.polito.it/microzone_e_valori/cosa_sono_le_microzone.

[140] TREMO was established in 2000 through an agreement between the Municipality of Turin, the Chamber of Commerce and the Politecnico di Torino (Curto et al. 2015).

typology, year of construction, degree of conservation, location, etc.), the research group has contributed to elaborate forecasts, inspire marketing strategies and inform the decision making process of different actors (Curto et al. 2008). Interestingly, information collected by TREMO are organised under the form of a GIS (Curto et al. 2008), as to integrate the spatial component into the analyses and better interpret the trends occurring in the 40 MZs.

Figure 40 illustrates the subdivision of the municipal area into the 40 MZs, showing the 2017 average list prices (used segment) computed for each MZ. Table 11 presents the name and main characteristics of each MZ, paying particular attention to the environmental and/or historic-artistic characteristics of the areas, to the functions and types of buildings currently prevailing and to the quality and/or level of maintenance of the buildings themselves; some of the main squares, axes and urban spots existing in each MZ are listed as well.
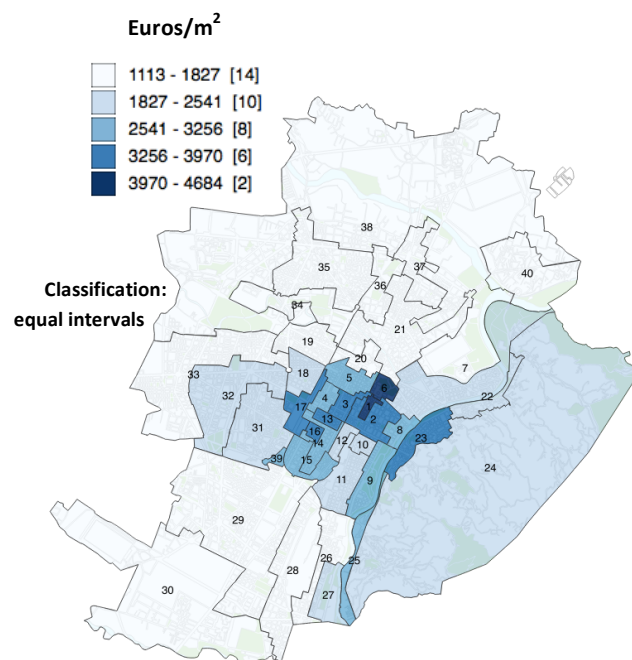


**Figure 40.** Mean list prices (euros/m$^2$) in Microzones (used segment-2017).
(*Source:* author's elaboration on TREMO data)

| ID MZ | Name MZ | Description |
|---|---|---|
| 1 | Roma | Urban area characterised by historic-artistic and environmental amenities. It includes the Piazza San Carlo square (17th century) and the Via Roma axis (redeveloped in the 1930s). |
| 2 | Carlo Emanuele II | Urban area characterised by historic-artistic properties. Even though the buildings and the urban fabric were developed in different phases, the area is homogeneous for what concerns the environmental and building quality. It includes squares and axis such as via Po and corso Vittorio Emanuele II. |
| 3 | Solferino | Urban areas characterised by historic-artistic and environmental quality. The urban fabric was mainly developed in the mid and late 1800s. It is characterised by the Piazza Solferino square, porches and the via Cernaia |

| | | and via Pietro Micca axes. |
|---|---|---|
| 4 | Vinzaglio | Urban area characterised by historic-artistic and environmental quality. It mainly presents Neoclassic buildings with either private or public functions. The main axes are Corso Vinzaglio, Corso Bolzano, Via Cernaia and others. |
| 5 | Garibaldi | Urban area characterised by high environmental and historic-artistic quality. The urban fabric was developed in the 17th-18th century, even though some emergencies date back to the Middle Ages. It combines services and private residencies. The main axis is Via Garibaldi. |
| 6 | Castello | Urban area characterised by high environmental and historic-artistic quality. It incorporates relics of the Roman times and the Middle Ages and it includes buildings related to the Savoia royal family, such as Palazzo Reale and Palazzo Madama. The main axes are Via Roma and Via Po. |
| 7 | Vanchiglia | The urban fabric of the area is not homogeneous but it is characterised by environmental quality. It was mainly developed in the 1800s and later on. It includes the Po river and some ex-industrial areas. Residential and commercial functions prevail. It includes axes such as the Northern part of via Po, Corso Regina Margherita and Corso San Maurizio. |
| 8 | Rocca | The urban area presents a high historic-artistic and environmental quality, and it is characterised by the Po river and by a system of squares (Piazza Cavour, Piazza Maria Teresa, piazza Vittorio Veneto). The urban fabric mainly developed during the expansion that took place in the 19th century. It includes streets such as Via Della Rocca and Via Giolitti. |
| 9 | Valentino | Urban area characterised by historic-artistic and environmental quality, especially for the presence of the park and of the Castello del Valentino. The existing urban fabric and buildings were planned in the 19th century but built in the 20th. The main axes are Corso Massimo D'Azeglio, Corso Dante, viale Mattioli and via Ormea. |
| 10 | San Salvario | Urban area characterised by historic and environmental quality. The urban fabric is typical of the 1850s and it combines both residential and commercial functions. It is highly influenced by the Porta Nuova railway station, the local market and the co-existence of different religions. Its social fabric is not homogeneous and it includes via Nizza, via Madama Cristina, via Saluzzo and piazza Madama Cristina. |
| 11 | Dante | The urban fabric was mainly developed in the 1850s; it is homogeneous and characterised by building blocks. Via Madama Cristina and via Nizza presents numerous commercial activities and the area is influenced by the presence of hospitals. Other streets of the area are corso Dante, corso Bramante, corso Marconi. |
| 12 | San Secondo | The urban fabric dates back to the second half of the 19th century-beginning of the 20th century. It includes porches and the main axes are via Sacchi, via San Secondo, via Gioberti. |
| 13 | Stati Uniti | The urban fabric was developed between the second half of the 19th century and the beginning of the 20th. It includes buildings devoted to services as well as different types of residential buildings (e.g. villas, small blocks of flats, houses for one or more families, in some cases provided with a garden).The main streets are corso Stati Uniti, corso Duca degli Abruzzi, corso Re Umberto I, corso Vittorio Emanuele II, via Vela. |
| 14 | Galileo Ferraris | The urban fabric was developed between the late 19th century and the first decades of the 20th. It is homogeneous by an environmental and typological perspective and it includes streets such as corso Galileo Ferraris, corso Re Umberto, corso Einaudi and corso Montevecchio. |
| 15 | De Gasperi | The urban fabric was developed in the period between the late 19th century and the first decades of the 20th. The area has been recently interested by urban transformations, such as the realisation of the city rail link and of the Spina Centrale. The main axes are corso Mediterraneo, corso Einaudi, corso Turati and corso Rosselli. |
| 16 | Duca D'Aosta | Urban area characterised by environmental and historic-artistic quality. It includes upscale residential buildings and villas built in the late 19th |

century-early 20th. It is characterised by pedestrian and garden areas. It is delimited by streets such as corso Galileo Ferraris, corso Montevecchio and Corso Duca degli Abruzzi.

| | | |
|---|---|---|
| 17 | Spina2-Politecnico | In the 19th century the area used to host urban services such as the railway station, the cattle market and the prisons. It has recently undergone a significant transformation, with the building of the city rail link, the creation of the Spina Centrale, the renovation of the Carceri Le Nuove and of the Officine Ferroviarie compounds. The Politecnico and some cultural and innovation hubs are based here. The main streets are corso Castelfidardo, via Boggio, via Borsellino, via Corso Inghilterra and via Bixio. |
| 18 | Duchessa Jolanda | Urban area characterised by environmental, historic-artistic and documentary values. It is formed by regular blocks and buildings were erected at the end of the 19th century-beginnings of the 20th. It counts many buildings characterised by Liberty style. The main streets are Corso Francia, via Duchessa Jolanda and via Principi D'Acaia, among the others. |
| 19 | San Donato | Historic urban area characterised by a homogeneous fabric developed in the second half of the 19th century after the first industrialisation phase of the city. The residential and commercial functions prevail. The main streets are via Cibrario, via San Donato and Corso Tassoni. |
| 20 | Porta Palazzo | Historic urban area highly characterised by the Piazza della Repubblica and its market. The urban fabric and the socio-economic conditions are not homogeneous but frequently interested by urban blight. It was built mainly in the second half of the $19^{th}$ century-beginning of the $20^{th}$ and the main streets are corso Regina Margherita, via Borgo Dora, corso Giulio Cesare, corso Principe Oddone, corso Principe Eugenio. |
| 21 | Palermo | This area expanded since the last decades of the $19^{th}$ century and it now includes residential buildings and ex-industrial areas: some of them are currently undergoing a variety of transformations. It contains axes that develop from the city towards Milan. The main streets are corso Vercelli, corso Giulio Cesare, via Cigna and via Bologna |
| 22 | Michelotti | The urban fabric develops along Corso Casale, which represent one of the main axes of the area. Its function is mainly residential and the area is strongly connected with the hill system and the Po river. |
| 23 | Crimea | Area delimited by the Po river and the hillside, characterised by historic-artistic, landscape and environmental values. The Monte dei Cappuccini, the Gran Madre di Dio complex and Villa della Regina are significant spots. It includes Piazza Crimea and the main streets are corso Fiume, corso Moncalieri, corso Casale and corso Lanza. |
| 24 | Collina | Area characterised by high environmental quality, green areas and scattered buildings (villas and other residential dwellings). The main streets are -among the others- corso Casale, corso Moncalieri, strada di Cavoretto and strada del Traforo del Pino. |
| 25 | Zara | This area presents strong links with the Po river and the hill system. It develops along the ancient road connecting Torino with Moncalieri and its fabric is heterogeneous in terms of building period and quality. The main streets are corso Moncalieri, corso Sicilia and piazza Zara |
| 26 | Carducci | This area is characterised by the presence of hospitals. It includes many commercial activities and buildings are heterogeneous. It is formed by piazza Carducci, piazza Bengasi, via Nizza and corso Spezia among the others. |
| 27 | Unità d'Italia | This area is connected with the hills and it has started to develop in recent times. It is devoted to residential and exhibit functions (Palazzo Vela and Palazzo del Lavoro), with well-maintained buildings. The main streets are corso Unità d'Italia, via Ventimiglia and. Via Genova. |
| 28 | Lingotto | This area used to host the FIAT industrial complex, which has been converted into a commercial and expo centre. Residential buildings show low-quality but renovation and regeneration projects are improving and transforming the area. Some of the urban axes are via Nizza, corso Sebastopoli and corso Traiano. |

| 29 | Santa Rita-Mirafiori | This area particularly developed in the 1950s-1970s, and it is now characterised by public services and infrastructures such as the Stadio Comunale. Regeneration initiatives have occurred since the 2006 Winter Olympic Games and the area includes piazza Santa Rita, corso Orbassano, corso Siracusa, corso Agnelli, corso Unione Sovietica and others. |
|---|---|---|
| 30 | Mirafiori Sud | Area characterised by fields, residential buildings badly maintained and the FIAT complex, which has been partially converted into a research and university centre. The main streets are via Artom, corso Unione Sovietica, strada Castello di Mirafiori and via Settembrini. |
| 31 | San Paolo | This area developed in the early decades of the 20th century, when industrial activities were established. It is influenced by the regeneration projects that have interested the MZ 39. The main streets are via Montenegro, via San Paolo, corso Pechiera and corso Racconigi. |
| 32 | Pozzo Strada | This area was mainly built in the 1950s-1970s and it now counts sport infrastructures, parks and well maintained buildings of medium quality. It includes Parco Ruffini and Parco della Tesoriera, together with piazza Rivoli, corso Francia, corso Trapani, corso Peschiera and corso Montecucco. |
| 33 | Aeronautica-Parella | The area is characterised by ex-industrial buildings, now regenerated and adapted to new uses. The main streets are corso Francia, piazza Massaua and Strada antica di Collegno. |
| 34 | Spina 3-Eurotorino | This is an ex-industrial area now adapted to new uses, included religious, residential and commercial ones. The tertiary sector is present too and the Environment Park and the Chiesa del Santo Volto represent two examples of new structures. The main streets are via Livorno, corso Umbria, via Orvieto and via Pianezza. |
| 35 | Madonna di Campagna | This is an ex-industrial area which has been partially converted to new uses. It presents heterogeneous characteristics with regard to the urban fabric, building periods and level of maintenance. Many streets exist in the area, included via Stradella, corso Potenza, corso Grosseto and others. |
| 36 | Spina 4-Docks Dora | This area has been largely renovated and ex-industrial complexes have been adapted to new uses. It includes both private and public areas and it is interested by the city rail link. The historical buildings Docks Dora are located here, together with axes such as via Cigna, corso Vigevano, corso Grosseto and via Fossata. |
| 37 | Rebaudengo | It represent an urban expansion in the Northern area of the city, with new residential buildings erected along local axes such as corso Vercelli, corso Giulio Cesare, via Sempione, corso Taranto, via Reiss Romoli and squares (e.g. piazza Derna, piazza Respighi). |
| 38 | Corona Nord Ovest | It is a very extensive and peripheral area, characterised by heterogeneity of functions (residential and productive). It presents low environmental and building quality. It includes the Vallette and Falchera residential complexes. The main streets are via Ala di Stura, via Paolo Veronese, via Orbetello, corso Ferrara and others. |
| 39 | Spina 1-Marmolada | The area was originally characterised by industrial buildings, but it has more recently undergone transformations that include the establishment of residential units, commercial activities, offices and urban parks. It includes corso Mediterraneo, corso Lione, piazza Marmolada and corso Rosselli. |
| 40 | Barca Bertolla | This area presents characteristics still linked to the rural and proto-industrial development, as well as to green areas and the Po and Stura rivers. It includes streets such as strada San Mauro, strada Settimo, strada comunale di Bertolla and others. |

**Table 11.** The 40 Microzones and their characteristics.
(*Source:* author's elaboration based on descriptions published by TREMO)

As evidenced by the map, in 2017 the MZs that manifested the residential-used (RU) highest mean prices per square meter (range: 3,970-4,284 euros per square meter) were the 1-Roma and 6-Castello, i.e. two central MZs presenting monumental features and corresponding –together with MZ 5-Garibaldi- to the most ancient and historically stratified parts of the city[141]. High prices (M range = 3,256-3,970 euros per square meter) were registered also for central areas MZ 2-Carlo Emanuele II and MZ 3-Solferino – which are characterised by services, transports and environmental and historic-artistic quality- and for MZ 16- Duca D'Aosta and MZ 13-Stati Uniti, which present upscale residential dwellings; the same mean range of prices interested also MZ 17- Spina 2 Politecnico – which has undergone a deep regeneration phase in recent years- and MZ 24-Collina, which particularly benefits from environmental amenities, quality of the dwellings and its relative vicinity to the services offered by the city. Mid-range prices (M range = 2,541-3,256 euros per square meter) concern central MZs such as 4-Vinzaglio and 5- Garibaldi, 19th-20th century areas 14-Galileo Ferraris and 15-De Gasperi – which was interested by interventions at the urban level-, upscale residential MZ 8-Rocca, the green MZ 9-Valentino, the recently transformed MZ 39- Spina 1 Marmolada and MZ 25-Zara, which also take advantage of its proximity to the Po river. A mean range of prices (between 1,827 and 2,541 euros per square meter) was obtained for MZs 31- San Paolo and 32-Pozzo Strada- which are located on the East-West axis of the underground, they are characterised by a 20th century urban fabric and are influenced by regeneration projects occurred in neighbouring areas-, MZs 18-Duchessa Jolanda – which combines a good architectural and environmental quality with accessibility to a variety of services-, MZ 7-Vanchiglia – which presents a considerable extension and a heterogeneity of characteristics- , MZ 10-San Salvario – which is influenced by the vicinity to the Porta Nuova railway station, the local market and mixed socio-economic conditions- , 11-Dante – highly influenced by the presence of hospitals- and 12-San Secondo – which is close to the railway station-, but also 27-Unità d'Italia – which shows well-maintained and peculiar buildings, 22-Michelotti and 24-Collina, i.e. two MZs either connected to or located in the hill zone of the city. The lowest price range (M = 1,113-1,827 euros per square meter) was identified for the Northern and Southern areas of Turin, which are in many cases characterised by industrial and/or ex-industrial areas and by buildings with different levels of quality and maintenance. In the Southern sectors, MZ 26-Carducci is characterised by the presence of a hospital compound, whereas MZs 28-Lingotto, 29- Santa Rita Mirafiori and 30-Mirafiori Sud have been interested by some regeneration projects, even though the quality of the buildings and of some sub-areas still remain poor and/or to some extent problematic. The Northern areas constituting the edge of the municipal territory – i.e. 38-Corona Nord Ovest and 40-Barca Bertolla- are more peripheral by a geographic point of view and they also present more fragile socio-economic conditions; MZs 33-34-35-36 are

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[141] For a more detailed investigation of the historical, architectural and historic characteristics of these areas, see paragraph 6.4.1 of this piece of work.

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former industrial areas partially adapted to new uses, whereas MZ 37-Rebaudengo includes urban axes that project the city to its outskirts and MZ 19-San Donato resulted from the expansion of the urban fabric in the first phases of the industrialization that occurred in Turin. A variety of transformations (e.g. regeneration of limited areas and establishment of the headquarters of significant companies) is currently interesting MZ 21-Palermo, whereas MZ 20-Porta Palazzo displays peculiar characteristics, since it hosts the greatest daily open market in Europe and at the same time it is still affected by urban blight, even though some interventions aimed at regenerating its neighbourhoods have been actuated throughout the years. Concerning the nature and identity of Porta Palazzo, it must be added that a recent article (Gilli and Ferrari 2018) has highlighted the increasing attractiveness of the area for tourists. In fact, the article underlines that until 2006 only two hotels were present in the area, whereas it is now served also by private accommodations (such as Airbnb listings), by at least 12 bed and breakfasts and by two alternative hospitality structures. Additionally, urban markets – included Porta Palazzo- are now promoted by the Municipality to tourists, increasing their visibility and attractiveness; quoting the words of a cultural operator interviewed by the authors of the article, this does not mean that *"other problems, such as those of security, delinquency and urban decay have disappeared, but the gap between this area and other urban districts is now greatly limited and the tourism development may represent an additional benefit"* (Gilli and Ferrari 2018, p. 153).

The comparison of the mean RU list prices registered in 2010 and 2017 may help better interpret the most recent values and the evolution of the market. Figure 41 compares the mean RU list prices registered in 2010 and 2017; the 2014 line has been inserted to help better interpret market trends. Figure 42 displays to what extent these prices have changed in the time span 2010-2017; in order to quantify change, the difference of the means registered in 2010 and 2017 for each MZ was converted into the percent variation of the 2010 price.
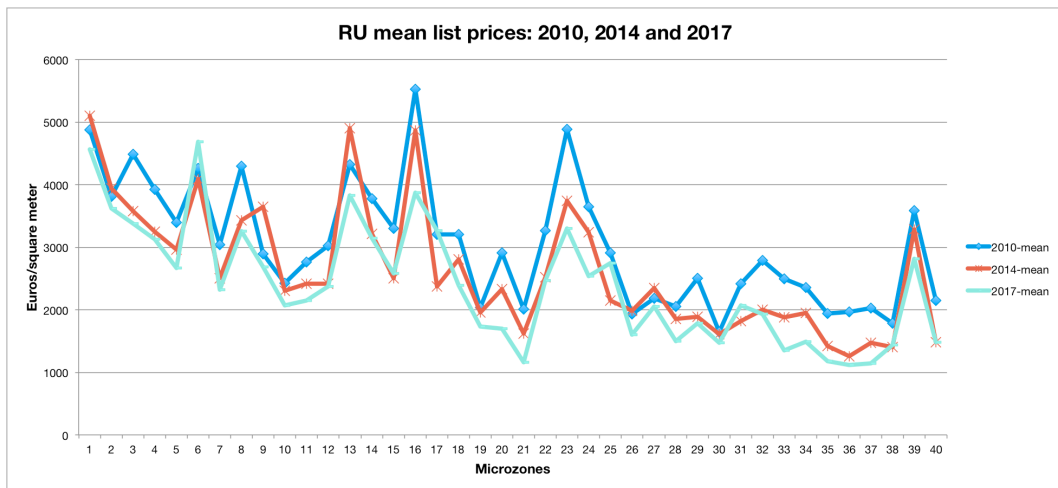
**Figure 41**. RU list prices in the 40 Microzones: comparison of means
(years 2010, 2014 and 2017).
(*Source:* author's elaboration on TREMO data)
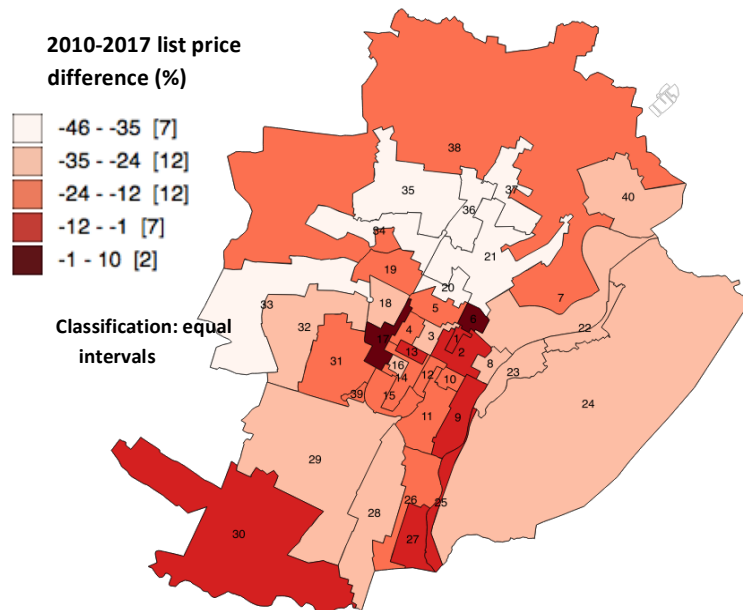


**Figure 42**. RU list prices variations (mean 2010- mean 2017) in the 40 Microzones.
(*Source:* author's elaboration. TREMO data were used as a basis for original computations)

As evidenced by the above graph and map, the most stable MZs are the monumental and highly attractive 6-Castello and the newly regenerated 17-Spina 2 Politecnico, followed by other central areas such as 1-Roma, 2-Carlo Emanuele II and 13-Stati Uniti; the real estate market has experienced the same (relatively limited) degree of variation (between -1% and -12%) also in the MZs 9-Valentino, 27-Unità d'Italia and 30-Mirafiori Sud, meaning that this level of depreciation

affected MZs belonging to almost all the price segments of the market. Results show that a greater level of depreciation (between -12% and – 24%) occurred both in central (MZs 4, 5, 10, 12, 14 and 15) and semi-central areas (MZs 11, 26, 18, 31, 39), as well as in the Northern periphery. Higher levels of depreciation (between -24% and -35%) were registered especially in the Eastern MZs - being central and semi-central (MZs 8 and 7 respectively), peripheral (MZ 40) or connected with the hill system (MZs 22, 23 and 24)- but also in semi-central Western (MZs 18 and 32) and Southern (semi-central: MZ 29; peripheral: MZ 28) parts. Prestigious and upscale MZs 3 and 16 were affected by this level of depreciation too. Finally, the MZs that registered the most considerable negative peak are the ones located in the Northern proximity of the city centre (MZs 20, 21, 34, 35, 36 and 37) and in MZ 33.

The 2014 line allows to observe that – with the exception of the MZs 1, 9, 13 and 27, which are characterised by high quality and have overall experimented a relatively marginal depreciation in the period 2010-2017 – the market has progressively declined.

Even though MZs are useful to make reflections on real estate market trends – even though they should be to some extent redefined to better take into account the transformations occurred at the urban level in recent years-, it must be noted that it can be difficult to explain market characteristics, trends and variations in light of – for instance- the socio-economic context; as a consequence, the adoption of a spatial unit such as the statistical zone – for which index and indicators are available on the ISTAT website- can be particularly fruitful.

A brief analysis of some contributions elaborated by researchers of TREMO and the Politecnico di Torino helps further interpret the real estate market of the city of Turin. Among the available studies, some articles focused on the listing behaviours of agents and sellers and on the identification of the variables that contributed more on the determination of prices (Curto et al. 2015; Semeraro and Fregonara 2013). Through the analysis of a sample of list prices, it was observed that characteristics such as the size of the domestic unit, the number of rooms, the number of bathrooms, the building quality and location significantly affect list prices (Curto et al. 2015); then, considering a sample of transaction prices, it was found that the building condition was able to explain around 30% of both list and selling price variations (Semeraro and Fregonara 2013). Interestingly, researchers found that agents' and sellers' awareness of the contribution of location to a house value is different: whereas the former always take into account the positional factor, the latter seem to consider it only with regard to hillside areas. Then, whereas list prices defined by agents represented a function of the house features, the ones published by sellers did not incorporate the marginal value of single characteristics (Curto et al. 2015), but they mainly reflected the size of the domestic units.

As underlined by the literature, the positional factor is very important for the determination of prices: in fact, the socio-economic characteristics of a specific

area (e.g. demographics, criminality rate, occupation…), the availability and quality of services (e.g. transports, schools, facilities devoted to recreational activities…) and the environmental quality of the immediate surroundings (e.g. presence of urban amenities, degree of air pollution, climate conditions…) have the power to affect the value of real estate properties (Stanca 2008).

This pattern is confirmed also in the case of Turin, where the MZ variable is able to explain around 45% of price variation (Curto et al. 2015; Fregonara et al. 2012). Then, it was advanced that for central areas - that present typological homogeneity and prices generally high- the incidence of the location may be even higher, since the significance of the other characteristics (e.g. type and physical attributes of the building, architectural, social and environmental characteristics, etc.) are almost levelled out (Fregonara et al. 2012)[142].

The investigation of the role of the positional factor has been particularly carried out in some recent contributions. Through the application of geo-spatial statistics approaches, A. Barreca and colleagues (Barreca et al. 2017b) investigated the link between the Turin's real estate market and social and territorial vulnerability[143], highlighting that geographic clustering of property prices exists in the northern, central and southern areas of the city. More precisely, low prices were particularly found in the Northern area, which is characterised by a high concentration of African and American immigrants; then, a reverse correspondence was found between the price and low education variables, since areas characterised by low levels of education manifested generally low real estate prices. The same authors also investigated the spatial correlation of social and housing vulnerability patterns, together with their influence on real estate prices (Barreca et al. 2018). Given that several transformations and changes have occurred in Turin since the definition of the Microzones in 1999, the authors preferred to consider the 94 statistical zones already used by ISTAT -instead of the Microzones- as units of analysis. Then, they identified as housing vulnerability indicators the percentage of buildings erected between 1946-1970 (which are usually characterised by poor quality)[144], the percentage of buildings belonging to the economic and popular category, and the percentage of buildings with a mediocre or bad maintenance status (referred to as B4670, BEC and BMB respectively). The calculation of the Moran's index for all the indicators considered suggested the presence of a certain degree of spatial autocorrelation for all the indicators, and it was also found that the statistical zones manifesting low listing prices were also characterised by a high concentration of buildings presenting housing vulnerability features. More precisely, the performance of a

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[142] The results obtained by Fregonara and colleagues were based on the analysis of a sample (n = 3,179) of list prices appeared in the years 2008-2010 (Fregonara et al. 2012).

[143] The sample included 773 property listing published by one of the main Italian real estate advertisement websites during the years 2011-2012, whereas the indicators were obtained on the basis of the data published by ISTAT (Italian National Institute of Statistics).

[144] With reference to the sample included in the study, the buildings erected between 1940 and 1970 amounted to the 49% of the total building stock of the city (Barreca et al. 2018). The sample included 3,071 property listing published by one of the main Italian real estate advertisement websites during the years 2011-2017.

spatial LAG regression model highlighted that BEC and B4670 were able to negatively and significantly affect the real estate prices of the statistical zones. Then, the inclusion of the low education population indicator (LEPI) and of the foreign population indicator (FPI) pointed out that LEPI and BEC are positively correlated and present a similar spatial clustering. The authors thus concluded that a spatial correlation between housing vulnerability, social vulnerability and real estate prices exists in Turin: whereas the most peripheral areas seem to be more vulnerable, the central area and the hillside represent the social upper classes and the semi-central areas display characteristics distributed more randomly. Overall, results stressed the presence of great inequalities in different areas of the city.

Other studies analysed the local real estate market paying particular attention to the socio-economic characteristics of buyers and to real estate dynamics fostered by gentrification processes (Curto et al. 2009)[145]. Then, other contributions analysed internal mobility patterns: for instance, with reference to the years 2000-2006, it was found that the MZs that manifested the highest degrees of internal mobility were 10-San Salvario, 17-Spina 2 Politecnico and 20-Porta Palazzo, with a percentage of mobility exceeding 26%; on the contrary, the MZ with the lowest degree of mobility (11%) was 13-Stati Uniti (Curto et al. 2008).

As more recently remarked by Curto and colleagues, semi-central MZs such as the 9-Valentino, 11-Dante, 15-De Gasperi, 17-Spina 2 Politecnico, 29-Santa Rita Mirafiori, 31-San Paolo and 32-Pozzo Strada are characterised by real estate properties built after 1960 and they represent the most dynamic sub-markets (Curto et al. 2015). Central MZs present historical buildings instead: these properties are deemed particularly desirable and they are frequently not listed in real estate advertisements (Curto et al. 2015). A particularly attractive zone, characterised by a pedestrian area and by upscale buildings, is –for instance- MZ 16-Duca D'Aosta; another peculiar MZ is the 24-Collina, which includes both apartments and detached houses (Curto et al. 2015): however, it must be noted that in recent years these appealing MZs have nonetheless experienced high depreciation rates.

As previously remarked, given that some changes have occurred in the urban fabric since the establishment of the 40 MZs in 1999, some preliminary studies aiming to update these subdivisions have also been carried out. An example is represented by the adoption of the historical territorial units as a basis for analysis. The 93 Historical territorial units are portions of the urban fabric identified considering the historical-urban interpretation of the urban area, and the extension of each one is generally smaller than the one of the MZs (Barreca et al. 2017). Even though the reduction of the surface of the units of analysis usually entails that the number of observations per unit decreases – with the consequence of considering less representative data samples- (Bates 2006 in Barreca et al. 2017),

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[145] For a detailed description of these results, see paragraph 1.6.2.

authors concluded that such units were nevertheless able to explain the role played by location in the determination of prices[146].

## 5.5 Turin's rental market and the homogeneous zones

Microzones are used by the OHCCT- Observatory on the Housing Conditions of the City of Turin (Osservatorio sulla Condizione Abitativa della Città di Torino - OCACT) in an aggregated form as a basis to monitor the long-term subsidized rental market (Città di Torino, 2016). More precisely, these aggregations - the so called "homogeneous zones" (HZs)- were defined to apply the lease contracts established by the Law 431/98, art.2, comma 3 (Città di Torino, 2016). Table 12 and Figure 43 illustrate the names and extension of the different HZs, explicating which MZs are aggregated to form a specific HZ.

| HOMOGENEOUS ZONE | MICROZONES |
|---|---|
| **Centre** | 2  4  5  10  12  14  15 |
| **Centre_upscale** | 1  3  6  8  13  16 |
| **Semi-centre** | 7  11  17  26  29  31  32  33  39 |
| **Semi-centre_upscale** | 9  18  27 |
| **Periphery** | 19  21  28  30  34  35  36  37  38  40 |
| **Hills** | 22  25 |
| **Hills_upscale** | 23  24 |
| **Urban blight** | 20 |

**Table 12.** The Homogeneous Zones: aggregations of Microzones.
(*Source:* Città di Torino 2016)

Overall, the rental segments identified by OHCCT are eight (i.e. centre, centre upscale, hills, hills upscale, semi-centre, semi-centre upscale, periphery and urban blight): each MZ is constituted by the aggregation of a variable number of MZs, with the exception of the urban blight area, which corresponds to a single MZ (i.e. 20-Porta Palazzo).

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[146] In this case the study considered a sample of housing units (n= 1,758) offered on the Turin's real estate market in the years 2013-2016 (Barreca et al. 2017a).
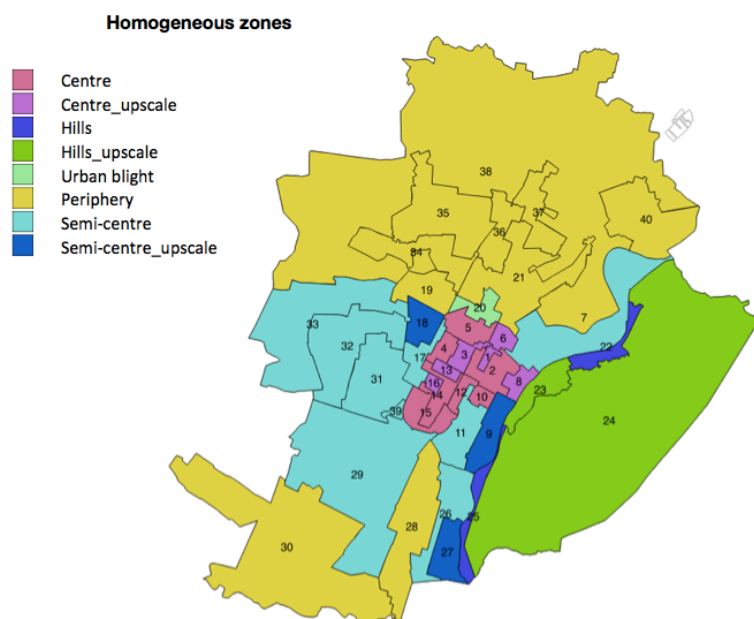
**Figure 43**. The Homogeneous Zones identified by OHCCT.
(*Source:* author's elaboration on OHCCT data)


OHCCT publishes every year a report containing the monthly average prices of different types of residential units in the various HZs, with regard to the following typical types of dwellings: studio (30 m$^2$), one room plus kitchen (45 m$^2$), two rooms plus kitchen (60 m$^2$) and three rooms plus kitchen (70 m$^2$), which for brevity reasons will be referred to as studio, small, medium and large types respectively. The tables below illustrate monthly prices, together with price variations occurred year by year and in the period 2010-2017.

| HZ | STUDIO 2010 | SMALL 2010 | MEDIUM 2010 | LARGE 2010 | STUDIO 2017 | SMALL 2017 | MEDIUM 2017 | LARGE 2017 |
|---|---|---|---|---|---|---|---|---|
| **Monthly rates (euros) in 2010 and 2017, by type of residential unit** | | | | | | | | |
| **Centre** | 371.70 | 557.55 | 743.40 | 867.30 | 246.00 | 369.00 | 492.00 | 574.00 |
| **Centre upscale** | 378.90 | 568.35 | 757.8 | 884.10 | 288.00 | 432.00 | 576.00 | 672.00 |
| **Semi-centre** | 288.60 | 432.90 | 577.2 | 673.40 | 222.00 | 333.00 | 444.00 | 518.00 |
| **Semi-centre upscale** | 303.60 | 455.40 | 607.2 | 708.40 | 231.00 | 346.50 | 462.00 | 539.00 |
| **Periphery** | 256.80 | 385.20 | 513.6 | 599.20 | 207.00 | 310.50 | 414.00 | 483.00 |
| **Hills** | 297.30 | 445.95 | 594.6 | 693.70 | 243.00 | 364.50 | 486.00 | 567.00 |
| **Hills_upscale** | 299.40 | 449.10 | 598.8 | 698.60 | 231.00 | 346.50 | 462.00 | 539.00 |
| **Urban blight** | 190.50 | 285.75 | 381.00 | 444.50 | 201.00 | 301.50 | 402.00 | 469.00 |

**Table 13.** 2010 and 2017 monthly rent rates, per HZ and residential unit type.
(*Source:* author's elaborations on OHCCT data)

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| Monthly rates variations (%) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **HZ** | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 | 2016-2017 | 2010-2017 |
| **Centre** | -14.9 | -7.0 | -14.3 | -4.8 | -1.3 | 1.3 | 2.5 | -33.8 |
| **Centre_upscale** | -14.2 | -6.4 | 8.4 | -8.2 | -1.0 | -4.0 | 0.0 | -24.0 |
| **Semi-centre** | -6.5 | -0.4 | -14.0 | -6.5 | 6.9 | -3.9 | 0.0 | -23.1 |
| **Semi-centre_upscale** | -8.9 | 1.6 | -8.2 | -7.0 | 0.0 | -5.0 | 1.3 | -23.9 |
| **Periphery** | -0.3 | -0.4 | -11.8 | -6.7 | -4.3 | 3.0 | 0.0 | -19.4 |
| **Hills** | 0.2 | -0.4 | -8.0 | -2.2 | -5.6 | -4.8 | 1.3 | -18.3 |
| **Hills_upscale** | -0.1 | 0.7 | -15.3 | 4.7 | -4.5 | -3.5 | -6.1 | -22.8 |
| **Urban blight** | 0.0 | 0.0 | 26.0 | -7.5 | -5.4 | -4.3 | 0.0 | 5.5 |

**Table 14.** Monthly rates variations (%), per homogenous zone and year.
(*Source:* author's elaborations on OHCCT data)

Generally speaking, monthly rates have progressively decreased from 2010 to 2016, then registering a partial and limited inversion of tendency in 2017; however, with respect to the previous year, all types of units located in the Hills-upscale HZ were interested by a -6.1%. The highest yearly depreciations occurred in 2013, and since then yearly variations generally started to be more limited. Considering the 2010-2017 period, monthly rates especially decreased in the Central HZ (with 2017 rates being more than -30% of the 2010 monthly rates), in the Central upscale and Semi-central upscale HZ (around – 24%) but also in the Semi-centre and Hills-upscale areas (around – 23%). A decrease in monthly rates under -20% occurred in the Periphery and in the Hill area; an exception is constituted by the Urban blight zone: in fact, in the 2010-2017 period it registered a + 5.5% variation, especially due to the peak + 26% that took place in 2013.

If we compare these data with the ones related to the real estate market described above, it seems that whereas the Urban blight zone has experienced a depreciation regarding selling -or, better, list- prices, monthly rates values have overall increased in the 2010-2017 period. In very general terms, the Northern and Southern peripheries have both experienced a relative stability of real estate prices and a relatively contained decreasing of monthly rent rates; however, it must be remembered that the periphery just North of the centre has been interested by a great decrease of real estate values instead. The residential centre-upscale area is characterised both by a great depreciation of real estate values (with the exception of MZ 1-Roma and 6-Castello) and by 2010-2017 monthly rates negative variations among the highest. The highest 2010-2017 monthly rate variation (-33.8%) was registered for the central area, which has overall experienced a mid-range depreciation for what concerns real estate list prices: on the buyer/tenant perspective, the central area has thus become progressively (and relatively) more affordable and convenient. In the Hill HZ, the decrease of monthly rates has been among the lowest, whereas real estate depreciation levels were high; the Hills-upscale HZ has been more stable at least with regard to some MZs, with 2010-

2017 rental variations amounting to – 22.8% instead. The semi-central upscale zones along the Po river were quite stable for what regards the real estate market, but they became more affordable for rentals (-23.9%). Variable real estate price variations were present in MZs constituting the large Semi-centre HZ (-23.1%) instead.

Even though the monitoring of the free rental market could highlight different trends and add further insights to the discourse, the figures presented above may be nonetheless useful to point out rental trends occurred throughout the years.

# Chapter 6

# Airbnb in Turin: relationships with built heritage resources, socio-economic indexes and the urban context

## 6.1 Addressing research questions: defining built heritage and identifying data sources

As outlined in more detail in Chapter 4.5, this work firstly aims to investigate whether correspondences between Turin's built heritage resources and the location of Airbnb accommodation exist, also paying attention to the socio-economic characteristics of the areas most affected by the phenomenon; then, it aims to study whether the vicinity to areas with high densities of built heritage resources actually affect occupation rates of Airbnbs and their prices per night; finally, it would like to explore the possible consequences related to the presence of short-term rental accommodations in Turin, with special regard to fields such as the rental and real estate market and to gentrification processes.

If the data about the city of Turin presented in previous chapters help better contextualise the case-study, at this point it is necessary to introduce the other data sources that will be used as a basis for the analyses. Given the complexity of the phenomenon, data sources have been either accessed or specifically compiled for the purposes of this research.

As described in Chapter 1, cultural heritage is constantly re-defined by communities: as a consequence, the univocal identification of cultural (and built) heritage resources may present some difficulties and in some contexts the process may be even subject to a certain degree of subjectivity. As a consequence, in order

to partially overcome this issue, the built heritage resources that will be taken into account in this part of the research are represented by the buildings and architectural complexes that are recognised by experts working in the historical and architectural field as presenting historical and architectural value. Considering that up to now the Airbnb phenomenon is mainly connected to tourism rather than to other forms of temporary residency, it was decided to integrate the professional point of view with a touristic approach identifying as built heritage resources the buildings mentioned in the following two sources:

- Comoli, V. and Olmo, C. (Eds), 1999. *Torino. Guida di Architettura.* Torino, Allemandi
- Società degli Ingegneri e degli Architetti di Torino, 2000. *26. Ventisei Itinerari di Architettura a Torino/ Architectural walks in Turin.* Torino, Società degli Ingegneri e degli Architetti in Torino[147].

*Guida di Architettura* was edited by V. Comoli and C. Olmo, two distinguished professors of the Politecnico di Torino, with the purpose of offering both to tourists and scholars a thorough description of the most significant buildings of the city of Turin, taking into account different historical periods and providing information based on detailed historical research.

*Ventisei Itinerari di Architettura a Torino* presents an introduction for each itinerary and then short and easy-to-read descriptions of each selected building, both in Italian and English. Each itinerary can be interpreted as a walk and it groups works that are homogeneous in their stylistic and historical characteristics. Additionally, the guide has recently been converted into a mobile application under the name "ArchitetTour"[148], as to promote a greater access to contents and extend its communication goal to a wider audience.

Both guides were deemed particularly suitable since they do not only present high-quality contents, but they also specify the complete address of the buildings: this allows to georeference their position and to create a database compatible with GIS software, as to perform spatial analyses[149]. Given that the two guides were published in the late 1990s-early 2000s, it was decided to add some relevant spots

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[147] Tourist guides have been used both to identify and estimate the number and importance of built heritage resources by other authors too. For instance, in their study about the influence of built heritage resources on real estate values of the Italian Veneto region, P. Rosato and colleagues adopted the *Guida del Touring Club* as a source (Rosato et al. 2008). More precisely, they considered the number of rows describing each municipality as a proxy of the importance of local built heritage resources, and they found a positive and statistically significant correlation between this value and real estate prices. Interestingly, authors also found that the effect of built heritage on real estate values is strengthened if these resources are associated with high concentrations of facilities and activities related to the tourism and service sectors.

[148] The mobile application can be downloaded for free from the Google Play (https://play.google.com/store/apps/details?id=it.studioand.architettour&hl=it) and Apple Store (https://itunes.apple.com/it/app/architettour/id1001173389?l=it&ls=1&mt=8) markets.

[149] In the era of digital and user-generated content, an alternative approach for the identification of cultural heritage resources not only suitable for but favoured by tourists could be represented by accessing data abd rankings available on platforms such as TripAdvisor.com. For a similar approach, see Gutiérrez et al. 2017.

that have emerged in the meanwhile (e.g. Officine Grandi Riparazioni, which represent an example of industrial heritage that has been recently restored and converted into a cultural hub). In order to perform different analyses, information concerning architectural buildings were structured in this way: 1) Identification number; 2) name of the building/site: 3) complete address; 4) latitude; 5) longitude; 5) type of building/site (e.g. church, palace, castle…); 6) century/year of construction; 7) historical period/architectural style (e.g. medieval, baroque, liberty…). Buildings were thus inputted in the GIS database and treated as point features, being aware that the inclusion of areas, of people attending the sites (whenever possible) and the attribution of different weights to environmental complexes could have added further depth to the analysis. However, given the exploratory nature of the study, it was deemed appropriate to start with the simplest approach, leaving some issues open for further research.

In order to get a more comprehensive overview of the built and historic heritage of the city, the open cartography concerning buildings *sottoposti a vincolo* freely accessible on the Geoportal of the Municipality of Turin was also accessed and explored, especially to perform descriptive and qualitative considerations[150]. Then, other open access information provided by the Geoportal were also used too. More particularly, the sights included in the .shp "places of interest" (which includes historical hotels, shops and cafès, together with some buildings of particular relevance), "museums", "green areas" and "pedestrian areas" were consulted too, since possibly contributing to the quality of the environment.

In order to perform analyses taking into account the economic dimension, the "commercial activities" .shp freely available on the Geoportal was considered too. Then, other socio-economic indexes and figures were extracted from the reports published by ISTAT in 2017 (ISTAT 2017a and ISTAT 2017b). The reports aimed at describing and mapping the socio-economic conditions of a sample of Italian cities: given that one of the goal of the research was to highlight the conditions of the peripheries, the reports provide indexes and figures with reference to spatial units of analysis able to highlight the peculiarities of different zones, and in the case of Turin the spatial unit adopted is the *statistical zone* (SZ). Statistical zones were selected as units of analysis since they are considered morphologically, environmentally and demographically more homogeneous than other types of sub-municipal areas (ISTAT 2017a). In the cases in which data were available at the census tract level (i.e. with reference to a spatial unit which is smaller that the SZ), information for SZs were obtained by ISTAT aggregating relevant census tracts (ISTAT 2017a).

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[150] The Geoportal of the Municipality of Turin is available at http://geoportale.comune.torino.it/web/ and open data can be downloaded from: http://geoportale.comune.torino.it/geocatalogocoto/?sezione=catalogo. A special thank is due to Donato Gugliotta (Municipality of Turin), who promptly shared information about Turin's cartography.

For what concerns Turin's Airbnb accommodations, data were acquired from Airdna (www.airdna.co)[151], i.e. a U.S.A.-based company that scrapes and collects data publicly available on the Airbnb website. Relevant files were provided by the company in .csv format, and the database concerning single listings was characterised by the structure highlighted in Table 15.

| Field | Property ID | Host ID | Listing Title | Property Type | Listing Type | Last Scraped Date | Calendar Last Update | Instantbook Enabled |
|---|---|---|---|---|---|---|---|---|
| Ex. | 68974 | 281229 | Unique spacious loft | Loft | Entire home/apt | 14/02/16 | 13/02/16 | Yes |
| Definitions | Unique Airbnb property ID | Unique Host ID | Main Airbnb Listing Title | Types of Accomodations | Three listing types: Entire Home, Private Room, & Shared Room | The last date the property was scraped on Airbnb. | The last time the host updated their calendar | Yes= The property can be booked without any host/guest communication |

| Field | Average Daily Rate | Annual Revenue LTM | Occupancy Rate LTM | Number of Bookings LTM | Number of Reviews | Overall Rating | Bedrooms | Bathrooms |
|---|---|---|---|---|---|---|---|---|
| Ex. | 654,63 € | 113.905,00 € | 51% | 37 | 101 | 4,8 | 3 | 1 |
| Definitions | The average booked price over the Last Twelve Months. This includes cleaning fees distributed across the length of each reservation | Last Twelve Months listing revenue. Includes cleanings and daily rate but not other additional fees. | The percentage of (days with a reservation) / (total number of days with a reservation & available) Calculation excludes blocked days | Number of Unique Reservations in the last 12 months | Total all time listing reviews | Overal Customer Rating from on a scale of 1-5 | Number of bedrooms | Number of bathrooms |

| Field | Superhost | Published Nightly Rate | Count Reservation Days LTM | Count Available Days LTM | Count Blocked Days LTM | Number of Photos | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|
| Ex. | t | $575 | 174 | 166 | 25 | 16 | 40,71943094 | -73,99626741 |
| Definitions | T = Superhost | The default Airbnb listing price if a rate for each date is not provided by the host | The total number of days that a listing is rented for in the past year. | The total number of days of nights that a listing is available for rent, but not actually rented in the past year | The total number of nights that a listing is blocked from receiving a reservation. | Count of days blocked from accepting reservations in the last year | | |

**Table 15**. Data on Airbnb listings provided by the Airdna firm: most relevant fields. (*Source:* author's elaboration of Airdna data)

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[151] The analysis of the literature on the Airbnb topic highlights that data provided by Airdna were used for academic purposes by a variety of researchers (see, for instance, Heo et al. 2019, Adamiak 2018, Kakar et al. 2017 and Mody et al. 2017).

The *Property ID* univocally identifies each listing published on the Airbnb platform; the *Host ID* field identifies every single host; *Listing title* refers to the title assigned by the host to the listing; *Listing type* refers to the type of accommodation on offer (i.e. entire home/apartment, private room, shared room), whereas *property type* adds some more detailed information on the nature of the property; then, the number of *bedrooms* and *bathrooms* make explicit some intrinsic characteristics of the property. Concerning dates, *Last scraped date* indicates the last date the property was scraped on Airbnb, whereas *Calendar last update* indicates the last date the host updated his/her calendar (i.e. availability of the property for rent). *Average daily rate* is the average price per day for each listing (in this case, in euros); *Number of bookings* is the number of bookings registered for a listing, in the last 12 months (LTM); *Reservation days* refers to the number of days with a reservation in the LTM; *Available days* represents the number of days that were available for rent in the LTM, but that were not actually booked by guests (i.e. days in which accommodations were vacant); *Occupancy rate* is calculated dividing the number of reservation days by the number of available days plus days with a reservation; *Blocked days* indicates the number of nights during which the listing is blocked from receiving reservations; then, *Annual revenue* is calculated considering the number and type of days booked, the price per time unit (e.g. day or week) and cleaning fees (where applicable)[152]. As evidenced by the table, it is possible to get an overview of the level of appreciation manifested by guests through the *Overall rating* field, which is expressed on a 5-point scale; the total *Number of reviews* refers to the total number of reviews received by the listing instead. Each listing is geo-referenced and the provision of the *latitude* and *longitude* allows to locate the listing on a map, then enabling spatial analyses and considerations[153]. In addition, the knowledge of the *number of photos* published by the host helps understanding communication patterns and to what extent details of the listing are communicated visually; finally, the *Instant booking enabled* option indicates whether the listing

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[152] Airdna is able to provide information on the fields Number of bookings, Reservation days, Available days, Occupancy rate and Annual revenues through the application of artificial intelligence and machine learning (https://www.airdna.co/blog/short-term-rental-data-methodology); even though the figures should be accurate, it may be suggested to consider them as likely estimates, as to be more prudent.

[153] As declared by the Airdna company, latitude and longitude refer to the coordinates system WGS84. Since Airbnb does not publicly publish the exact coordinates of the listings, Airdna has developed an algorithm that helps optimize the exact location of each listing (https://www.airdna.co/blog/short-term-rental-data-methodology). In order to check whether the latitude and longitude values provided by Airdna were realistic, an empirical control of the correspondence between the coordinates provided and the plausible location of the listings was performed on a sample of accommodations. More particularly, the position on the map of a listing was compared to the textual descriptions of the listing itself written by the host, paying particular attention of the references to location (e.g. neighbourhood, proximity to railway stations, landmarks and urban amenities, etc.): even though coordinates may incorporate a certain degree of error, general correspondence was found. Even though in some cases Airdna provides information also on zip code and neighbourhood of the listing, this information was not available for Turin and it was thus deduced by the position of the listing visualised on the map.

can be booked by a potential guest immediately, i.e. without needing to wait the host's response. This last information seems particularly important, since both empirical practice and recent news highlight that, if the host agrees to the instant booking option, the visibility of his/her listing increases, with possible consequences on the performances of the property[154].

For what concerns the time period, data regarded all the listing published on the Airbnb platform between 2009 and November 2017, for a total of more than 7,200 listings. Considering that not all listings presented complete and usable data, data cleaning was performed; then, data were also filtered coherently with the research questions progressively addressed (e.g. identification of new listings appeared on the market in a given moment, identification of active listings, etc.).

Overall, the research thus capitalizes on both private and open access data concerning the city of Turin, combining them for the first time to develop an original and in-depth interpretation of the presence of Airbnb accommodations in the selected urban context.

Additionally, for what concerns the identification of built and cultural heritage resources, the study does not only take advantage of the georeferenced resources freely available on the Geoportal of the Municipality of Turin, but it integrates them with the historical knowledge that has been developed throughout the years by scholars working in the architecture field at the Politecnico di Torino.

## 6.2 Diachronic and spatial evolution of the Airbnb phenomenon

In order to investigate the characteristics and the evolution of the Airbnb phenomenon, geo-referenced data concerning Airbnb accommodations available in Turin in the period 2009-November 2017 were considered. The analysis of the data highlighted that, overall, 7,227 listings were published in that timeframe, and that the number of listings newly appeared on the market greatly increased throughout the years. If in the 3-year period 2009-2011 50 listings were present in the Turin market, in 2012-2014 the number of listings newly appeared was 1,264 and in the time span 2015- November 2017 it amounted to 5,913. The empirical comparison of different types of trendlines (i.e. linear, logarithmic, polynomial,

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[154] The boost of a listing's visibility thanks to the instant booking option has been communicated by Airbnb itself (https://blog.atairbnb.com/search/) and then recalled by other web sources (see, for instance, Porges 2017). The company incentivises this option in order to make bookings quicker and limit the possibility for a guest to be rejected; however, it is undeniable that this option make Airbnb even more competitive with respect to hotels, since in this way the booking process becomes similar to the one followed by Booking.com etc. As declared by the company, every search is personalised and the listings that appear on the top of the list are affected by more than 100 signals; a positive influence is exerted, for instance, by positive reviews, level of engagement fostered by photos, inclusion of the listing in wish-lists, competitiveness of price and the instant booking option; negative influence may depend, for instance, by a high percentage of rejections performed by the host.

exponential, power) calculated on the basis of 2012-2016 data highlighted that the best model that describes the increase of the number of accommodations throughout the years is the power trendline[155].
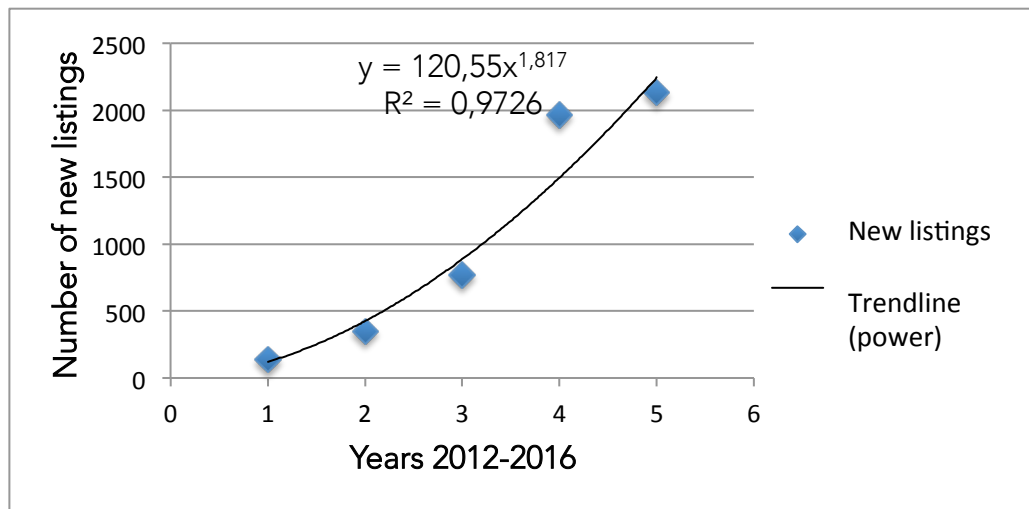


**Figure 44**. Number of Airbnb listings newly appeared in the years 2012-2016: trendline.
(*Source:* author's elaboration)

Heat-maps capitalizing on geo-referenced data and elaborated with open QGIS software allow to visualize the concentration of the listings by a spatial perspective and to better understand the evolution of the phenomenon through time (Figure 45)[156]. In 2009-2011 Airbnb accommodations seem to be distributed in various areas of the city, with a prevalence in Microzone 5-Garibaldi; in 2012-2014 the concentration begins to be higher in three areas, i.e. in Microzone 5-Garibaldi and 20-Porta Palazzo, in Microzone 10-San Salvario and 7-Vanchiglia, which all represent either central or semi-central areas of the city. In 2015-2017 a similar trend is registered, even if in this case the concentration seems to be even higher in 10-San Salvario; additionally, it is possible to identify the presence of new listings both in less-central areas of the city and in areas that connect the zones that previously manifested a particularly high concentration, as well as in Microzone 11-Dante and 26-Carducci, i.e. along the North-South axis of the

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[155] Since data available for 2017 did not cover the full year, they were not included in this analysis. However, data seem to suggest that 2017 experienced a slight decrease in the number of listings newly appeared on the market; if this trend will be confirmed in the next years, it can not be excluded that the function best fitting the data could become a logistic one, which represents phenomena firstly characterised by a steep variation of the data and then by a stabilisation of the phenomenon. However, 2017 could represent a turning point, and other types of future evolution of the phenomenon can not be excluded.

[156] Some of the contents concerning the spatial distribution and diachronic evolution of the phenomenon were published under the form of a peer-reviewed article on *Territorio Italia* (see Rubino 2018a and Rubino 2018b).

underground, which connects the Torino Porta railway station with the Lingotto multifunctional compound.
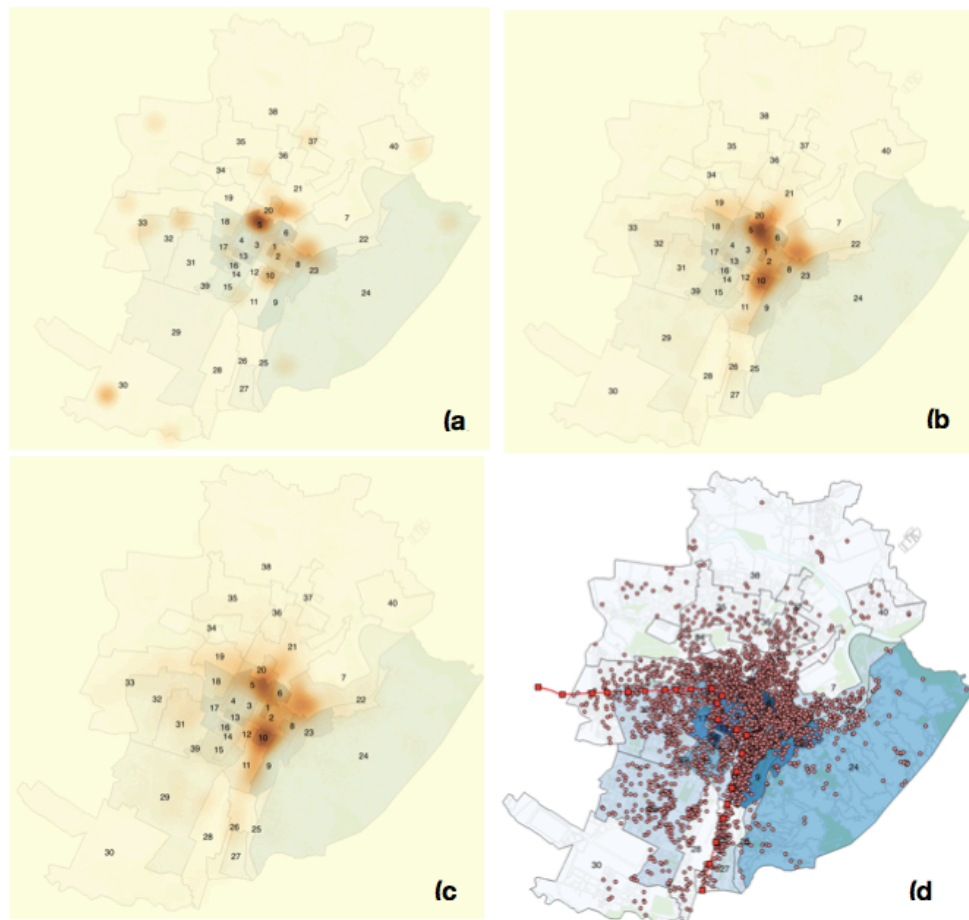


**Figure 45**. Heat-maps highlighting the new listings appeared in Turin in the 3-year periods 2009-2011 (a), 2012-2014 (b), 2015-2017 (c). Image (d) shows the location of single listings existing in 2017; the red colour refers to the track and stops of the underground line.
(*Source*: author's own elaboration on Airdna, OICT and Geoportal of Turin data)

Even though some Airbnb accommodations are present also along the East-West axis, in this case the trend seems less pronounced. The diachronic and spatial analysis thus suggests that, after a first phase in which listings were distributed in various areas of the city -with a higher concentration in the central Microzone 5-Garibaldi-, the phenomenon has progressively interested especially the Microzones located in an either central or semi-central position. It is interesting that these last mentioned zones correspond to areas that were interested by renovation initiatives in the relative recent past and/or that are experimenting urban redevelopment projects at present, such as Microzone 5-Garibaldi, 10-San Salvario and 7-Vanchiglia. A special case may be represented by Microzone 20-Porta Palazzo - which hosts the biggest open-air, daily market in Europe-, instead. In fact, the permanent residency in this Microzone – which is defined as an "urban blight zone" by the 1999 OCACT terminology- may sometimes present some

difficulties due to the environmental and socio-economic conditions facilitated by the busy daily market; it seems thus plausible to hypothesize that short-term rentals may represent an effective strategy to make more profitable real estate units that otherwise could risk either to be under-used due to a low demand or to be under-profitable, due to the relative low prices of the real estate and long-term rental markets.

Overall, in the period 2009-2017, 10% of all openings took place in MZ 07-Vanchiglia, 8% in 02-Carlo Emanuele II, 7% in 21-Palermo and 05-Garibaldi, 6% in 11-Dante, 5% in 10-San Salvario, 20-Porta Palazzo and also 29-Santa Rita-Mirafiori, 4% in 19-San Donato and 31-San Paolo, 3% in 33-Aeronautica Parella and 32-Pozzo Strada; all the other Microzones registered percentages ranging from 0 to 2% instead.

In order to better understand the characteristics of the Airbnb accommodations on offer on the Turin market in the above mentioned timeframes, geo-referenced data were then analysed considering first of all the types of accommodations on offer (e.g. entire home/apartment, private room, shared room); physical characteristics and dimensions of the units were estimated using the number of bedrooms as a proxy, instead. Tables 16 and 17 show the main characteristics of the listings published in the three periods under study.

| LISTINGS newly appeared on the Turin Airbnb market, by type | Before 2012 | 2012-2014 | 2015-2017 |
|---|---|---|---|
| Entire home/apartment | 66.0% | 70.9% | 66.6% |
| Private room | 34.0% | 27.3% | 30.0% |
| Shared room | 0.0% | 1.8% | 3.4% |

**Table 16**. Characteristics of the listings newly appeared on the Turin Airbnb market, by type.
(*Source*: author's own elaboration on Airdna data)

| ENTIRE HOMES/APARTMENTS: NUMBER OF BEDROOMS | Before 2012 | 2012-2014 | 2015-2017 |
|---|---|---|---|
| 0 | 12.1% | 8.7% | 9.4% |
| 1 | 57.6% | 58.5% | 63.4% |
| 2 | 24.2% | 26.3% | 22.1% |
| 3-4 | 3.0% | 6.3% | 4.6% |
| 5 or more | 3.0% | 0.2% | 0.5% |

**Table 17**. Characteristics of the listings newly appeared on the Turin Airbnb market, by number of bedrooms.
(*Source*: author's own elaboration on Airdna data)

Percentages referring to listing types (i.e. entire home/apartment, private room, shared room) highlight that entire homes/apartments are the most frequent type of Airbnb accommodation; if private rooms represent – in all the three periods considered- nearly one third of the listings newly appeared on the market, shared rooms are a residual percentage, even if a growth has progressively been registered.

With reference to dimensions, it can be noted that entire homes/apartments are mostly real estate units with a limited number of bedrooms, which are thus presumably characterized by small surfaces; more particularly, a unimodal distribution with the peak being registered in correspondence of the one bedroom option has been identified for all the three periods considered. Additionally, it must be noted that the percentage of real estate units with a limited number of bedrooms is also higher when considering studios (codified as having 0 bedrooms). Overall, nearly one quarter of the accommodations has two bedrooms, whereas only a residual percentage (i.e. around 5-6%) presents three or more bedrooms. However, it must be underlined that the percentage of real estate units with more than one bedroom is actually higher: in fact, in order to optimize economic convenience and satisfy possible demand's needs (e.g. singles, couples or people seeking to save money), some hosts offer different bedrooms belonging to the same real estate unit through different private room listings. Moreover, it is reasonable that also in the case of private rooms rent by hosts in the house in which they reside – following the traditional bed&breakfast model- real estate units present more than one bedroom. However, generally speaking, it can be stated that also in Turin –coherently with other Italian and European cases- small units are the most common type of accommodations interested by short-term rentals strategies not entailing the co-housing between hosts and guests.

## 6.3 The most recent phase: Airbnb listings in 2017

The study of the spread of Airbnb listings through time undoubtedly represents an essential point for the comprehension of the short-term rentals phenomenon; however, another important step of research is constituted by the analysis of the most recent situation. Overall, the number of listings detected as active at the beginning of November 2017 exceeded the 3,500 units: considering that the total residential stock of Turin amounts to around 501,000 units (Città di Torino 2017), it is possible to state that in 2017 Airbnb active listings involved around 0.7% of the total residential stock.

In order to describe the 2017 Airbnb landscape, a multi-perspective analysis concerning the listings scraped as active at the beginning of November 2017, registering at least one year of activity (i.e. November 2016-October 2017) and for which prices per night were available was carried out ($n$ = 1,888), as to analyse their characteristics and performances over a period of 12 months[157]. More particularly, the study had the goal to identify the peculiarities of the offer and demand in the various Microzones, as to highlight the articulations of the phenomenon especially by a spatial perspective. Given the number of the Microzones (N = 40), it was deemed more appropriate to carry out some analyses using the so called "homogeneous zones", i.e. the areas defined by the OCACT and resulting from the aggregation of Microzones presenting similar characteristics. Descriptive statistics highlighted that the data set confirmed the general trends identified in the previous paragraphs: in fact, entire homes/apartments still represent the greatest majority (72.5%), followed by private rooms (26.1%) and finally shared rooms (1.4%). Additionally, coherently with the results previously presented, 70.0% of the listings are small apartments characterized by 0-1 bedrooms. As evidenced by the map (Figure 46), the Microzones that register a greater number of listings are located in either central or semi-central areas, as the examples of 7-Vanchiglia, 5-Garibaldi and 2-Carlo Emanuele show. Given that the extension of the Microzones is very variable, it was deemed appropriate to calculate density values (i.e. number of listings/km$^2$): as shown by Figure 47, the Microzone with the highest density is 10-San Salvario, which thus emerges as a neighbourhood considerably interested by short-term rentals.

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[157] The number of listings detected as active at the beginning of November 2017 amounts to about 3,500. The filters described in the main text were applied to the dataset in order to obtain comparable data (e.g. annual revenues), but inevitably select listings that have been active with a certain continuity and that have been to some extent successful: as a consequence, their performance might be higher than the one that could be registered for the total amount of listings existing on the Turin market.
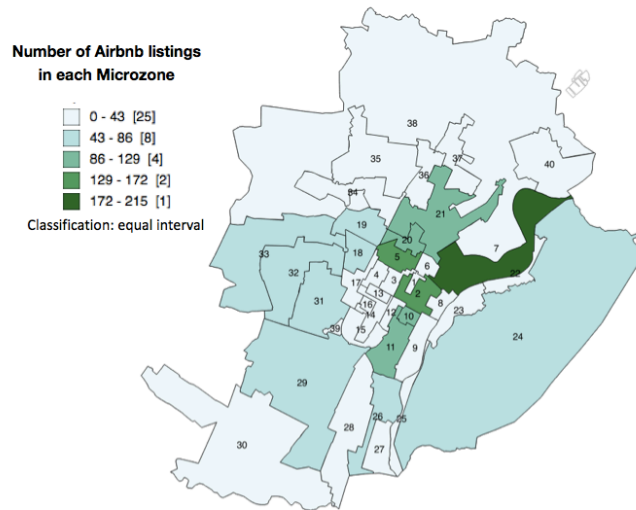
**Figure 46.** Number of Airbnb listings in the 40 Microzones of Turin.
(*Source*: author's elaboration on Airdna data)
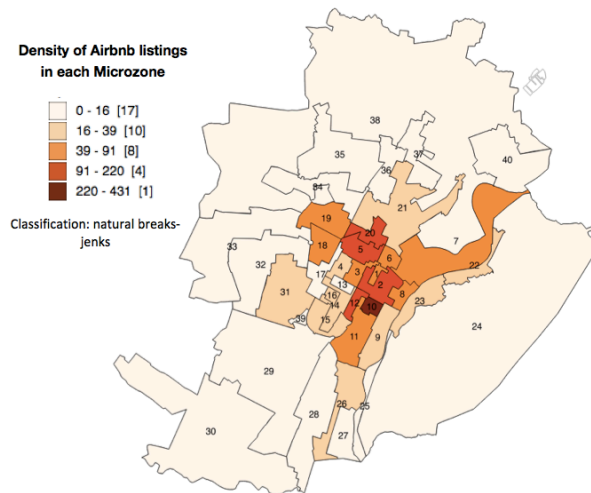


**Figure 47.** Density of Airbnb listings in the 40 Microzones of Turin.
(*Source*: author's elaboration on Airdna data)

With reference to real estate values (euros/m$^2$) it is possible to state that 50% of Airbnb listings is located in MZs that present prices ranging between 1,000 and 2,000 euros; the remaining 50% is subdivided as following instead: 22% in MZs showing a range of 2,000-3,000 euros per square meter, 26% in MZs with prices of 3,000-4,000 and 2% in MZs with real estate prices above 4,000 euros per square meter. Their distribution is thus similar to the one registered for hotels for what concerns the most expensive areas, whereas Airbnbs are more frequently located in MZs with low prices (50% vs 40% of hotels).

Then, in order to better understand the distribution of the phenomenon and check for spatial autocorrelation, it was decided to apply ESDA techniques, with specific reference to the Global and Local Moran's I. In order to perform this analysis, spatial relationships were firstly conceptualized: more particularly, it was decided to adopt an adjacency model considering polygon contiguity. Given

the irregularity of the shapes of the Microzones, the Queen type contiguity (first order) was selected. The variable included in the analysis was the density of listings existing in each Microzone. The Moran's I value emerged through the analysis highlighted a limited level of spatial autocorrelation (Moran's I: 0.264), with Microzones 6, 2, 10 and 12 showing a High-High pattern. Significant Low-Low patterns were identified especially for Northern Microzones instead (Figure 48).
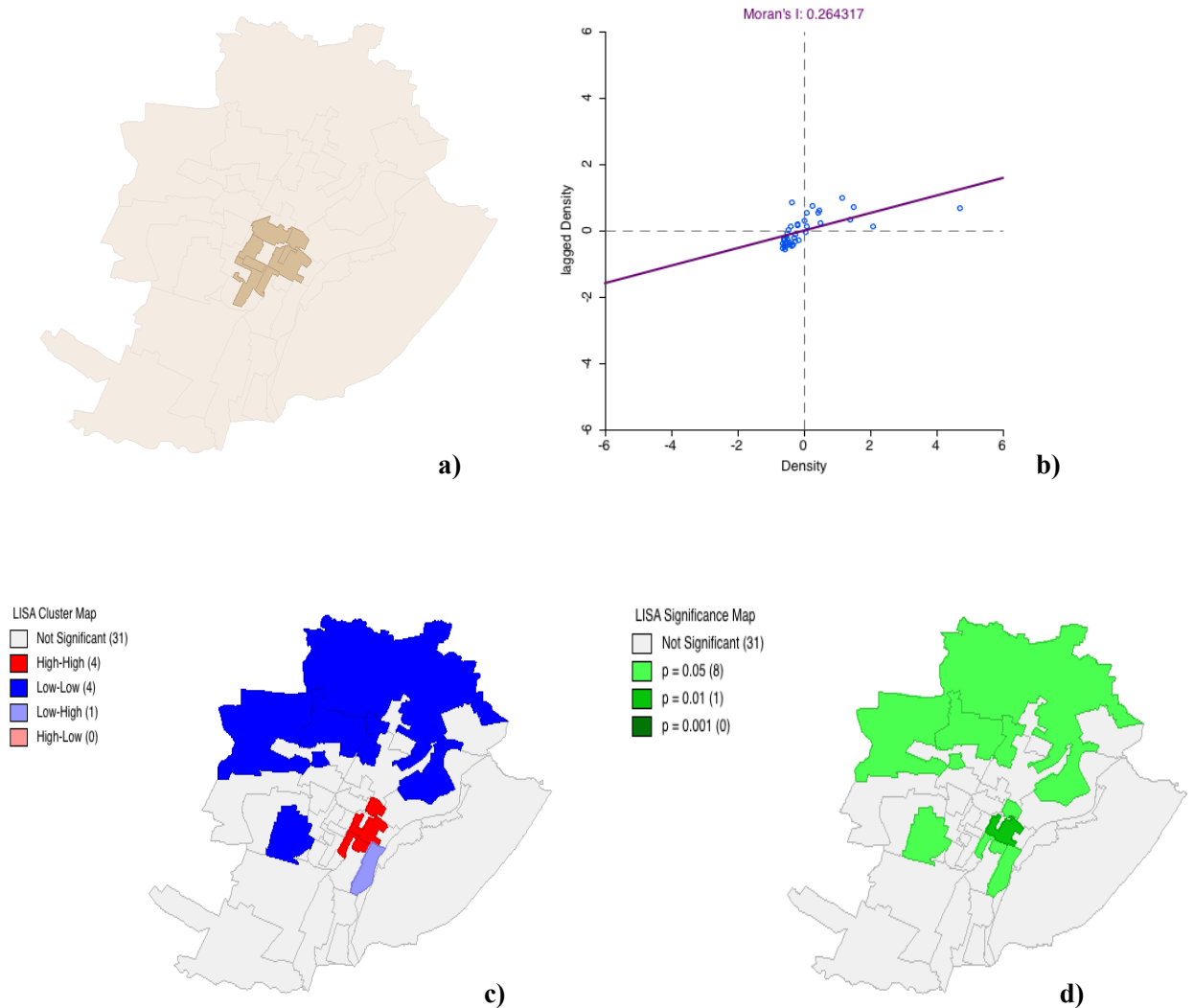


**Figure 48.** Global and Local Moran's I, with reference to the density of Airbnb listings detected as active in late 2017: a) connectivity map, b) Moran's scatterplot, c) LISA Cluster Map and d) LISA Significance map.
(*Source*: author's elaboration)

The performance of the Bivariate Local Moran's I (Figure 49) between the density of Airbnb listings in each Microzone and the average values of the real estate market in each Microzone (used segment, year 2017) highlighted a very limited level of spatial correlation too (Bivariate Moran's I: 0.214). In this case the Microzones showing High-High patterns were the number 1, 2 and 3. Low-Low patterns were again identified for Northern Microzones.

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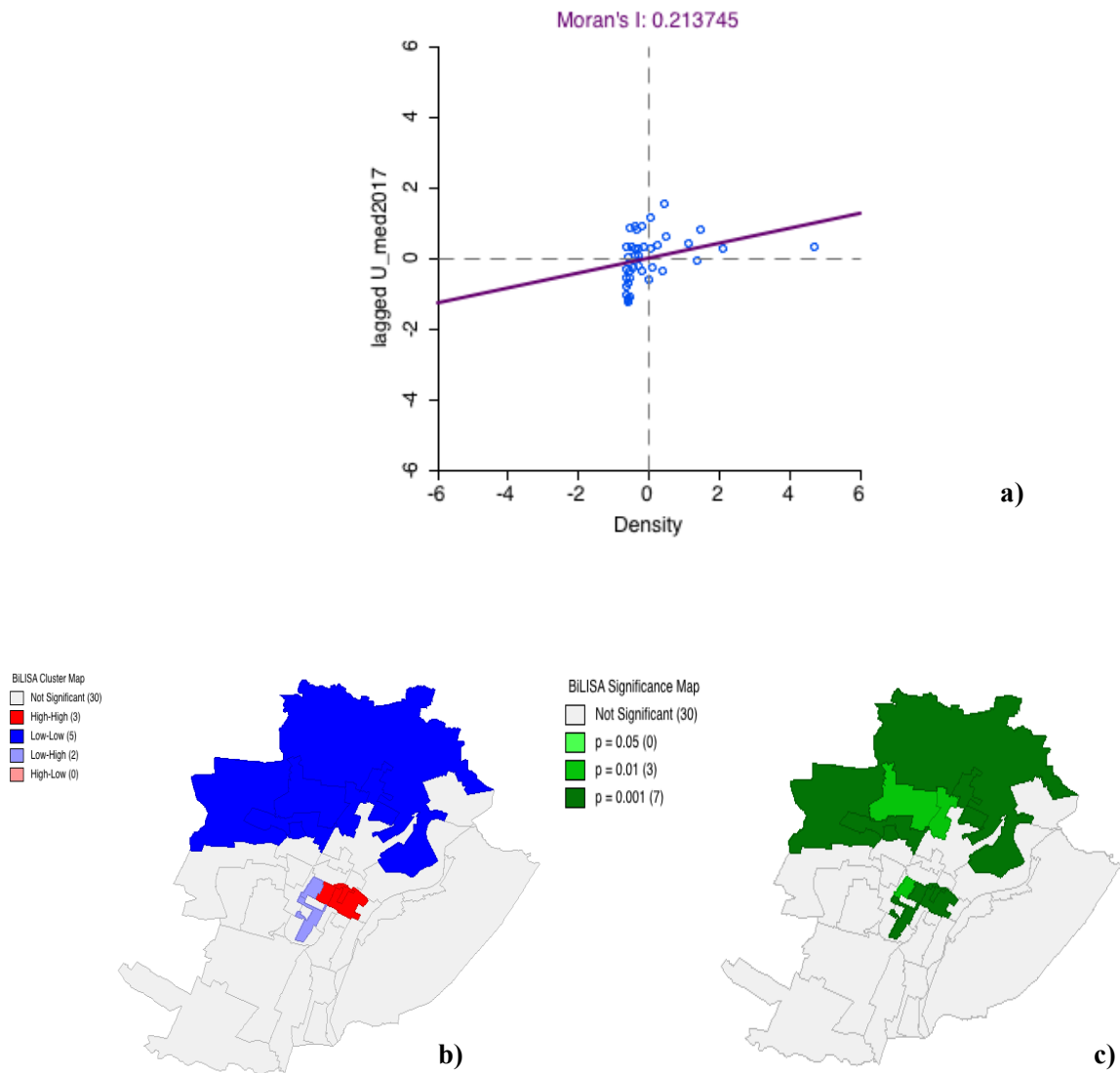
**Figure 49.** Bivariate Local Moran's I (density of Airbnb listings detected as active in late 2017 and average 2017 real estate list prices): a) Moran's bivariate scatterplot, b) BiLISA Cluster Map and c) BiLISA Significance map.
(*Source*: author's elaboration)

When analysing the characteristics of the listings in relation to the homogeneous zones, the frequencies registered for the different listing types (i.e. entire homes/apartments, private rooms, shared rooms) in the different homogeneous zones highlight that, even though entire homes/apartments always represent the majority, higher relative percentages regarding private rooms emerge in the semi-central zones, in the periphery and in the "urban blight zone"; shared rooms are proportionally more frequently located in the periphery, too. Figure 50 provides a graphical outcome of the results.
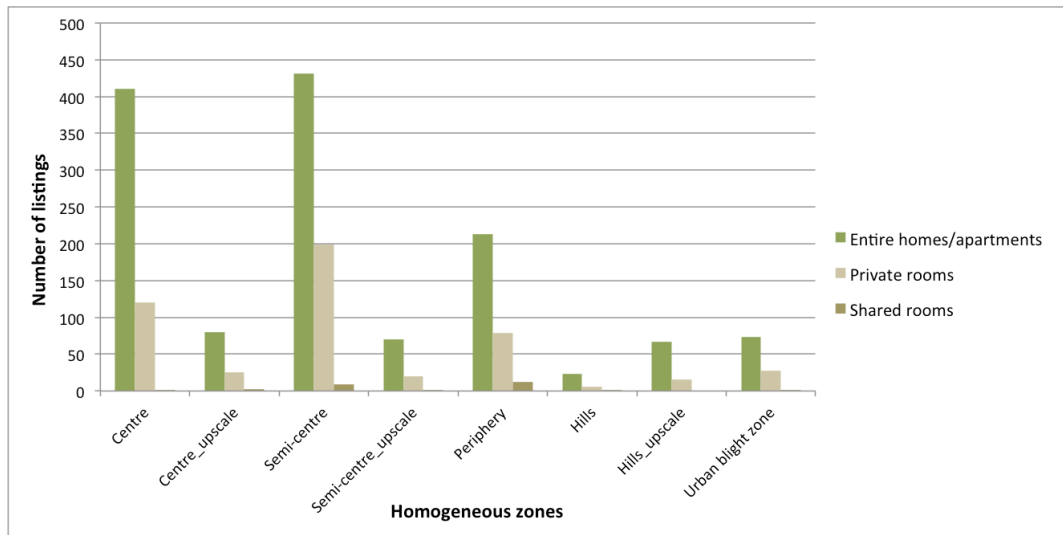
**Figure 50.** Airbnb listing types in the homogeneous zones: frequencies.
(*Source*: author's elaboration on Airdna data)

For what concerns the dimensions of the entire homes/apartments, the smallest units (i.e. 0 bedrooms) are especially located in the city centre zones and in Porta Palazzo (urban blight zone). The few accommodations located on the hillside mainly present only one bedroom, and this kind of unit is actually the most frequent in each Microzone.

| Number of bedrooms | Centre (n=409) | Centre_upscale (n=80) | Semi-centre (n=431) | Semi-centre_upscale (n=70) | Periphery (n=213) | Hills (n=23) | Hills_upscale (n=67) | Urban blight zone (n=73) |
|---|---|---|---|---|---|---|---|---|
| 0 | 13.7% | 7.5% | 6.3% | 11.4% | 5.6% | 0.0% | 9.0% | 19.2% |
| 1 | 61.9% | 53.8% | 65.2% | 57.1% | 61.0% | 87.0% | 49.3% | 56.2% |
| 2 | 17.4% | 31.3% | 23.2% | 25.7% | 28.6% | 8.7% | 28.4% | 23.3% |
| 3 | 5.9% | 5.0% | 5.1% | 2.9% | 3.3% | 4.3% | 7.5% | 1.4% |
| 4 | 0.7% | 2.5% | 0.2% | 1.4% | 0.0% | 0.0% | 3.0% | 0.0% |
| 5 or more | 0.5% | 0.0% | 0.0% | 1.4% | 1.4% | 0.0% | 3.0% | 0.0% |

**Table 18.** Characteristics of entire homes/apartments: location and number of bedrooms.
(*Source*: author's elaboration on Airdna data)

## 6.4 Interpreting Airbnb distribution in light of built heritage and other urban data: the statistical zones

In order to reach a greater degree of granularity and better understand the Airbnb phenomenon not only in light of the real estate and rental market but also considering a variety of socio-economic data, the 94 statistical zones in which Turin is subdivided were used as spatial units of analysis as well (ISTAT 2017a). As previously mentioned, statistical zones were selected as units of analysis since they are considered morphologically, environmentally and demographically more homogeneous than other types of sub-municipal areas (ISTAT 2017a), and socio-economic data referring to them have been recently made available by ISTAT (ISTAT 2017a). Among data published by ISTAT with reference to the statistical zones of Turin (ISTAT 2017b), the following variables were deemed particularly relevant and were thus included in the study:

| Variable | Definition |
|---|---|
| *Population density* | Number of inhabitants per square kilometre |
| *Incidence of foreigner residents* | Number of foreigner residents/residents, multiplied for 1,000 |
| *Employment rate* | Number of employed people aged 15 years or more/number of residents of the same age segment, in percentage |
| *Education index* | Number of people aged 25-64 years with a high school degree or higher/number of residents of the same age segment, in percentage. It can be considered as a proxy for income and general economic conditions |
| *Cultural and creative operators index* | Number of people working in the creative, cultural, sport and entertainment industries/number of residents, in percentage |
| *Vulnerability index* | Synthetic index. It derives from other seven indexes ant it describes in a synthetic way the degree of social and economical vulnerability of an area |
| *Centrality index* | Number of commuters entering the area for working reasons/number of commuters going out from the area for working reasons. It communicates the attractiveness of single zones, with reference to working opportunities |
| *Real estate values* | They are expressed in euros/m$^2$. As underlined in the methodological notes published by ISTAT (ISTAT 2017b), real estate values are particularly important because they represent a |

| | |
|---|---|
| | proxy of the "liveability" of a specific area |
| ***Real estate expansion index*** | Number of residential buildings erected after 2005/number of residential buildings, in percentage |
| ***Building conservation index*** | Number of residential buildings showing a bad conservation state/number of residential buildings, in percentage. |

**Table 19.** Variables associated to the SZs of Turin.
(*Source*: author's elaboration on ISTAT 2017a data)

With the exception of the figures concerning real estate values – which are updated to the values of the first semester 2016-, all indexes and figures referred to 2011 (ISTAT 2017a), i.e. the year in which the last national census occurred. Even though considering census data that do not exactly refer to the same year taken into account for analysing Airbnb accommodations undoubtedly represents a limit of the research (since socio-economic conditions may have to some extent changed in the meanwhile), it must be underlined that they constitute the most updated available data and that the application of descriptive and statistical analyses seems nonetheless worth-exploring for a variety of reasons. In fact, Airbnb is a relatively recent phenomenon and it seems preferable to conduct a less precise study than renouncing to the analysis at all. Additionally, even though digital economy-related socio-economic changes may occur at a speed that is different from the one registered for traditional socio-economic cycles, perceivable socio-economic change usually occurs throughout years. Then, it must be underlined that the methods adopted could also be applied for future research, and that the present limit could be partially overcome after 2018, when a permanent census procedure will take place in Italy: in fact, after the introduction of the permanent census approach, data updated on a yearly basis will be hopefully available and progressively be integrated in the research.

Overall, this section aims to answer to the research question identified with a) in paragraph 4.5: *Is it possible to identify correspondences and correlation patterns between Turin's built heritage resources and the presence of Airbnb accommodations in the city? Which are the other physical and socio-economic characteristics of the areas most affected by the Airbnb phenomenon?*

In order to interpret Airbnb listings in light of the above mentioned socio-economic variables, visual exploration was firstly carried out. In this phase, the statistical zones showing different levels of Airbnb density were identified and correspondent socio-economic data were considered, making reference to the indexes and values published by ISTAT (ISTAT 2017b). This step allowed to better understand which are the socio-economic characteristics of the statistical zones that are more/less interested by the Airbnb phenomenon and to explore whether these zones present similar socio-economic indexes.

Then, spatial statistic approaches were implemented with reference to listings detected as active in November 2017. The Airbnb presence in each area was considered under the form of the density index (number of Airbnb listings/Km$^2$), in order to take into account the spatial width (i.e. area) of each zone and thus use comparable data.

Finally, further analyses based on estimated annual revenues and occupancy rates were carried out considering a subset of data satisfying certain conditions (i.e. having been scraped as active in November 2017 and having been created at least 12 months earlier).

### 6.4.1 Data exploration

*Airbnb listings*

With the aim of performing a visual exploration of available data, maps showing the location of Airbnb listings considered as active in late 2017 and their density in Turin's 94 statistical zones were elaborated, using QGIS software; more specifically, the Jenks' natural breaks classification method was adopted and data were then visualised coherently[158] (Figure 51).
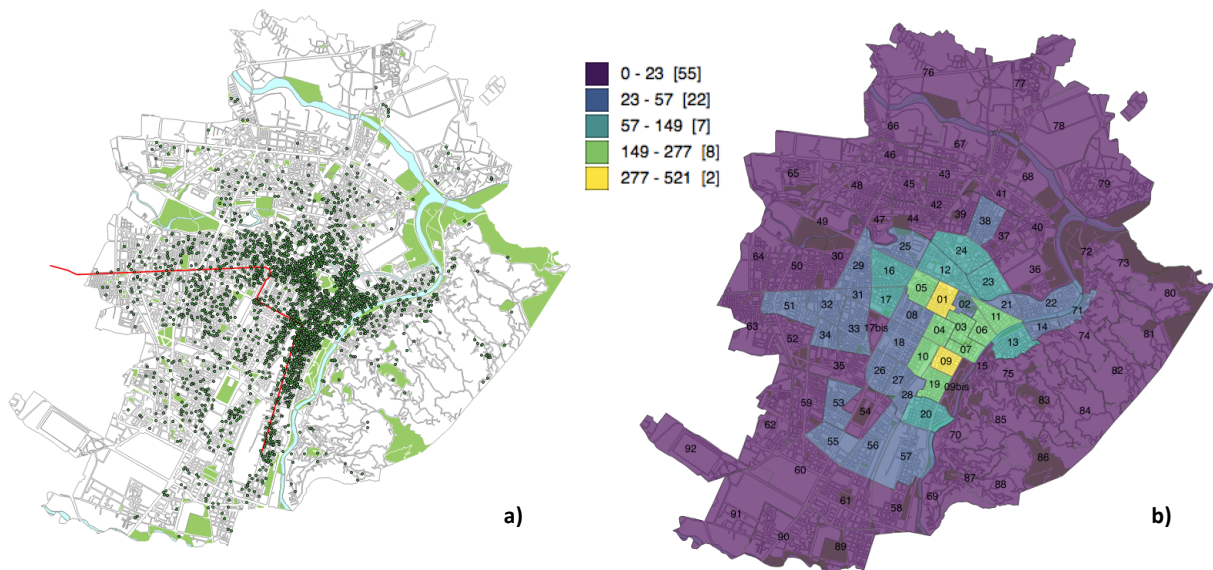


**Figure 51**. a) Distribution and b) density (number of listings/Km$^2$) of Airbnb listings detected as active in late 2017 in Turin's 94 statistical zones.
(*Source:* author's elaboration on Airdna data)

The map highlights that the statistical zones displaying a higher density of listings are 01-Municipio and 09-Piazza Madama Cristina (Borgo San Salvario), followed by 03-Palazzo Carignano, 04-Piazza San Carlo-Piazza Carlo Felice, 05-Piazza Statuto, 06-Piazza Vittorio Veneto, 07-Corso Cairoli-Piazza Bodoni, 10-Borgo

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[158] This classification method optimizes the clustering of data, and it aims to reduce the variance within classes and maximise the variance between classes (Jenks 1967 in Jiang 2013).

San Secondo-Stazione Porta Nuova, 11-Borgo Vanchiglia and 19-Piazza Nizza (Borgo San Salvario). The lowest values of density are registered especially in northern, eastern and southern areas; however, whereas density values abruptly decrease in the eastern part (e.g. in SZ 15, 70, 75 etc., i.e. where hills are located), density values seem to decrease more gradually in the northern, southern and especially western parts of the city. Overall, 7.3% of all listings are located in SZ 09-Piazza Madama Cristina, 7.1% in 01-Municipio, 4.9% in 11-Borgo Vanchiglia, 4.8% in 12-Borgo Dora-Valdocco, 4.1% in 5-Piazza Statuto, 3.9% in 19-Piazza Nizza Borgo San Salvario, 3.4% in 6-Piazza Vittorio Veneto, and 3.4% in 4-Piazza San Carlo. The other SZs manifest lower percentages instead.

The map showing the number of listings per 1,000 inhabitants (Figure 52) highlights that the highest values are again registered in either central or semi-central SZs (e.g. 01-Municipio, 03-Palazzo Carignano, 04-Piazza San Carlo-Piazza Carlo Felice, 06-Piazza Vittorio Veneto, 09-Piazza Madama Cristina (Borgo San Salvario), even though some differences with respect to Figure 51 can be detected.
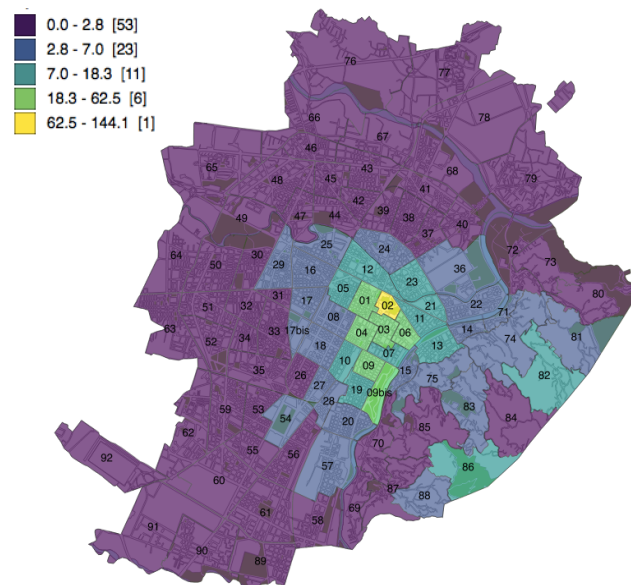


**Figure 52**. Number of Airbnb listings per 1,000 inhabitants in Turin's
94 statistical zones.
(*Source:* author's elaboration on Airdna data)

The first difference is constituted by SZ 02-Palazzo Reale, which is a central zone characterised by historical buildings, museums and green areas, with a population that barely exceeds one hundred units. The second is represented by the hill zone (Eastern areas), as indicated by SZs such as 82-Reaglie and 86-Parco della Rimembranza, which presents a population barely exceeding 100 people and whose surface is occupied for a great part by a popular park. The third is SZ 09bis-Parco del Valentino, a green area where residents are under the 20 units. In

these cases it seems that, even though the map correctly shows – in mathematical terms- a high number of listings per 1,000 inhabitants, results could be to some extent misleading: in fact, even though it could be advanced that in these SZs the few existing residential units are intensely devoted to short-term rentals, it seems more reasonable to suggest to interpret these results with great caution[159]; density values taking into account the surface of the SZs will thus be considered in the rest of the study.

With reference to the location of specific types of listings (i.e. entire homes/apartments, private rooms and shared rooms), the maps presented below (Figure 53) seem to indicate that the few shared rooms existing on the market are only to some extent concentrated in the city centre: the SZ with the highest density is 11-Borgo Vanchiglia, followed by central SZ 01, 06, 09, 19, by 13 on the hills, by more Northern 12 and 24 and by SZ 16.

Private rooms and entire homes/apartments present a reciprocal similar distribution instead, and almost the same areas result to be affected by the phenomenon. For both the types of accommodation (private rooms and entire homes/apartments), the SZ that presents the highest density values of listings in 09-San Salvario, and, in the case of entire homes/apartments, also SZ 01-Municipio. Overall, other SZs registering high density values are SZ 01, 11, 19 in the case of private rooms and SZ 03, 04, 05, 06, 07, 10, 11 and 19 in the case of entire homes/apartments. Then, density values seem to progressively decrease with the increase of the distance from the city centre.

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[159] The partially different results emerged when considering the surface of the statistical zones and the population component highlight that choropleth maps are able to describe phenomena, but nevertheless they do not speak for themselves: in fact, outputs need to be necessarily contextualised in order to be interpreted. Additionally, it must be noted that, especially in the case of SZ 09bis-Parco del Valentino and 02-Palazzo Reale, the few listing detected could actually belong to neighbouring zones and might be thus due to the inaccuracy of latitude and longitude values.
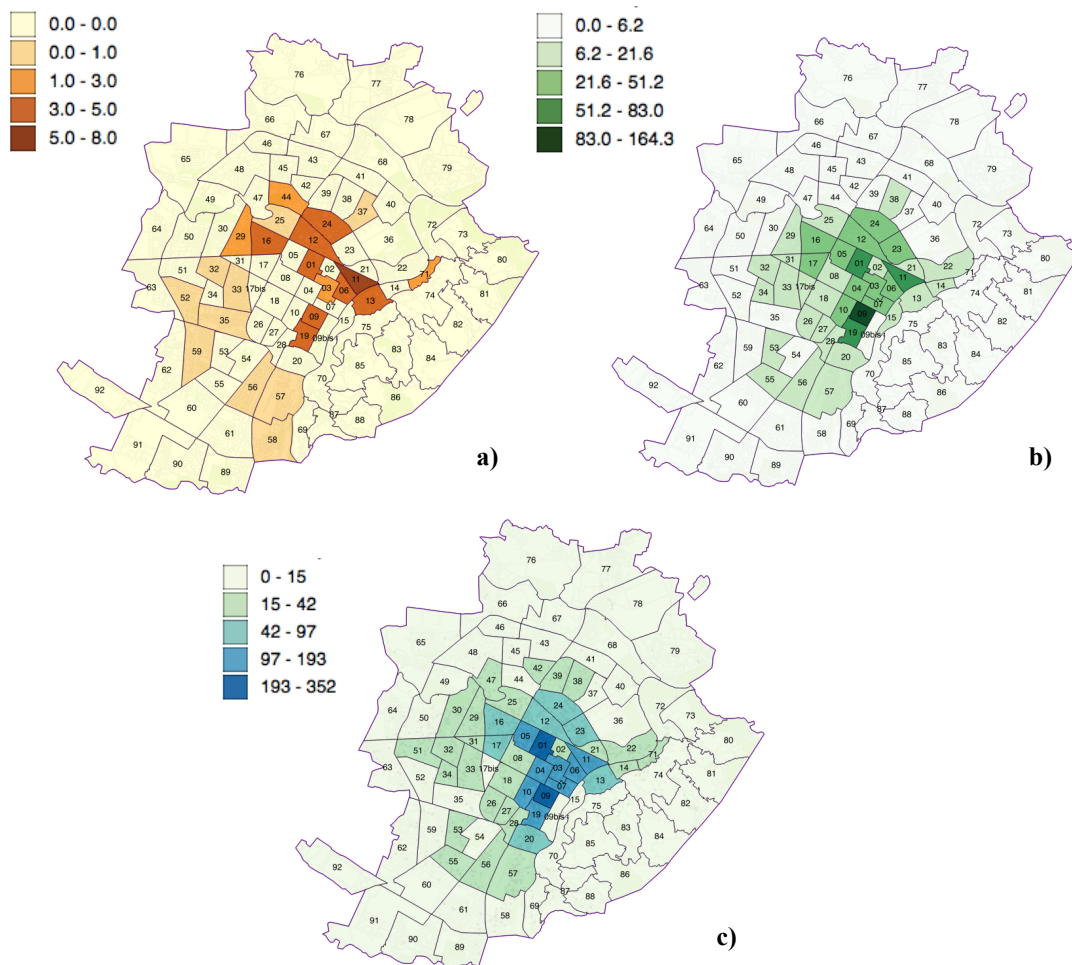
**Figure 53**. Density of shared rooms (a), private rooms (b) and entire homes/apartments (c) in Turin's 94 statistical zones.
(*Source:* author's elaboration on Airdna data)

### *Socio-economic characteristics and other features*

With reference to the socio-economic characteristics reported by ISTAT (ISTAT 2017b), it is possible to point out that the areas that are more interested by the Airbnb phenomenon are usually characterised by relatively moderate population density values (with the exception of the zone 09-Piazza Madama Cristina-Borgo San Salvario, which present very high values) and a variable incidence of foreigner residents (Figure 54 a and b). About this point, it can be observed that the highest rates are registered for instance in SZ 12-Borgo Dora Valdocco; high rates are present in 01-Municipio and 09-Piazza Madama Cristina (Borgo San Salvario) and 19-Piazza Nizza (Borgo San Salvario). Then, in the areas more affected by short-term rentals the employment rate is overall high (Figure 54 c) and the education index is mostly high (Figure 54 d); in both cases an exception is SZ 12-Borgo Dora-Valdocco. The vulnerability index is usually

low to moderate, with the exception of SZ 12-Borgo Dora-Valdocco, which presents high values (Figure 54 e). The centrality index of the SZs most affected by Airbnb varies, but it generally presents relatively high values (Figure 54 f). Then, the mapping of the cultural and creative operators index indicates that central and semi-central areas also present among the highest values (Figure 54 g).

The comparison between the map showing the Airbnb distribution in the SZs and the map displaying real estate values suggests that the areas most affected by the phenomenon are characterised by moderate-to-high real estate values, with the exception of SZ 12-Borgo Dora-Valdocco, that manifest very low real estate values (Figure 54 h); on the contrary, not all the SZs with the highest real estate values seem to be equally affected by short-term rentals. With regard to the building expansion index, the areas most affected by the Airbnb phenomenon usually present very low values (frequently equal or close to zero), together with a residential buildings' conservation index which is mostly low but that can also assume relatively high values (Figure 54 i and l): this means that, generally speaking, residential buildings are mostly well preserved (see, for example, SZs 03, 04, 06, etc.), even though in some cases (e.g. SZs 09 and 10) they present worse conditions.



a)

b)

c)



d)



e)



f)



g)



h)

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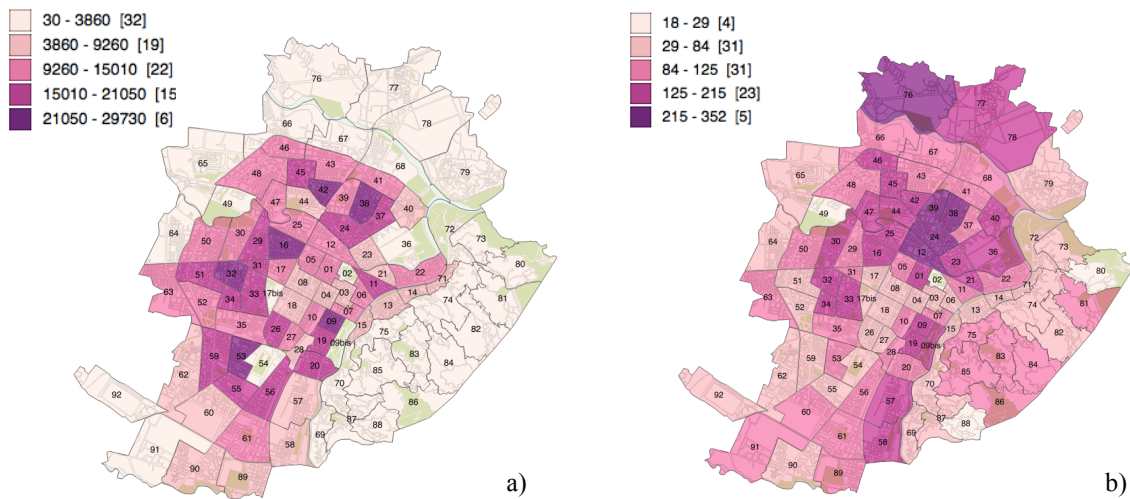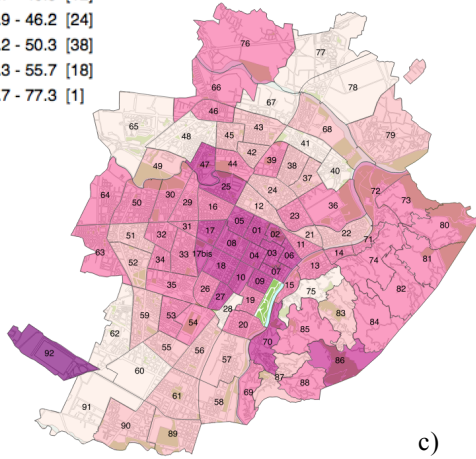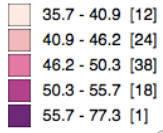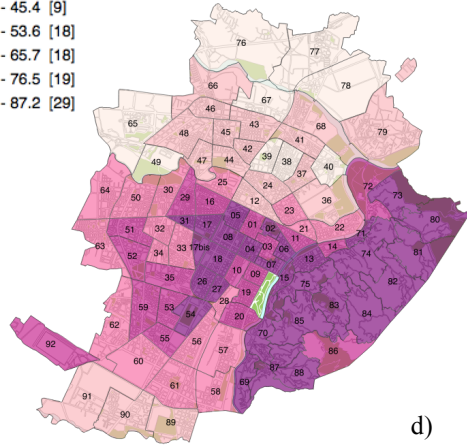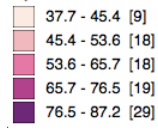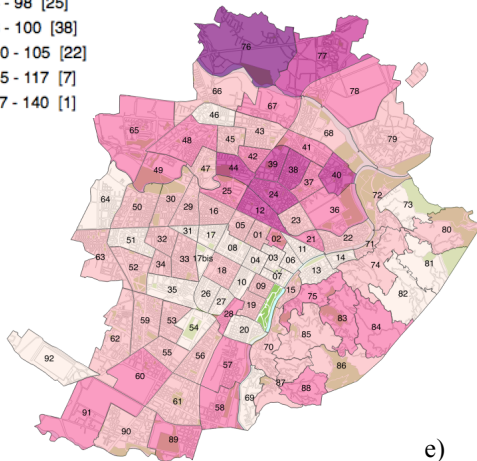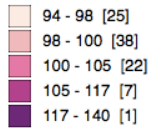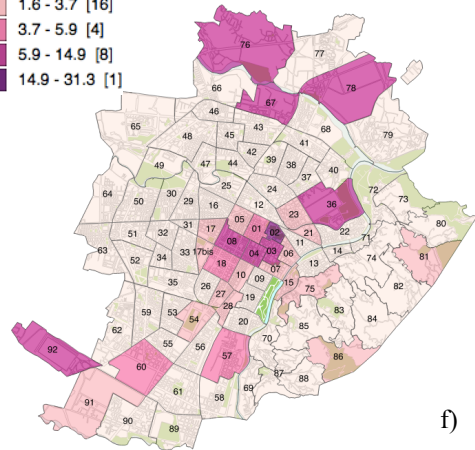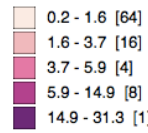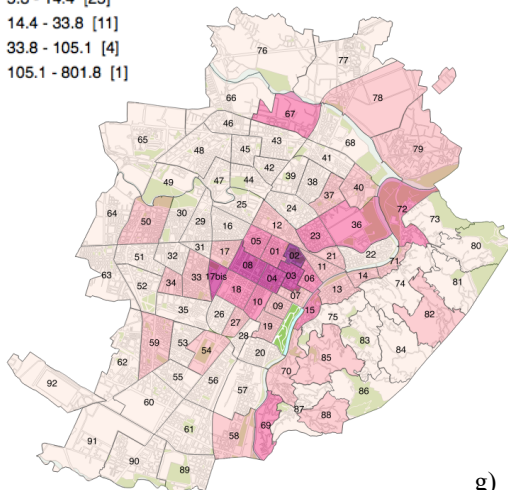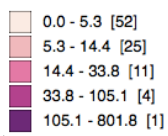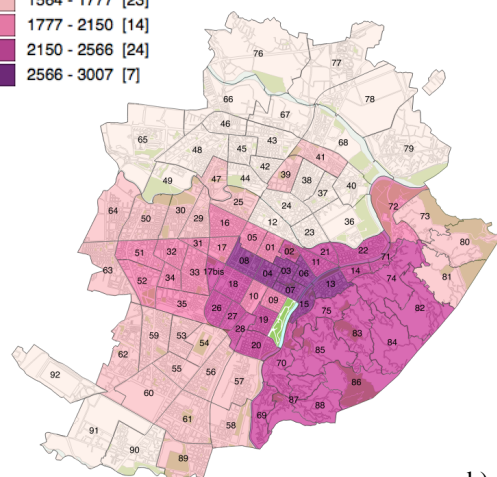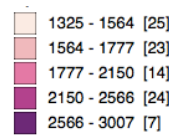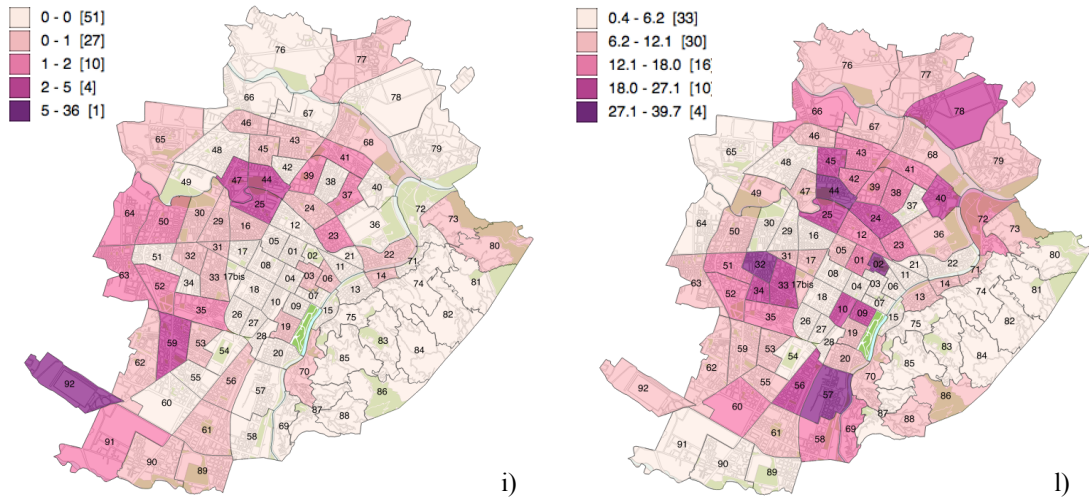
**Figure 54.** Demographics and socio-economic conditions in Turin's SZs:
a) population density; b) incidence of foreigner residents; c) employment rate;
d) education index; e) vulnerability index; f) centrality index; g) cultural and creative operators index; h) real estate values; i) buildings expansion index; l) residential buildings conservation index
(*Source*: author's elaboration on ISTAT data)

Additionally, some considerations can be made about the prevalent building phases characterising the areas most affected by Airbnbs. In fact, a recent article (Barreca et al. 2017) has presented a map showing the prevalent construction period of the buildings existing in different historical territorial units, i.e. spatial units identified on the basis of historical-urban analysis (Figure 55). Even though there is not a perfect overlapping between SZs and historical territorial units, at the descriptive level it seems that in the areas most interested by Airbnb listings the buildings mainly date back to a historical period prior to 1918.
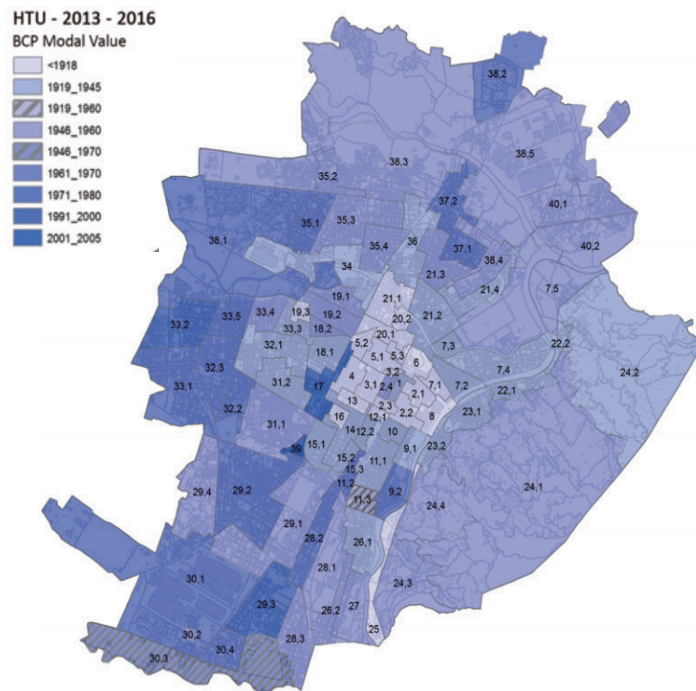
**Figure 55.** Most frequent building construction period (BCP) in Turin's historical territorial units (HTU)
(*Source*: Barreca et al. 2017, p. 61)

In order to better understand Airbnb distribution, it could be useful to describe other characteristics of the SZs with the highest presence of Airbnbs. For instance, figure 56 highlights that the density of commercial activities (number of businesses/km$^2$) is overall low especially in the eastern and northern parts of the city. The density of commercial activities is particularly high in central areas such as 01-Municipio, 04-Piazza San Carlo-Piazza Carlo Felice and 09-Piazza Madama Cristina (Borgo San Salvario) instead; high levels are visible in other central SZs such as 05-Piazza Statuto, 03-Palazzo Carignano, 06-Piazza Vittorio Veneto, 07-Corso Cairoli-Piazza Bodoni, 11-Borgo Vanchiglia and a more peripheral SZ (38-Borgata Monterosa). More particularly, SZs 01, 04 and 09 present a density of commercial activities which is almost eight-nine times higher than the average one (M = 228 units/Km$^2$; SZ 01 = 2217 units/Km$^2$; SZ 04 = 2109 units/Km$^2$; SZ 09 = 1957 units/Km$^2$). A similar distribution pattern can be detected also with reference to bars, restaurants and other businesses related to the administration of food and beverages (Figure 57 a)[160]; this pattern seems of particular interest, since

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[160] The database available on the Geoportal of the Municipality of Turin reports a total of 29,677 commercial activities: 354 are classified as newsagents', 2,706 as hairdressers and aestheticians, 5,267 as businesses devoted to the administration of food and/or beverages, and 21,350 as commercial activities run in fixed premises. Given that the database does not specify whether a business is still active or not, the density values reported in the main text can be interpreted as an indicator of the "commercial vocation" of the areas. On the basis of available data, businesses devoted to the administration of food and/or beverages corresponded to 17.7% of the total. However, of the 5,267 businesses devoted to the administration of food and/or beverages, some are associated to schools, hospitals, private companies, clubs, recreational activities etc.; on the basis of information that can be empirically deduced from the database available on the Geoportal, food and beverage businesses addressed to the general public seemed to amount to

the administration of food and beverages is a type of activity that may appeal locals, temporary city-users but also tourists.

Figure 56 b) illustrates that, if the number of inhabitants of each SZs is considered, central areas (i.e. 09bis, 01, 02, 03 and 04) manifest the highest number of commercial activities per 1,000 inhabitants; central areas register the highest number of businesses devoted to the administration of food and beverages, too (Figure 57 b). Then, it is interesting to note that bars, restaurants, pubs, wineries, etc. are mainly concentrated in areas such as San Salvario and the Quadrilatero Romano but that they are also located along some main urban axes that connect the centre with more peripheric areas of the city and viceversa.
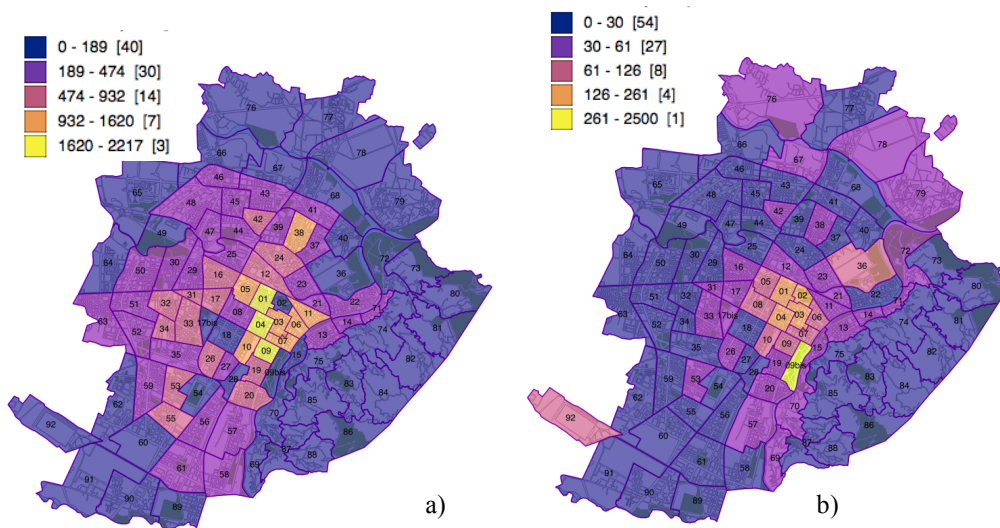


**Figure 56.** Commercial activities in statistical zones: density (a) and number of businesses per 1,000 inhabitants (b).
(*Source*: author's elaboration on Geoportal data)

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4,193 (14.1% of the total), and they are constituted by restaurants, bars, pubs, wineries, etc. Only this last type of venues was considered for the elaboration of the maps presented in Fig. 57.
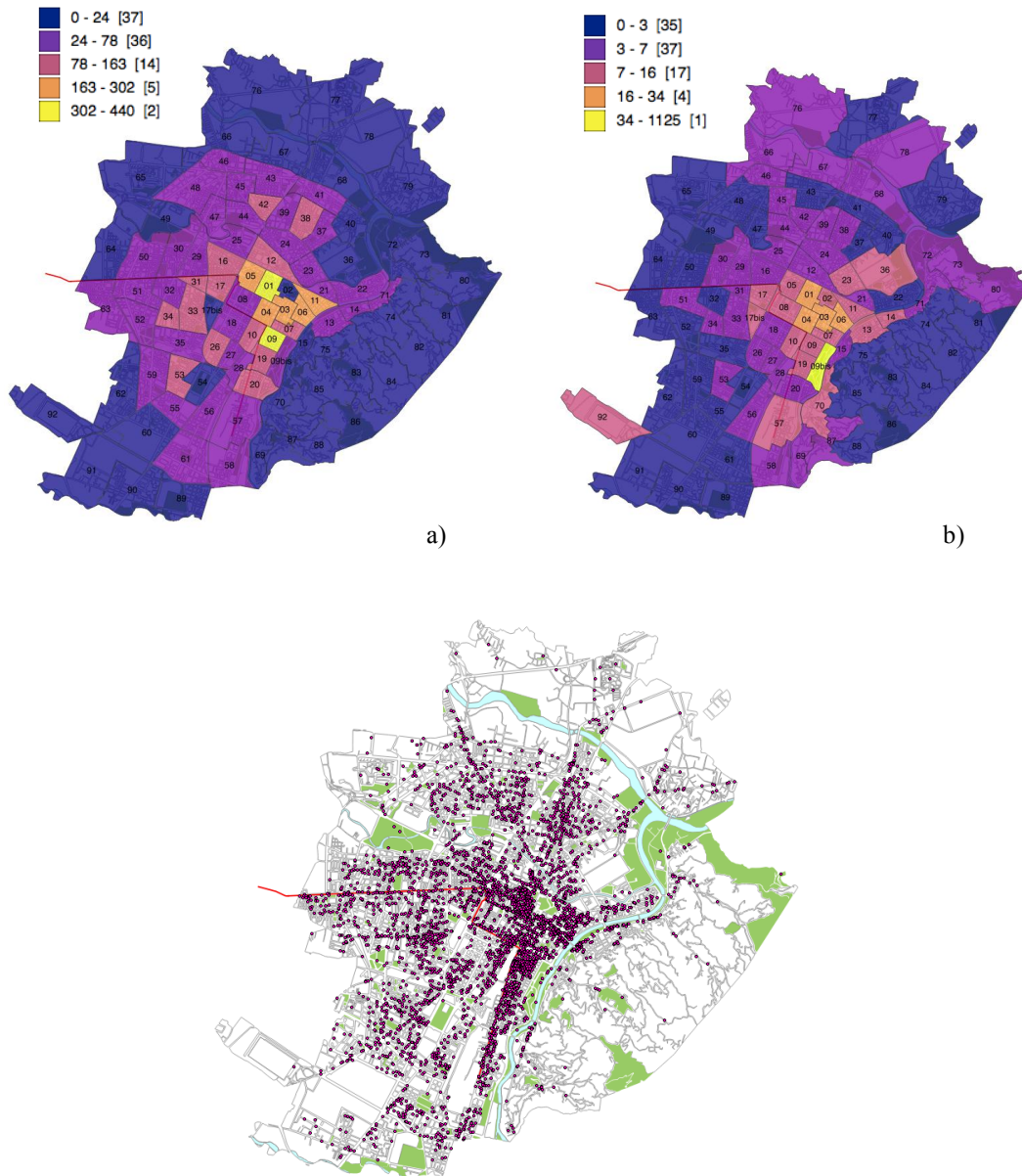
**Figure 57**. Businesses related to the administration of food and beverages in SZs:
a) density (number/Km$^2$); b) number of businesses per 1,000 inhabitants; c) location.
(*Source*: author's elaboration on Geoportal data)

Figure 58 visualizes the trajectory and the stops of the existing underground line (in red), the localisation of pedestrian areas (in orange) and of local markets (in black). Circled underground stops correspond to the main railway stations of Turin, i.e Porta Nuova and Porta Susa. The subway currently includes only one line connecting the western (West-East axis) and southern (South-North) parts of the city to more central areas and viceversa.

Visual exploration suggests that some of the SZs more interested by Airbnbs are located in the nearby of the South-North axis, whereas relationships between the West-East axis and Airbnbs seem less evident. The maximum Euclidean distance occurring between the centroids of the polygons that incorporate the

railway stations of Porta Nuova and Porta Susa and the centroids of the polygons corresponding to the SZs more interested by Airbnb listings (i.e. SZ 01, 09, 03, 04, 05, 06, 07, 11, 19) corresponds to about 2.2 Km both in the case of Porta Susa and in the case of Porta Nuova (around 3.0-3.5 km in Manhattan distance, i.e. corresponding to about 15 minutes by car or 40 minutes on foot).



a)                                                                                      b)
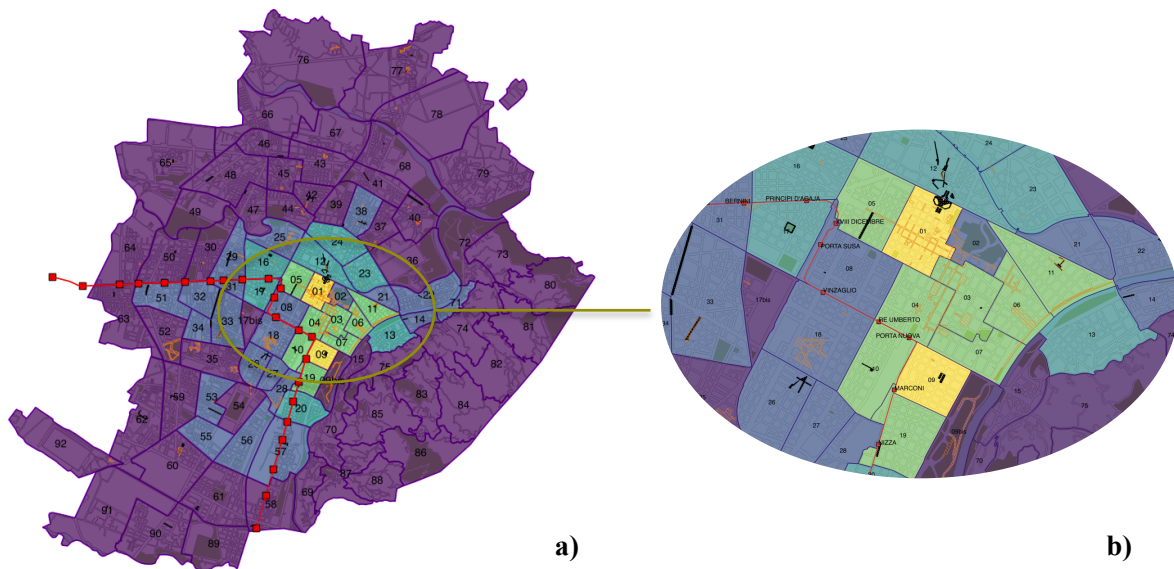
**Figure 58.** Underground stops (red), pedestrian areas (orange) and markets (black) plotted on Airbnb listings density map (a); zoom of the most central areas (b).
(*Source*: author's elaboration on Airdna and Geoportal data)

For what concerns pedestrian areas, they are to some extent scattered throughout different areas of the city, but they are particularly present in SZs 01-Municipio (via Garibaldi axis, via Barbaroux axis and perpendicular streets in the proximities), 02-Palazzo Reale (Piazza Castello), 03-Palazzo Carignano (via Roma axis, via Accademia delle Scienze axis, Piazza Carignano, Piazza Carlo Alberto, Piazzale Valdo Fusi), 04-Piazza San Carlo-Piazza Carlo Felice (via Carlo Alberto axis, via Lagrange axis, Piazza San Carlo), 05-Piazza Statuto (via Garibaldi), 06-Piazza Vittorio Veneto (Piazza Vittorio Veneto, via Verdi, Lungo Po), 07-Corso Cairoli-Piazza Bodoni (Piazza Bodoni), 18-Vecchia Piazza d'Armi (Piazzale Duca d'Aosta, Corso Duca d'Aosta), 11-Borgo Vanchiglia (Piazza Santa Giulia and Lungo Po) and 35-Polo Nord (Piazza Giovanni Paolo II, Piazza Don Franco Del Piano). In SZ 09bis-Parco del Valentino and 52-Parco Francesco Ruffini they are associated to local parks instead. It seems interesting that in many cases the SZs with pedestrian areas are the ones that present many Airbnbs too. Local markets are scattered throughout the city, but two areas seem particularly noteworthy for the wide surface devoted to the market, i.e. the ones where the Porta Palazzo (SZ 01-Municipio and 12-Borgo Dora-Valdocco, Piazza della Repubblica) and Balon (SZ 12-Borgo Dora-Valdocco) markets take place.

*Built heritage and other cultural and landscape heritage resources*

In order to address the research questions of this study, it is then important to better outline the characteristics of the SZs in terms of its built heritage, landscape and cultural resources. Capitalising on data available on the Geoportal of the Municipality of Turin, it is possible to locate the heritage sites and buildings protected by the D.Lgs 42/2004[161], together with landscape heritage areas preserved by the same law; figure 59 shows that relevant heritage sites and buildings are to some extent scattered throughout the city, but that they are – again- mostly concentrated in central areas. This is coherent with the extension of the CHUZ-Central Historic Urban Zone (ZUCS-Zona Urbana Centrale Storica in Italian) defined by the general regulatory plan (GRP) of Turin[162] and basically corresponding to the SZs 01, 02, 03, 04, 05, 06, 07 and 08. The CHUZ particularly includes the so called "Roman Quadrilateral" – i.e. the part of the city that was settled in Roman times, and that presents a particularly intense continuity of life and settlement-, the urban form mainly resulting from the interventions implemented in the baroque period (i.e. 17th and 18th century), and some urban spaces defined in the 19th century. In the urban development of the zones that now present a characteristic of centrality a very important role was performed by urban axes. Urban axes generated the urban form in Roman times but also during the Baroque period; then, also the expansions that took place in the 19th century -such as the wide Neoclassic squares or neighbourhoods such as San Salvario, San

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[161] The D.Lgs 42/2004 is also known as *Codice dei Beni Culturali e del Paesaggio*. It counts 184 articles and it currently disciplines the definition, protection, conservation, circulation, access, management, use, communication, support, planning, sanctions and creation of value pertaining to landscape and cultural heritage resources. The full version of the text is available at http://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblic azioneGazzetta=2004-02-24&atto.codiceRedazionale=004G0066&elenco30giorni=false.

[162] As specified by the PRG, the CHUZ is one of the so called *normative zones* of the Municipality of Turin, which provide specific urban and building transformation parameters; these parameters are defined on the basis of the morphological characteristics and time period associated to the urban form and to its buildings, as well as considering the transformation and conservation goals set by the PRG. Overall, Turin presents the following 9 normative zones: 1-CHUZ; 2-Historic-environmental urban zones; 3- Mixed residential urban zones; 4- Zones with private green areas and pre-existing buildings (flat areas); 5-Urban zones devoted to production activities; 6-Hill zones; 7- Zones with private green areas and pre-existing buildings (hills); 8- Woody zones; 9- Urban zones subject to transformation. The CHUZ is delimited by Corso Regina Margherita, San Maurizio, Lungo Po Cadorna, Lungo Po Diaz, Cairoli, Vittorio Emanuele, Re Umberto, Bolzano, Vittorio Emanuele II, Principe Eugenio and by via Saluzzo, via San Pio V, via Magenta, via Santarosa, piazza XVIII Dicembre, piazza Statuto and Porta Nuova. Interventions in the CHUZ are finalised to the protection of the architecture and of the environment, which can be implemented taking into account the historical values and the transformations that have progressively shaped the city (Città di Torino 2018, pp. 86-87). The areas belonging to the normative zone of type 2 present interesting features too: in fact, they are defined as parts of the city that are distinguished by historical settlements and by spaces that provide character to the urban fabric. These areas also contain buildings that are classified as "buildings of particular historical relevance" and as "buildings characterising the historical urban fabric" (Città di Torino 2018, p.100).

Secondo, Borgo Po, Crimea and Via Cibrario– were influenced by this model (Comoli and Viglino 1992)[163].
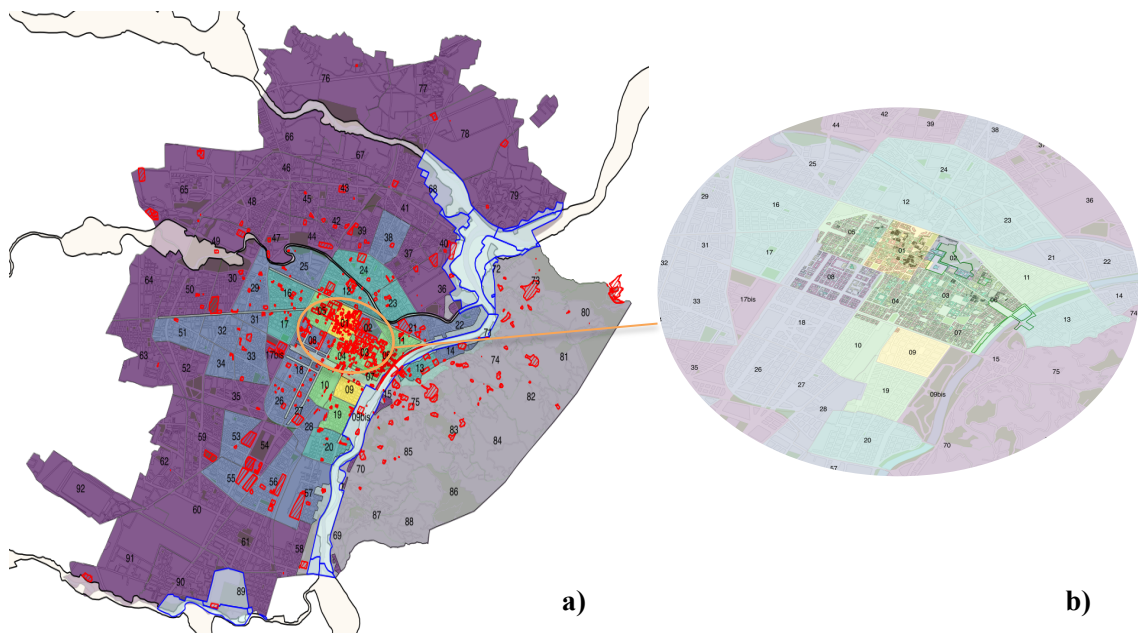


**Figure 59.** Landscape and cultural heritage sites and buildings: a) location and areas; b) zoom on the Central Historic Urban Zone identified by the GRP of Turin. (*Source*: author's elaboration on Geoportal data)

Overall, it is agreed that in the case of Turin the value brought by architecture stems from the complexity of the historical process and consequently not only from the quality of the building types but also from their variety (Comoli and Viglino 1992a, p. 31). As pointed out by scholars, the present image of Turin is also due to the regulations progressively implemented by the Municipality, which -at least up to the 1930s- has fostered the development of a city with homogeneous characteristics, especially with regard to the shape and volumes of the buildings, the design of the façades, the building materials, the colours and the decorations (Comoli and Viglino 1992a; Lupo 1992).

On the basis of the buildings defined by experts as presenting historical and architectural value and listed in the publications *Guida di Architettura. Torino* (Comoli and Olmo 1999) and *26.Ventisei Itinerari di Architettura a Torino* (Società degli Ingegneri e degli Architetti di Torino 2000) mentioned above, a georeferenced database was elaborated and combined with the .shp concerning the SZs. The aim was both to treat relevant buildings as points with QGIS and to combine a historical and architectural perspective with a more touristic one

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[163] Corso San Maurizio, Corso Regina Margherita, Corso Principe Eugenio, Corso Inghilterra, Corso Vittorio Emanuele II and Corso Cairoli testify the interventions either planned or implemented in the Napoleonic period, when a process of "circonvallazione" allowing to move in the city without necessarily crossing it – but circumnavigating it- was initiated instead (Comoli and Viglino 1992).

(considering that the guides were also conceived as tools supporting actual visits of the city). Figure 60 a) shows relevant geo-referenced points plotted on a map displaying the density of Airbnb active listings in late 2017, whereas 60 b) shows the density (number of built heritage points/km$^2$) of built heritage points in SZs. Figure 60 c) displays Airbnb listings active in late 2017, plotted on the density map of built heritage resources: this type of visualization stresses how Airbnbs are particularly located in SZs characterised by buildings of historical and architectural value. Finally, Figure 60 d) shows the plotting of the museums included in the .shp shared by the Geoportal of the Municipality of Turin, underlining once again that the most central SZs (see SZs 1, 2, 3 and 6) are the ones that actually offer the most extensive cultural offer.
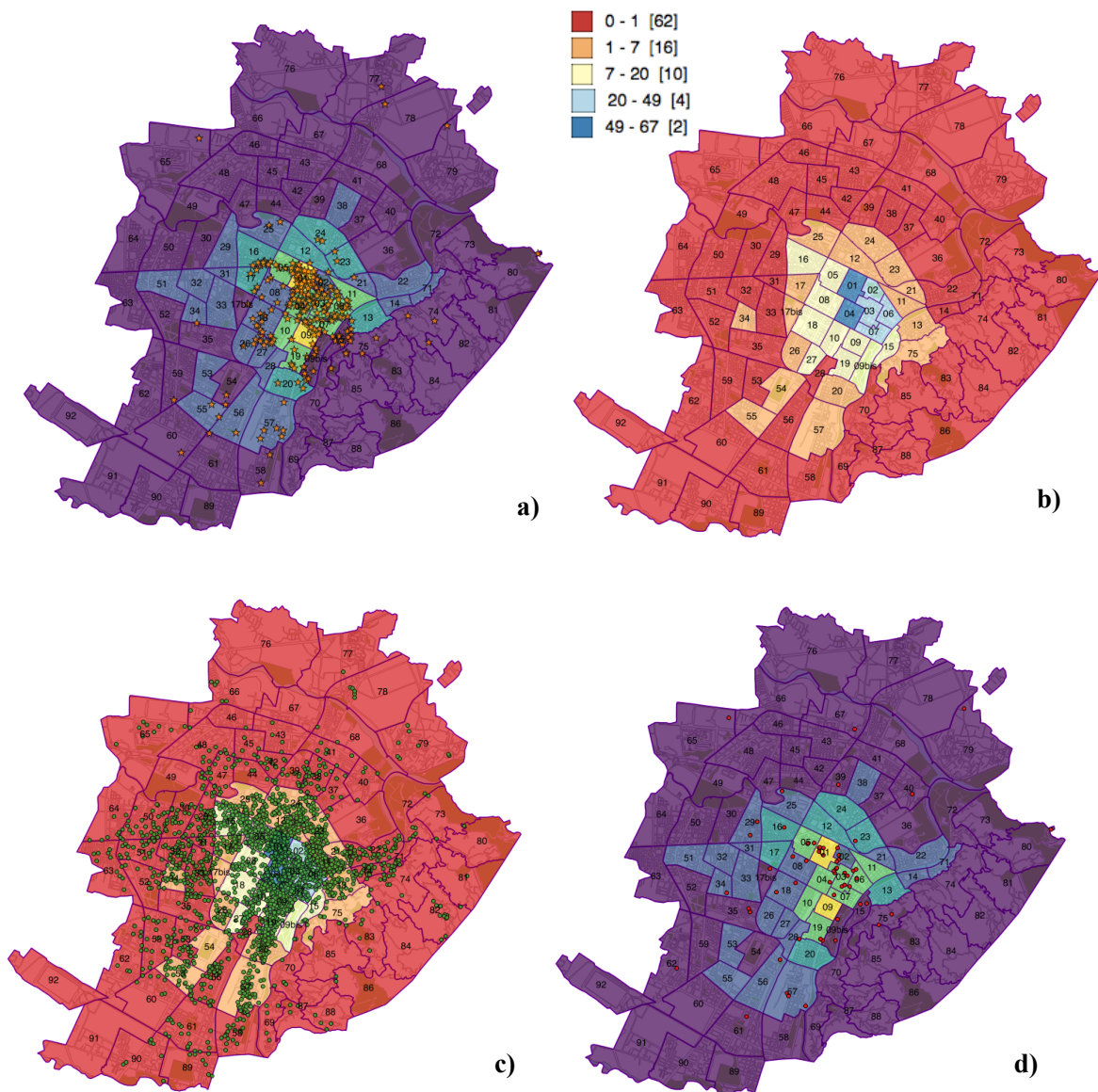


**Figure 60.** Point (a) and density (b) map of buildings of historical and architectural value.
Airbnb listings active in late 2017 plotted on the built heritage density map (c).
Main museums location plotted on late 2017 Airbnb density map (d).
(*Source*: author's elaboration)

With reference to some of the most attractive museums mentioned in previous chapters, it must be noted that -for instance- the Museo Egizio, the Museo Nazionale del Cinema, Palazzo Reale and Palazzo Madama are located right in the central area.


## 6.4.2 Spatial statistics

Visual exploration allowed to understand not only which are the areas most interested by the Airbnb phenomenon, but also their socio-economic characteristics and their features in terms of built heritage and museum resources. However, in order to better understand the relationships occurring between variables, provide a more objective outline of the phenomenon and identify particular spatial patterns, it seems recommendable to treat available data by the means of spatial statistics approaches.

Given the exploratory nature of the study and the characteristics of the statistical zones of Turin -which can be considered as polygons of similar size and distribution- it was deemed appropriate to express spatial relationships through a polygon contiguity model, in coherence with what suggested by the literature (Longley et al. 2015). Given the irregularity of the shape of the SZs, a Queen's (first order) type of contiguity was adopted. As for the analyses already described in the above paragraphs, the data set pertaining the listings considered as active in November 2017 was taken into account. In order to describe the spatial distribution of the listings and to investigate the possible presence of spatial autocorrelation patterns, the Global and Local Moran's indexes were computed, considering as variable the density of the listings existing in each SZ (Figure 61). Results highlighted that the distribution of Airbnb listings is not random, but that a certain degree of spatial autocorrelation exists instead (Moran's I: 0.491).



a)  b)
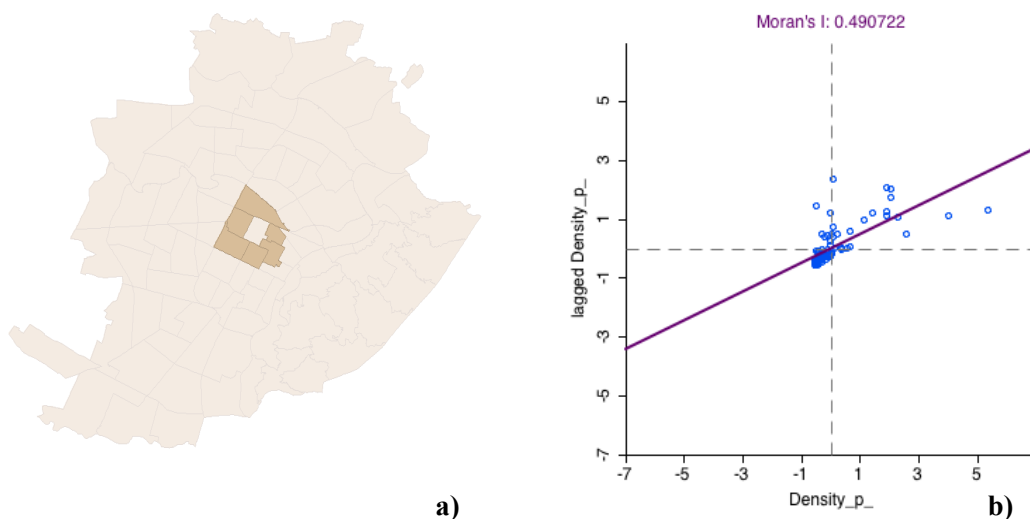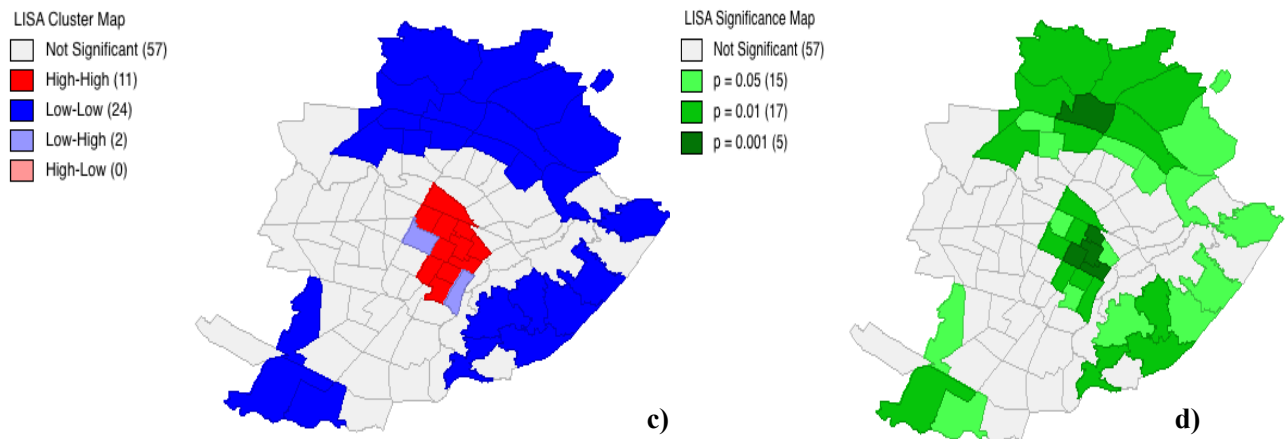
**Figure 61.** Global and Local Moran's I, with reference to the density of Airbnb listings considered as active in late 2017: connectivity map (a), Moran's scatterplot (b), LISA Cluster Map (c) and LISA Significance map (d).
(*Source*: author's elaboration)

The LISA cluster map pointed out that particularly significant High-High spatial autocorrelation patterns (p = 0.001) exist for central areas such as SZ 2, 3, 4 and 7; even though characterized by a lower level of significance (p = 0.01 and p = 0.05), High-High patterns interest other central and semi-central statistical zones too (SZ 12, 5, 1, 6, 9, 19 and 10). Significant Low-Low patterns are registered for Northern, Southern and Eastern (i.e. hills) areas located towards the borders of the city, instead. Low-High patterns are evidenced for SZ 9bis-Valentino and SZ 8-Stazione Porta Susa, i.e. statistical zones that for their characteristics (park and railway station respectively) present low density values of Airbnb listings, even though their neighbouring zones manifest high density values.

In order to have comparable data and make reflections on the methods adopted, the Global Moran's I (type of contiguity: queen; order of contiguity: first) was also calculated considering the density of the listings scraped as active in November 2017 and created at least 12 months before; the objective was to calculate the Moran's I using the same set of data employed when calculating the Moran's I (variable: density of listings) with a spatial matrix considering Microzones as units of analysis, and then to compare the values. Results (Moran's I = 0.499) highlighted that a degree of spatial autocorrelation exists also for this set of data; the elaboration of a LISA cluster map pointed out that, also in this case, particularly significant High-High patterns exist for central areas, whereas Low-Low patterns mainly interest Northern, Southern and Eastern areas, as explained for the example mentioned above. Then, this value (Moran's I = 0.499) was compared with the one obtained when considering Microzones as spatial units of analysis (Moran's I = 0.264): it is evident that the Moran's I related to SZs is higher than the one concerning MZs. The difference between results empirically confirms the existence of the areal unit problem highlighted by the literature (Longley et al. 2015, pp. 298-299), which affirms that the selection of

the unit of analysis influences results and –likely- their interpretation. In fact, the literature suggests that correlation coefficients usually increase with scale, and it also points out that zoning systems implemented for general socio-economic purposes usually maximise within-zone homogeneity, reducing the magnitude of the problem: this seems exactly the case of SZs, which – for the description of the Airbnb phenomenon- appear to be a more appropriate spatial unit of analysis than MZs.

In order to better understand the distribution of Airbnb listings in relation to the socio-economic characteristics of the SZs, the Bivariate Global and Local Moran's I were computed. In this case, correlation coefficients were calculated considering the values of the variable "density of Airbnb listings" at a given location and the values of a different variable in neighbouring areas (spatially lagged variables). Apart from density of Airbnb listings, the variables considered in the analyses were the following: population density; incidence of foreigner residents, vulnerability index, centrality index, cultural operators' index, average offer prices (euros/square meter) of the real estate market, density of built heritage resources, density of commercial activities, density of museums, real estate expansion index, building conservation index, level of education and occupation rate. The results emerged from the analysis are reported in Table 20.

Correlation coefficients indicate that spatial autocorrelation patterns are either low or not present when considering spatially lagged variables such as population density, incidence of foreigner residents and vulnerability index; low positive spatial autocorrelation patterns emerge when considering the centrality index and the cultural operators' index instead. Interestingly, higher Moran's values are obtained when taking into account the average offer prices (euros/square meter) of the real estate market: this indicates that high densities of Airbnb listings are associated to SZs that present neighbouring areas characterised by high real estate prices. If it is neither possible nor recommendable to state that high real estate prices cause high densities of Airbnbs or viceversa, it seems reasonable to affirm that high values of one variable are associated to high values of the other spatially lagged variable instead.

| Variable | Spatially lagged variable | Bivariate Moran's I |
|---|---|---|
| **Density of Airbnb listings** | Population density | 0.132 |
| | Incidence of foreigner residents | 0.044 |
| | Vulnerability index | - 0.118 |
| | Centrality index | 0.312 |
| | Cultural operators' index | 0.263 |
| | Average offer prices of the real estate market | 0.437 |
| | Density of built heritage resources | **0.544** |
| | Density of commercial activities | 0.472 |
| | Real estate expansion index | - 0.044 |
| | Building conservation index | 0.020 |
| | Education level | 0.242 |
| | Occupation rate | 0.313 |
| | Density of museums | 0.403 |
| | Density of businesses devoted to the administration of food and beverages | 0.464 |

**Table 20.** Computation of Bivariate Moran's I between the density of Airbnb listings in SZs and other spatially lagged variables: values.
(*Source*: author's elaboration)

Considering that real estate prices are frequently recognized in the literature as a proxy for the quality of the residential units but also of the local environment, it is possible to advance that the presence of conditions contributing to the quality of the areas (such as transports, services, commercial activities and so on) favours both high real estate prices and the emergence of Airbnbs. By this perspective, it is particularly interesting to note that the Bivariate Moran's I computed between the density of Airbnb listings and the density of built heritage resources is particularly high (Bivariate Moran's I = 0.544), thus indicating the presence of positive spatial autocorrelation patterns between these two variables. Similar results were obtained considering also the density of museums (Bivariate Moran's I = 0.403), the density of commercial activities (Bivariate Moran's I = 0.472) and the density of businesses devoted to the administration of food and beverages (Bivariate Moran's I = 0.464).
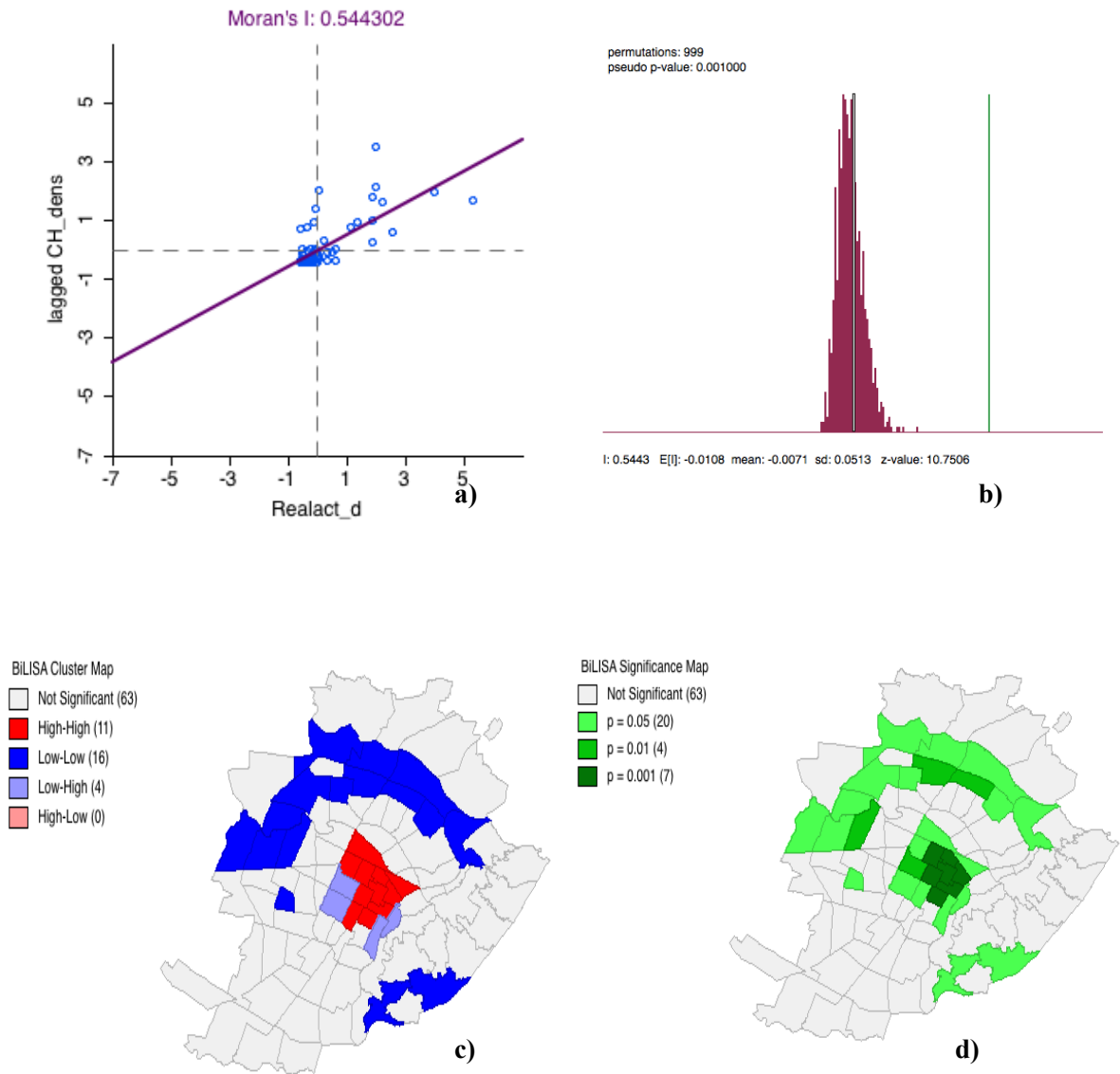
**Figure 62**. Bivariate Global and Local Moran's I, computed considering the density of Airbnb listings and the density of built heritage resources in SZs: Moran's scatterplot (a), permutation test (b), BiLISA Cluster Map (c) and BiLISA Significance map (d). (*Source*: author's elaboration)

Additionally, it must also be noted that the prevalent time of construction of the buildings located in central zones is prior to 1918, meaning that at least some of the residential units involved in short-term rentals might present some characteristics and/or lack of facilities that may make permanent residency less desirable.

## 6.5 Investigating the role of the location factor in the determination of prices per night and occupancy rates

The analyses performed in the above paragraphs aimed at exploring the distribution patterns of Airbnb listings, thus paying particular attention to the offer trends. This paragraph aims to identify and explain some other offer and demand patterns, with the goal of answering to the research question identified with the letter b) in section 4.5, i.e.: *Does the vicinity to areas with high densities of built heritage resources affect occupation rates of Airbnb accommodations and their prices per night?*

In order to answer to this question, data were firstly explored in a descriptive way and then regression models were performed. Regressions aimed at identifying the influence of one or more independent variables on selected dependent variables. For comparability reasons and considering that the vast majority of listings is constituted by entire homes/apartments, exploratory analyses were performed on the data set including listings about entire homes/apartments acknowledged as active in late 2017 and created at least 12 months before (n = 1,297).

### 6.5.1 Data exploration

The first variable deemed worth-exploring was ADR. The relationship between the density of Airbnb listings and the ADR variable can be described by the cartogram presented in Figure 63. In this graph, each circle represents a SZ: whereas the size of each circle indicates the density value of the listings, the colour symbolizes the mean ADR calculated for each SZ. The cartogram highlights the existence of some SZs characterised by both high density and ADR values: these are central SZs 01, 06, 07, 03, 04, 05 and 10. SZ 09 distinguishes itself for high density values associated to ADR that are on average a little bit lower than the one registered for the above group; SZs 11 and 19 are also associated to the same range of mean ADR, even though their density is lower than the one of SZ 09. Then, SZ 12 manifests relatively high density values, associated to relatively low prices. Finally, it is interesting to note the presence of SZs with prices so high that can be considered as belonging to other segments of the market (SZ 85 and 88, located in the hill zone).
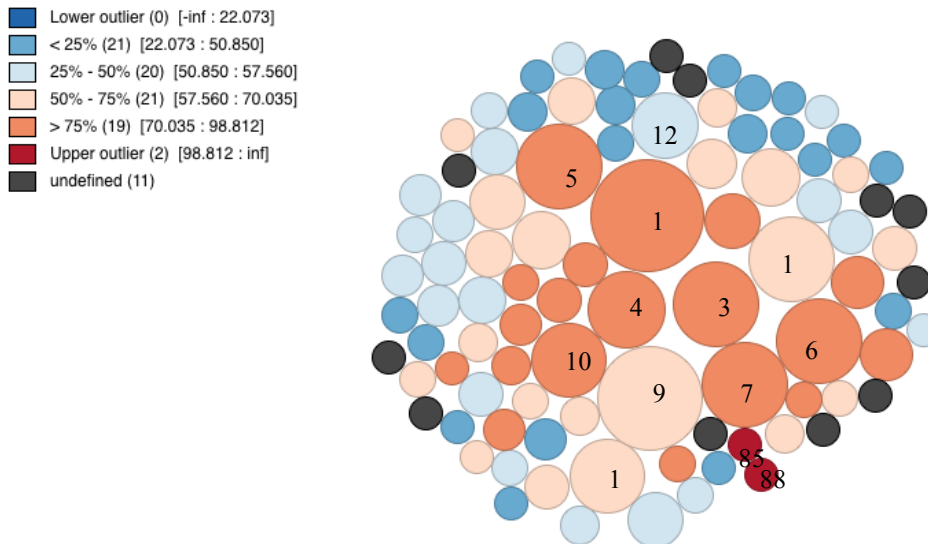
**Figure 63**. ADR and density of Airbnb listings considered in the analysis: cartogram
(numbers refer to SZs).
(*Source*: author's elaboration)

The maps below (Figure 64) show the SZs whose listings received -on average- a certain range of bookings in the previous 12 months[164]. With few exceptions, the SZs that were interested by the highest number of bookings were both central areas and the ones located in correspondence of the East-West underground axis (Figure 64 a). These were followed by other "complementary" central and semi-central areas (Figure 64 b), by zones located further from the city centre (Figure 64 c) and finally by more random SZs (Figure 64 d).

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[164] In general terms, the analyses performed on a similar amount of Airbnb listings detected as active in November 2017 and created at least 12 months before (Rubino and Coscia 2019) highlighted that around one third of entire homes/apartments (EH) received less than 11 bookings in the previous 12 months, and that the number of listings registering a certain number of bookings (e.g. 11-20, 21-30…) tended to decrease with the increase of the number of bookings; a similar pattern was registered for private rooms (PR) too, even though it was calculated that 40% of this type of listings registered less than 11 bookings in the previous 12 months. With reference to estimated annual revenues, it was calculated that 24% of entire homes/apartments collected less than 2,500 euros in the previous 12 months; this percentage was more than double (54%) in the case of private rooms instead. The other revenue patterns identified for EH were the following: 2,501-5,000 euros = 13%; 5,001-7,500 euros = 16%; 7,501-10,000 euros = 18%; more than 10,000 euros = 29%. Then, the following percentages were found for PR: 2,501-5,000 euros = 24%; 5,001-7,500 euros = 13%; 7,501-10,000 euros = 4%; more than 10,000 euros = 5%.

**Figure 64**. SZs that received the following number of bookings in the period late 2016-late 2017: 33-59 (a), 23-33 (b), 15-23 (c) and under 15 (d).
(*Source*: author's elaboration)

The calculation of the Spearman's rho highlighted a significant relationship (at the 0.01 level) between the average number of bookings and the distance from the city centre (= -0.647), as well as the density of built heritage resources (= 0.582), the density of bar and restaurants (= 0.512) and the density of commercial activities (= 0.454). Spearman's rho coefficients were then found significant when considering these bivariate relationships: occupation rate and average real estate prices (= -0.425), occupation rate and education index (= -0.440).

With regard to annual revenues, the following map and cartogram (Figure 65) highlight that central SZs were the ones that –on average- most benefited from a digitally-enabled peer-to-peer accommodation system such as Airbnb: in fact, in these SZs annual revenues per listing even exceeded 6,000 euros (on average). Results concerning Northern and hill areas are not robust instead, since the number of listings existing in those SZs is very low: these areas are identified with blue lines in Figure 65 and it would be reccommendable not to consider them as representative of the whole areas but rather as reflecting the revenue patterns of particular listings.
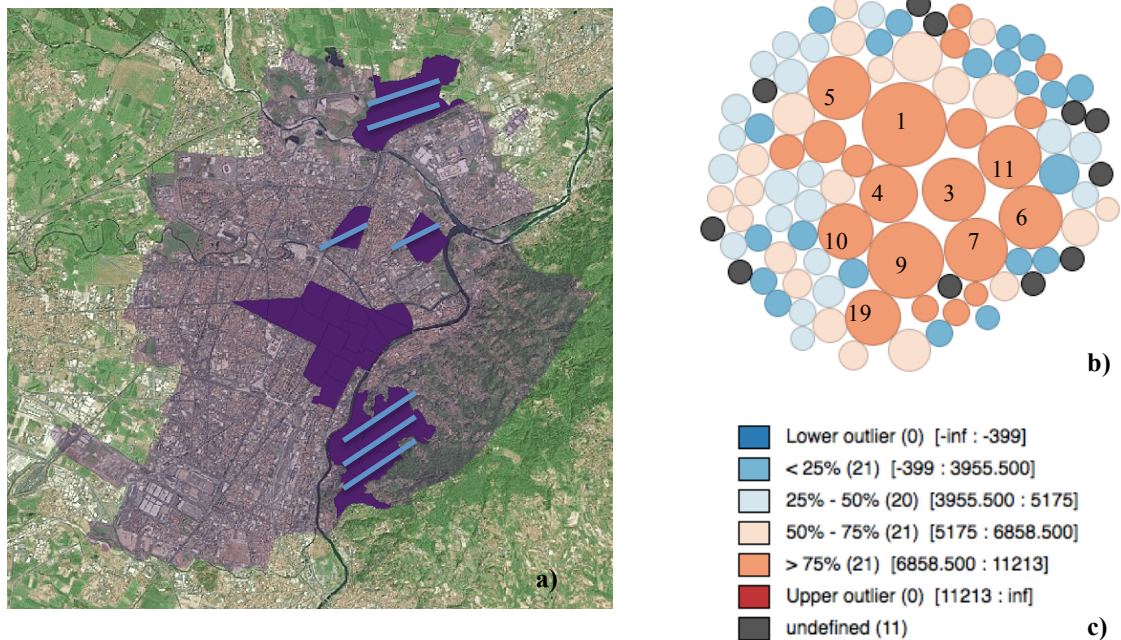
**Figure 65**. SZs with the highest annual revenues in the period late 2016-late 2017:
map (a), cartogram (b) and legend (c).
Blu lines in (a) indicate areas whose figures are not robust.
The radius of the circles in (b) is proportional to the density of listings.
(*Source*: author's elaboration)

## 6.5.2 Regression models

### *Regression models: research goal, hypotheses and approach*

Coherently with the research questions outlined at the beginning of the paragraph, the first goal of this section is to understand if selected variables are significantly correlated with the average daily rate that can be found in the different SZs (MADR). More specifically, the research hypothesis is that MADR values registered in the different SZs might be significantly associated with and potentially influenced by one or more of the following elements: a) the characteristics identified by ISTAT for each SZ and synthetically communicated through specific indexes (ISTAT 2017a; ISTAT 2017b), as previously described in par. 6.4; b) the presence of attractions favoured by tourists, such as built heritage resources and food & beverage facilities.

As a consequence, in order to address the problem, it was decided to firstly test the correlation between the variables calculating Speraman's rho values and then to explore the relationships by the means of regression models.

Given the spatial nature of available data, it seems important to reiterate that the problem will be overall addressed following a spatial approach. More precisely, spatial relationships relating to SZs were conceptualised through a polygon contiguity matrix (Queen type, first order); this choice was made in light of the literature (Barreca et al. 2017), the nature of the study and of the geometric

characteristics of the SZs: in fact, it is known that this type of matrix is usually employed in exploratory phases and when areal units have an irregular shape (Longley et al. 2015).

Given that -when dealing with data presenting a geographic nature- spatial autocorrelation may affect results, it was decided to apply ESDA techniques to assess the existence, sign (+/-) and magnitude of spatial dependence for each variable considered. Following the techniques mostly used in the literature (see Chapter 1), the univariate global and local Moran's I values were thus calculated.

### *Population under study and description of the variables of interest*

For the purpose of these analyses, the population that was considered to calculate MADR values associated to the different SZs was represented by the Airbnb entire homes/apartments (EH) identified as really active in November 2017 and characterised by a number of bedrooms ≤ 2 (n = 2,059); the choice of including all the listings active in November 2017 (instead of exclusively the ones registering at least 12 months of activity, as in previous paragraphs) was carried out with the goal of overcoming the limited reliability of the means outlined above (since this filtering increases the number of listings considered in each SZs); focusing only on EH with ≤ 2 bedrooms was deemed appropriate in order to analyse a more homogeneous segment of the short-term rental market, instead. As a note to the terms used, it can be underlined that "population" is preferred here to "sample" because all the listings meeting the conditions described above were considered to determine MADR, meaning that MADR were not calculated on the basis of a sample of this type of listings (MADR thus refer to the arithmetic mean of the daily rates reported by the company Airdna for the listings existing in a given SZ, computed for each SZ). Once obtained MADR, all the other analyses were performed with reference to discrete areal units instead (i.e. the 94 SZs thoroughly described in par. 6.4.1), using GeoDa software.

The descriptive statistics for the MADR variable are the following: Min. = 30.07; Max. = 108.17; Mean = 58.71; SD = 14.20; figure 66 shows the spatial distribution of the values, with reference to the 94 SZs, instead.
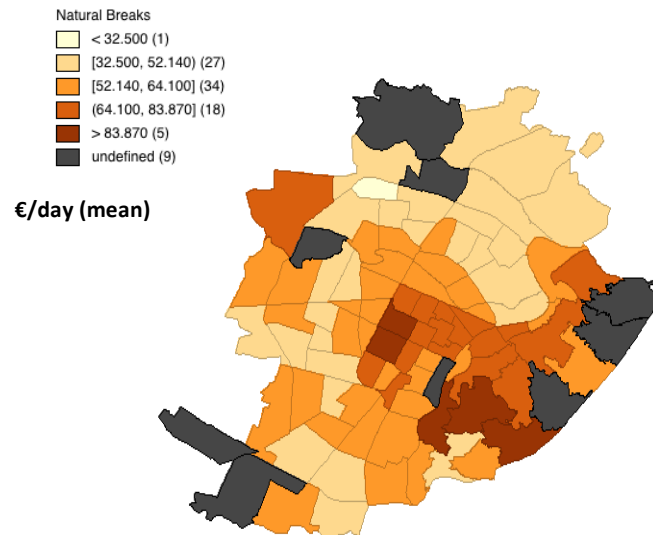
**Figure 66**. Average prices per day in Turin's SZs (MADR): choropleth map. MADR values are calculated on the basis of the daily fares of entire homes/apartments considered as active in November 2017 and having ≤ 2 bedrooms.
(*Source*: author's elaboration)

Figure 66 highlights that the highest prices per day (mean values) were registered in central SZs but also in the Eastern part of the city, included the hill-zone; with reference to the physical and environmental characteristics described in par. 6.4.1, it is interesting to note that the SZs with average daily fares above 83 euros correspond to SZ 08-Porta Susa and 18-Vecchia Piazza d'Armi (which are respectively characterised by proximity to the newly renovated railway station of the city and to the Politecnico) and to upscale SZs (SZ 70, 85, 86) located not only on the hill-side but also in the proximity of an appreciated urban park (SZ 86-Parco della Rimembranza). Another interesting pattern is defined by Corso Regina Margherita, which approximately runs East-West throughout the city: in fact, SZs located immediately South of this main urban axis show high average MADR (64.1- 83.8 euros), whereas the ones positioned immediately North are characterised by lower mean values. In general terms, the lowest MDR values were especially found in the Northern parts of the city instead, which – as described in par. 6.4.1- tend to show low real estate values and a low education rate, whereas they manifest a certain degree of socio-economic vulnerability.

*Independent variables: identification, description and considerations about the appropriateness of their number*

Coherently with the research hypotheses described above and with available data, it was decided to investigate MADR in relation with the following independent variables: average real estate listing price (euro/square metre), population density (inhabitants/square kilometre), density of built heritage resources (number of built heritage resources/square kilometre), food & beverage vocation of the areas (number of food & beverages businesses opened throughout the years/square kilometre), as well as socio-economic indicators of the areas such as employment rate and education rate. The following table reports the descriptive

statistics of these variables and of MADR; a dedicated column of the table makes reference to the corresponding choropleth maps already presented throughout the text.

| | Variable | Mean | SD | See fig. n. |
|---|---|---|---|---|
| MADR | Average euros/day (Airbnb EH) | 58.71 | 14.20 | 67 |
| REP | Average real estate listing price (euros/square m) | 1,930 | 425 | 54 h) |
| PD | Population density (inhabitants/square km) | 9,492 | 7,534 | 54 a) |
| BHD | Density of built heritage resources (number of built heritage resources/square km) | 5 | 12 | 60 b) |
| FBD | Food & beverage vocation (number of food & beverages businesses opened throughout the years/square km) | 59 | 80 | 57 a) |
| ER | Employment rate (number of employed people aged 15 years or more/number of residents of the same age segment, in percentage) | 47 | 5 | 54 c) |
| EI | Education index (number of people aged 25-64 years with a high school degree or higher/number of residents of the same age segment, in percentage) | 65 | 14 | 54 d) |

**Table 21.** MADR and independent variables: descriptive statistics
(*Source*: author's elaboration)

Overall, it must be noted that – even in the event that they are all significant- the number of selected independent variables is compatible with the size of the population under study (N = 94 SZs), since it respects the conditions that are usually recommended for the performance of traditional OLS regression models (Morano 2002, p. 56). In fact, the literature on traditional regression models recommends that, given *k* the number of observations and *n* the number of independent variables, at least one of the following conditions is respected: $k > 10(n+1)$, $k > 10n$, $k > n+30$ or –alternatively- $k > 4n$ if $n < 10$ (Morano 2002, pp. 55-56).

***Correlation tests, Exploratory Spatial Data Analyses (ESDA) and identitication of linear releationships among variables***

In order to explore the existence, strength and sign (+/-) of the relationship possibly occurring between the selected variables, correlation tests were performed, calculating Spearman's rho values (p = 0.01).

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|       | MADR   | REP   | PD     | BHD   | FBD   | ER    | EI    |
|-------|--------|-------|--------|-------|-------|-------|-------|
| **MADR** | 1      | 0.611 | -0.295 | 0.417 | n.s.  | 0.492 | 0.601 |
| **REP**  | 0.611  | 1     | n.s.   | 0.449 | n.s.  | 0.559 | 0.812 |
| **PD**   | -0.295 | n.s.  | 1      | n.s.  | 0.852 | n.s.  | n.s.  |
| **BHD**  | 0.417  | 0.449 | n.s.   | 1     | 0.446 | 0.375 | 0.418 |
| **FBD**  | n.s.   | n.s.  | 0.852  | 0.446 | 1     | 0.286 | n.s.  |
| **ER**   | 0.492  | 0.559 | n.s.   | 0.375 | 0.286 | 1     | 0.578 |
| **EI**   | 0.601  | 0.812 | n.s.   | 0.418 | n.s.  | 0.578 | 1     |

**Table 22.** Correlation tests: Spearman's rho values
(*Source*: author's elaboration)

Results presented in Table 22 highlight that MADR is positively correlated with REP and EI, and to some extent also to ER and BHD; a low degree of negative correlation was found when consiering PD, whereas correlation was not significant with FBD.

The calculation of the Global Moran's I for the different variables led to the results presented in Table 23, instead:

| MADR  | REP   | PD    | BHD   | FBD   | ER    | EI    |
|-------|-------|-------|-------|-------|-------|-------|
| 0.435 | 0.726 | 0.419 | 0.641 | 0.432 | 0.190 | 0.753 |

**Table 23.** Variables under study: Moran's I values
(*Source*: author's elaboration)

Moran's I values thus highlight that a certain degree of spatial autocorrelation exists for all the variables considered (with the exception of ER), even though the magnitude is very different: in fact, whereas the Moran's I takes values around 0.4-0.5 for MADR, FBD and PD, it even exceeds 0.7 when considering REP and EI.

The performance of LISA techniques then highlighted where significant clusters (999 permutations) can be detected. Figure 67 shows the Moran's I scatterplot, the LISA Cluster map and significance map elaborated with reference to the MADR variable.
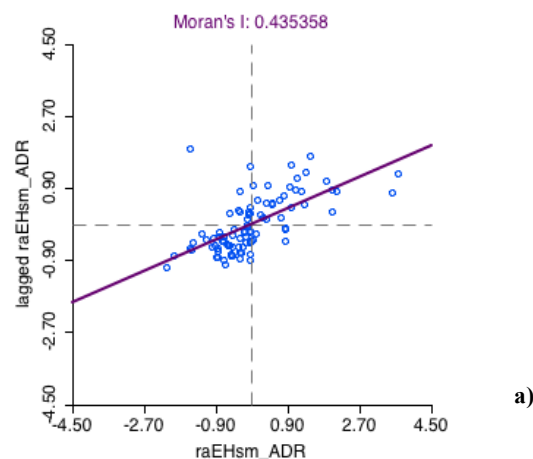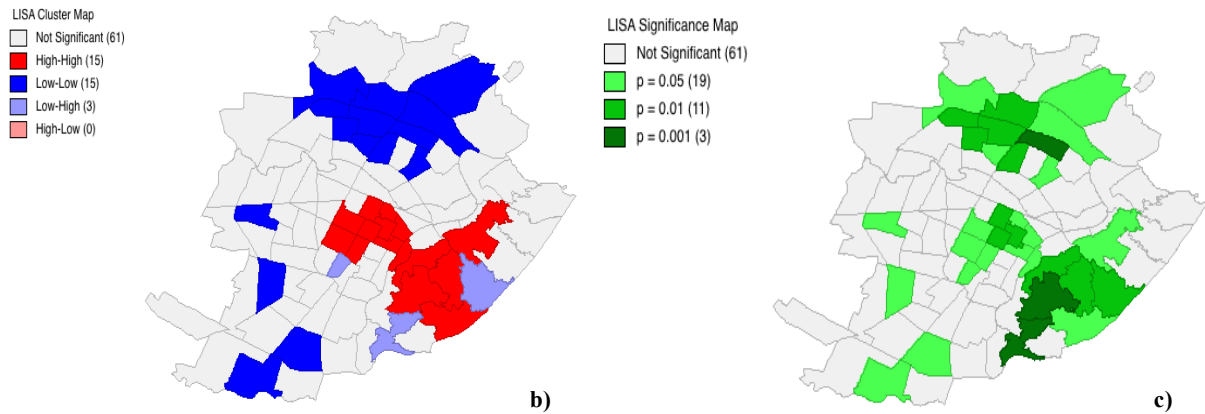
**Figure 67**. MADR: Moran's scatterplot (a), LISA cluster map (b)
and significance map (c)
(*Source*: author's elaboration)

The maps overall pointed out that High-High patterns can be detected in the central part of the city and in the hill-zone, whereas Low-Low clusters are mainly located in the Northern areas.

Then, the existence of a linear relationship between MADR and the independent variables that resulted to be significantly correlated with it was explored by the means of scatterplots; after visual inspection, it was concluded that a linear relationship could be detected only between the dependent variable MADR and REP and EI (Figure 68); as a consequence, it was decided to perform a linear regression model including only these two independent variables. Also in this case, the number of variables respects the conditions k > 10(n+1), k > 10n, k > n+30 and it can thus be considered acceptable.
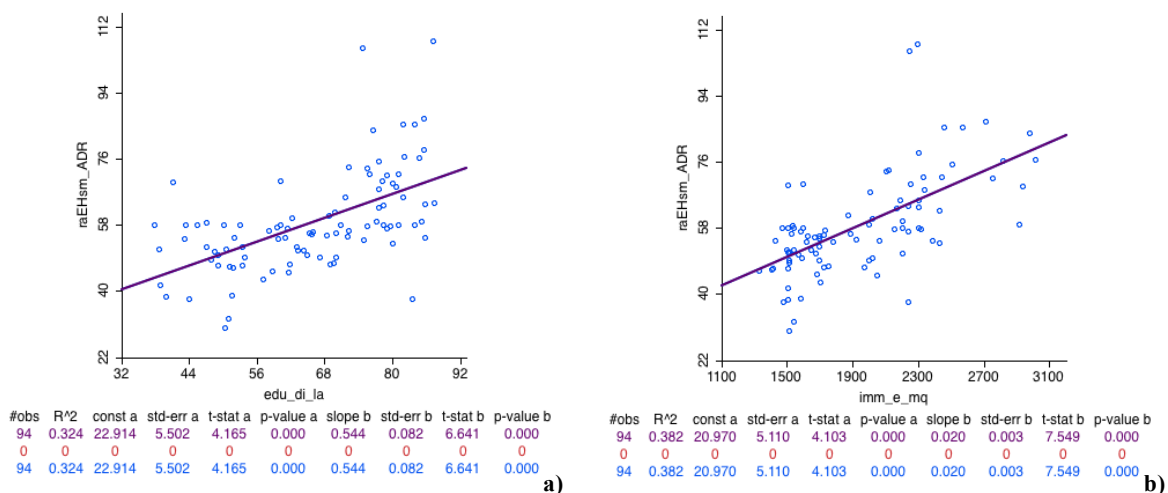


**Figure 68**. Exploring linear relationships between MADR (y axis) and education index (a) and real estate prices (b)
(*Source*: author's elaboration)

### Investigating the MADR variable: spatial regression model

In order to understand how independent variables are able to affect the MADR dependent variable, a regression model was finally implemented. Even though the existence of spatial autocorrelation patterns (as outlined above) suggested to directly perfom a Spatial Lag model, it was decided to firstly perform an OLS model, then to furtherly check the existence of spatial dependence through the examination of spatial diagnostics and finally to perform the appropriate spatial model. As expected, the diagnostics for spatial dependence pointed out a moderate significance of the LM (Lag) parameter, suggesting that - coherently with what outlined through LISA analyses- the performance of a Spatial Lag Model is appropriate. In fact, as recommended by the spatial regression model selection decision rule (Anselin 2005, p.199), when the LM-lag is significant, the performance of a Spatial Lag model is appropriate and can overall improve the model. Table 24 shows the results of the OLS and Spatial Lag model, respectively.

| | OLS | | Spatial Lag Model | |
|---|---|---|---|---|
| | Coeff. | Prob. | Coeff. | Prob. |
| W_MADR (spatial coefficient) | | | 0.300096 | 0.02803 |
| REP | 0.0139 | 0.00065 | 0.0111 | 0.00511 |
| EI | 0.2233 | 0.06401 | 0.1382 | 0.24090 |
| Constant | 17.1418 | 0.00220 | 10.4746 | 0.09522 |
| AIC | 712.101 | | 709.987 | |
| Log-likelihood | -353.051 | | -350.994 | |
| Adj. R square | 0.392 | | 0.441 | |
| Multicollinearity condition number | 16.633 | | | |
| Breush-Pagan test for diagnosing heteroskedasticity | 9.4130 | 0.00904 | 11.6308 | 0.00298 |

**Table 24.** OLS and Spatial Lag model: results
(*Source*: author's elaboration)

The comparison of the measures that indicate the fit of the regression model highlights that the Spatial Lag Model presents –as expected- a better fit. In fact, it shows a marginally higher Log-likelihood value and a marginally lower Akaike Info Criterion (Anselin 2005, p.175). Additionally, the R square value is higher for the Spatial Lag model, meaning a better fit of the Spatial Lag model.

The analysis of the multicollinearity condition number indicated an acceptable value < 30 (i.e. meaning that selected variables present only a limited degree of multicollinearity). However, it must be highlighted that the probability value associated to EI suggests that including this variable in the model is not significant, meaning that only the REP variable is actually able to significantly explain the variation of MADR. Overall, it can thus be stated that REP (i.e. an indicator that is usually employed as a proxy of the liveability of an area) is able to explain nearly 40% of MADR ($R^2 = 0.382$), and that more appropriate variables should be elaborated and/or found in order to improve the model.

About this point, it must be underlined that, as in the case of traditional real estate markets (Curto et al. 2015), the price variation not explained by the models highlights the potential presence of unobservable determinants contributing to prices per night. Even if Airbnb can suggest and adapt prices per night, it can be stated that hosts' behaviour shows some similarities with the one manifested by private/non-professional sellers in the traditional real estate market. In fact, both private sellers and hosts are not generally professionals operating in the real estate/hospitality field (at least in Turin), and even if they may be guided by a rational attitude, they may be nevertheless not aware of the full range of characteristics that could contribute to prices and thus propose prices that do not mirror the characteristics of the dwelling. As a consequence, unobservable factors – included desired revenues, emotional components and limited awareness of the markets- could play a role in the determination of prices. Additionally, it must be noted that characteristics of the listings that were not available in the database provided by Airdna - such as the quality of the interior design, the implementation or not of recent refurbishments, the conservation state of the building, the floor at which the property is located, etc.- could play a significant role in the case of Airbnbs. This suggests that – in order to better understand and predict average daily rates- different variables should be included in the model, as to better integrate both qualitative components related to the listing (e.g. type and style of furniture, new refurbishment, floor at which the residential unit is located, etc.) and elements associated to the digital booking experience (e.g. instant booking, cancellation policy, number and quality of photos of the listing, etc.). These analyses should consider single listings and not averages calculated for SZs, and the location variable should be included as a predictor.

If in this phase hosts' listing price behaviour seems difficult to capture, it can not be excluded that their price choices will be more predictable in the future, with the consolidation of the market and the increase of hosts' experience (e.g. performance of comparisons with other listings, critical analysis of the occupation rate registered in the previous year, etc.). Then, it can not be excluded that the growth of professional hosts could affect average daily prices too.

### *Investigating occupation rates: alternative approaches*

The second response variable considered was occupation rate (OR). All the variables described above were inserted in the model. Then, the price per night variable was included as well: in fact, if it may be considered as a dependent variable in the phase of the formulation of the price by the host, it can be considered as a predictor of the occupation rate variable, since it is acknowledged that price might highly influence consumers' decision-making process. The performance of regressions concerning OR generated models that were neither acceptable (for their t-statistic and p-values) nor able to explain the phenomena in a satisfactory way; among the variables included in the models, only the average price per night resulted significant, but its explanatory power was nonetheless very limited ($R^2 = 0.198$). As a consequence, the same considerations about the

need to include additional and different variables can be proposed again. In this case, occupation rates might be influenced by other factors related to the digital dimension (e.g. algorithms performed by the Airbnb platform) but also by the timing of the offer and demand: in fact, occupation rates are likely to be higher if the accommodation is offered when there is a higher level of demand; additionally, if a listing is put on the market for many days a year – included the ones in which the demand is low- and it is actually rent only for a limited amount of days, it is likely that its overall occupation rate is low. As a consequence, in order to better understand and predict occupation patterns, these factors should be studied more in depth. Just to make an example recalling the data about tourist flows during the 2017 Easter break, it must be noted that – on the basis of data provided by Airdna- in April 2017 both occupancy rates and number of bookings resulted particularly high. However, a comparison between the number of bookings registered monthly in 2016-2017 and the data concerning the number of tourist cards monthly sold in Piedmont in 2016-2017 seem to suggest that Airbnb users are not necessarily highly motivated by cultural visits, since a correspondence between the peaks of bookings and the peaks of number of tourist cards sold is registered only for April 2017. Even though it must be underlined that the figures concerning cards refer to the whole Piedmont and not only to Turin – which makes the comparison definitely approximate-, it could be suggested that Airbnb users may represent a tourist segment interested to a mixed use of the city, e.g. involving the enjoyment of its cultural (e.g. museums, art exhibitions and fairs, music festivals…) but also environmental (e.g. built heritage, parks…) and eno-gastronomic resources, where the experience of wandering around grasping the local atmosphere through encounters that involve all senses assumes a particular important role. However, these thoughts would require to be explored in depth through the use of appropriate methodologies and set of data, and they only represent hints for future research.

On the basis of available data, OR patterns could be nonetheless explored investigating which SZs present, on average, highest ORs, as to identify possible patterns that could be explored with further research. Results illustrate that, among the SZs that presented at least 6 listings, the ones that registered the highest ORs (i.e. around 60%) were 17-Mercato del Bestiame, 56-Mercato Ortofrutticolo, 64-Aeronautica, 29-Borgata Campidoglio and 39-Borgata Montebianco, which are generally located not in the central core of the city.

Considering that ORs may highly depend on the number of days during which the listing is put on the market and on the coincidence with periods of the year that present a high demand, other interesting suggestions may come from the descriptive statstics concerning the average Number of bookings (NB) registered in the previous 12 months and the estimated Annual revenues (AR). For what concerns NB, the top 10 SZs are the following: 21-Gasometro, 10-Borgo San Secondo, 6-Piazza Vittorio Veneto, 32-Borgata Cenisia, 17-Mercato del Bestiame, 1-Municipio, 5-Piazza Statuto, 23-Borgo Rossini, 2-Palazzo Reale and 3-Palazzo

Carignano: if we consider this variable, the situation seems thus very different, since –on average- the SZs with more bookings are located in either central or semi-central areas. Interestingly, SZs 17, 31 and 32 are located on the East-West axis of the underground and especially 17 and 5 are not too far from an important transport node such as the Porta Susa railway station; then, 21-Gasometro is in the proximity of the new campus of the University of Turin, whereas SZs 1,2,3,5,6 are generally characterised by high levels of centrality and SZ 10 is in the nearby of the Porta Nuova railway station. Similar patterns can be detected considering the average ARs: in this case, the SZs with the highest average ARs are 3-Palazzo Carignano, 10-Borgo San Secondo, 6-Piazza Vittorio Veneto, 1-Municipio, 2-Palazzo Reale, 8-Comandi Militari, 21-Gasometro, 5-Piazza Statuto, 31-Boringhieri and 4-Piazza San Carlo. Almost all of these last SZs are also characterised by the presence of entire homes/apartments that -on average- were present on the Airbnb market for the highest number of days in the previous 12 months; in this case, the ranking is the following: 21-Gasometro, 6-Piazza Vittorio Veneto, 3-Palazzo Carignano, 31-Boringhieri, 10-Borgo San Secondo, 2-Palazzo Reale, 1-Municipio, 5-Piazza Statuto, 11-Borgo Vanchiglia and 19-Piazza Nizza.

### *Further considerations: the Airbnb listings density variable*

Then, as a matter of comparison, it was decided to explore through scatterplots also the relationships between the density of the listings and a selection of variables, i.e. REP, BHD and FBD but also the distance of each SZ from the centroid of the central SZ04 (Figure 69).
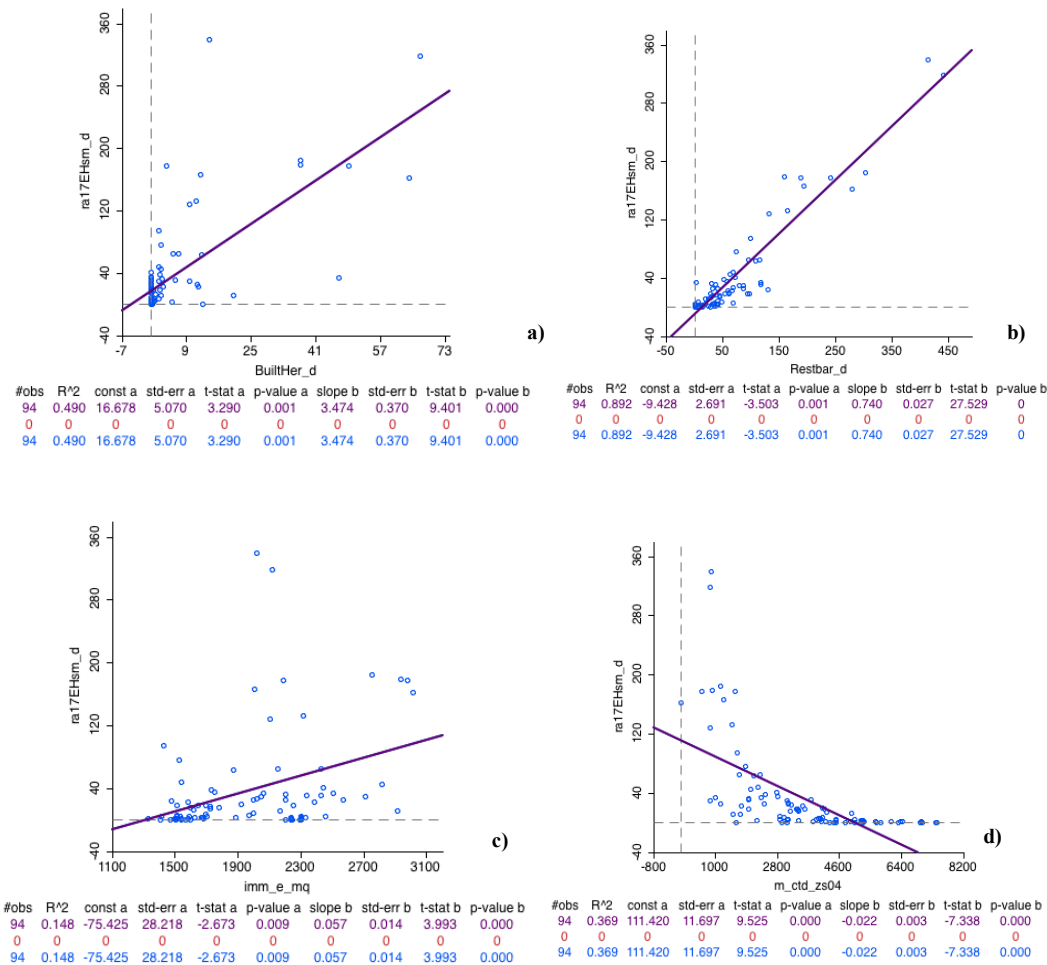
**Figure 69**. Scatterplots considering the density of Airbnb listings in SZs (y axis) and: a) density of built heritage resources; b) density of businesses devoted to the administration of food and/or beverages; c) average real estate listing prices; d) distance from the centroid of SZ 04
(*Source*: author's elaboration)

Results highlight that a certain positive linear relationship exists between the density of Airbnb listings and the BHD variable, but especially with the FBD one. The analysis of figure 69 c) suggests that Airbnbs and real estate prices seem to follow different logics and corroborate the need to include a spatial perspective in the analysis (as performed in previous sections): for instance, real estate prices may be high in zones that present characteristics (e.g. social, environmental, linked to the unavailability of transports or to the types of buildings, etc.) that have been not particularly suitable for short-term rentals so far (e.g. hills and central residential zones with villas). For what concerns the distance from the city centre, it must be noted that the scatterplot presented in figure 69 d) suggests that the relationship between the distance and the density of Airbnb entire homes/apartments is not linear instead, and this pattern should be taken into account in future research aiming at better investigating the distance factor.

## 6.6 To what extent is the Airbnb phenomenon inter-related with long-term rental and real estate market trends?

As described in chapter 4.1, the Airbnb phenomenon may have consequences on the local long-term rental and real estate markets, favouring economic speculation, limiting residentship and compromising the social fabric. Additionally, some authors found that Airbnb listings have arisen particularly in areas affected by a greater increase in monthly rental prices, advancing the hypothesis that a connection between the two trends exists (Horn and Merante 2017). If some general considerations on the higher profitability of short-term rentals have already been made also with regard to the city of Turin (Sdino and Magoni 2018), it seems particularly important to investigate possible convenience patterns considering sub-portions of the city. Even though the adoption of SZs as units of analysis would be more effective (as evidenced by the analyses carried out in previous paragraphs), HZs will be adopted in the case of the long-term rental market and MZs in the case of the real estate one, coherently with the data provided by available sources.

Figure 70 shows the average estimated annual revenues concerning entire homes/apartments located in different HZs, together with standard deviation values and annual incomes associated to apartments of different sizes put on the rental market at facilitated conditions.
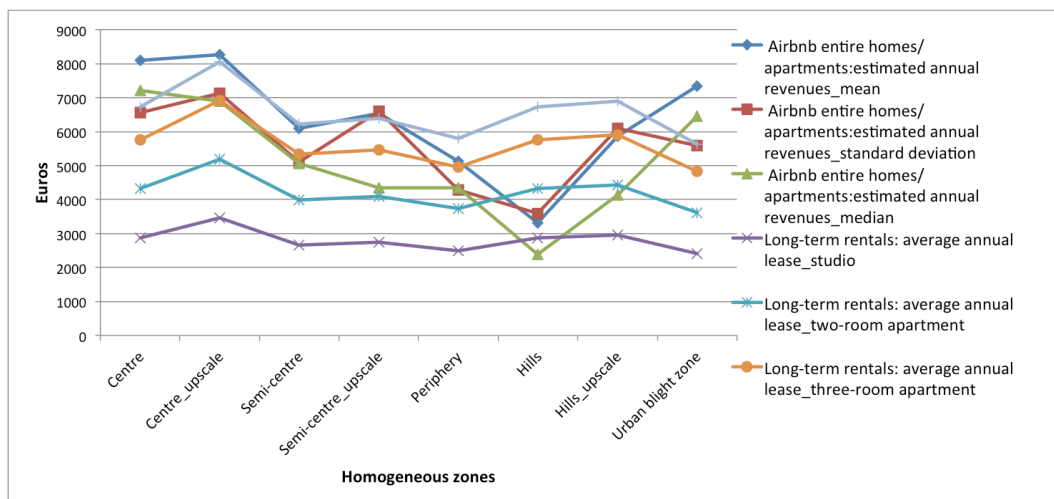


**Figure 70**. Airbnb and the subsidized long-term rental market: data concerning the different homogeneous zones.
(*Source*: author's elaboration)

The analysis of the graph suggests that –so far- short-term rentals have been particularly profitable in the central and central-upscale zones, as well as in the "urban blight" one. However, standard deviation values highlight that the internal variability is extremely high: further analyses taking into account not only the amount of days during which the apartments are put on the market but also

qualitative elements of the accommodations– e.g. the furniture style, the occurrence of recent renovation works, the historicity of the building, the presence of an elevator and the vicinity to public transports- will be needed to better understand the relationship between the offer and demand side.

However, it must also be underlined that these results should be interpreted with a caveat: in fact, it can not be excluded that some hosts might have promoted their accommodations via multiple digital platforms (e.g. websites addressing people looking for longer rentals of entire homes/apartments, systems focusing on luxury houses, etc.) according to their goals, needs and preferred targets; as a consequence, the results presented here are an indicator of the success and performance of the accommodations for users of the Airbnb platform[165].

Finally, the comparison between average Airbnb annual revenues and long-term rentals in the different homogeneous zones (Città di Torino, 2016) suggests that short-term rentals are particularly profitable for small residential units, which are indeed the most frequent type of lodging existing on the short-term rental market. However, further analyses considering both the leases of the free private rental market and the revenues generated by the short-term rental of residential units of certain dimensions could describe the phenomenon with a greater level of detail. In general terms, the performance of a regression considering the density of Airbnb listings active in late 2017 (dependent variable) and the percentage variation of monthly rates in the period 2010-2017 (indepenedent variable) highlighted that a linear regression model is not able to explain the relationship between these two variables ($R^2$ = 0.136). However, it is interesting to note that the Urban blight zone, which registered the highest density values, was the only one which manifested an increase of monthly leases. On the contrary, the central area – which is related to the second highest density of Airbnb listings- was interested by the most considerable decrease (in percentage) of monthly leases.

Then, on the basis of the data presented in Table 14, it is possible to state that the Urban blight zone is not only characterised by high density values of Airbnbs and high profitability of short-term rentals but it is also the HZ that has experienced an increase in monthly lease rates (at least for what concerns the subsidised rental market). Central and central-upscale areas have been interested by a decrease of monthly rates instead, making the connection between short-term rentals and long-term rentals place-specific and not generalizable. However, it will be interesting to monitor the same variables in the future, since data 2010-2017 are only partially able to photograph the possible influence of Airbnb, since – as described- this phenomenon has started to spread in 2015; additionally, the free rental market might be more able to reflect interrelationships too.

For what concerns the real estate market, a generalised correlation between the density of Airbnb listings existing at the end of 2017 and average real estate

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[165] At the current stage of research it is not possible to estimate the influence of Airbnb algorithms on booking rates of different listings, instead.

list prices (used segment) seems not to be present instead. More precisely, the scatterplot between the variables "density of Airbnb listings active in late 2017" and "2010-2017 list price difference (%)" pointed out that the relation between the variable is almost not existent; however, the visual exploration of the points of the scatterplot suggests interesting considerations (Figure 71).

06-Castello (indicated with the letter F in the scatterplot) and 17-Spina 2 Politecnico (G) are the only Microzones that have experienced an increase of their real estate values in the period 2010-2017, but for their intrinsic characteristics and for the functions associated to them (public and related to education and innovation, respectively) they have not been interested by the Airbnb phenomenon. 02-Carlo Emanuele (D) is the MZ that has manifested both a low depreciation of real estate values and a high density of Airbnb listings, whereas 10-San Salvario (A) distinguishes itself for a reltively low depreciation of real estate values but especially for the very high density of Airbnb listings. 05-Garibaldi (C) and 12- San Secondo (E) share some characteristics (high Airbnb density values and median depreciation rates), whereas 20-Porta Palazzo (B) has experienced a deep depreciation of real estate values and the establishment of a great number of Airbnbs.



| #obs | R^2 | const a | std-err a | t-stat a | p-value a | slope b | std-err b | t-stat b | p-value b |
|---|---|---|---|---|---|---|---|---|---|
| 40 | 0.021 | 110.592 | 37.768 | 2.928 | 0.006 | 1.323 | 1.468 | 0.901 | 0.373 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | 0.021 | 110.592 | 37.768 | 2.928 | 0.006 | 1.323 | 1.468 | 0.901 | 0.373 |
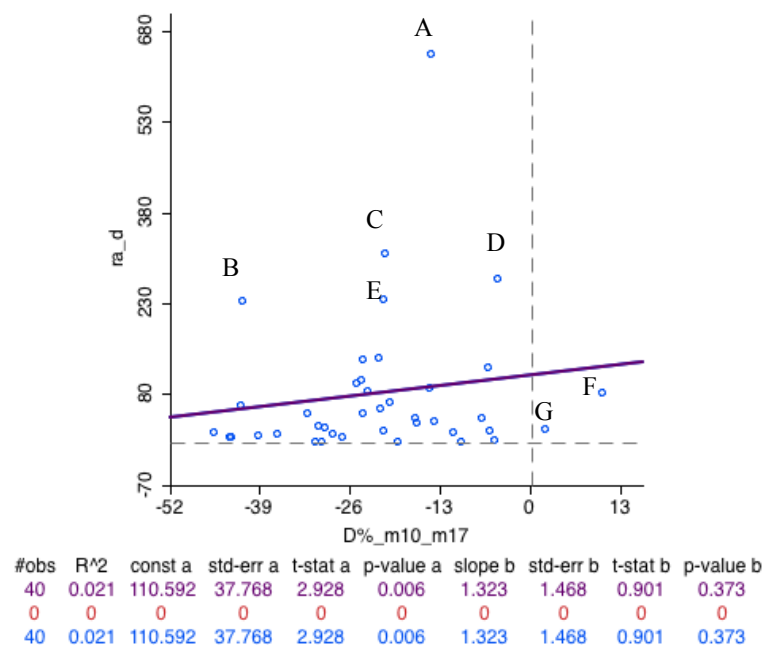
**Figure 71**. Density of Airbnb listings active in late 2017 and percentage variation of real estate values (2010-2017) in Turin's MZs.
(*Source*: author's elaboration)

Even though Airbnb annual revenues depend on demand trends and also on the characteristics of competitors, whereas leases usually represent a constant and middle-to-long term source of income, short-term rentals could overall represent a phenomenon influencing the real-estate and long-term rental markets, and a fundamental role will be played by the flows of tourists and business travellers that will be attracted by the city in the near future.

Finally, some considerations about the possible relationships and competition between short-term rents and the real estate and long-term rental markets can be made in light of the dimensions of the residential units involved in these markets. In fact, as described in paragraph 5.4.2, small apartments are the most frequent type of residential units exchanged on the Turin's real estate market; then, data presented in paragraph 6.2 have pointed out that studios and apartments with one bedroom are the most frequent kind of listing existing on the short-term rental market; as a consequence, if these data are combined with what described above, i.e. that small apartments are the ones that usually generate the highest revenues, it is possible to advance various possible scenarios for the future. Since the acquisition of small apartments is a profitable investment strategy, it is likely that the competition for this type of residential unit will increase in the future: in fact, both actors willing to buy these units for investment and the ones desiring to acquiring them for inhabiting them could compete for the same residential units; this pattern could cause an increase of prices especially in central and semi-central zones and, in the long run, even a modification of the destination of use of some neighbourhoods. However, the profitability linked to short-term rentals could also positively stimulate overall real estate trends, contributing to the increase of the amount of transactions that will occur. With the possible saturation of the market in central areas, it can then not be excluded that a revitalisation of the market could interest also those areas that have not been favoured by the market so far – e.g. for poor environmental conditions- but that are nonetheless conveniently located at a walking distance from attractive areas of the city or that are well connected with them thanks to the underground or other public transports. However, in order to better understand current trends and make forecasts, observations regarding the residential stock of Turin at an intra-city level should be included in the analysis and could represent a further step of research.

## 6.7 Interpreting short-term rentals in Turin: towards "accommodification"?

The integration of the evidence emerged by the analyses with current theories on gentrification and the results highlighted from previous empirical studies carried out for the city of Turin seems to suggest that a peculiar process is currently taking place in some residential neighbourhoods of the city.

In concise terms, this process could be defined as *"accommodification"*. This expression should be considered as a concept incorporating the words "accommodation", "commodification" and "(to) accommodate", followed by the suffix *–cation*.

The word *"accommodation"* refers to the new function that some private lodgings are currently assuming, i.e. becoming places that temporary visitors can rent -generally for short periods- via digital peer-to-peer accommodation systems.

The verb *"to accommodate"* refers firstly to the owners of the lodgings, who can take advantage of the new economic opportunities enabled by ICT and by the growth of urban tourism and new urban tourism to make profits and to accommodate their (new) needs, being economic, personal, familiar, or related in other ways to their current stage of life. In fact, gratification may occur through the direct spending of the money that stems from the short-term rental activity (which can be employed to satisfy various and immediate needs), but also through the possibility of relocating (and satisfy new needs such as larger space, greater privacy, proximity to relatives or to strategic spots) while keeping not only the ownership of the property but also access to it and to revenues. Even though the phenomenon of multi-listings hosts exists and it is undeniable that in many cases short-term rentals have become a specific investment strategy, the last mentioned process might be particularly applied to ex-gentrifiers. In fact, the literature shows that, after some years of residency in the gentrified neighbourhood, gentrifiers frequently manifest the desire or the necessity to relocate (due to intolerance to night noise, smallness of the residential unit…): if before the urban tourism and ICT era relocation could be mainly combined either with the selling of the property or with a long-term rental solution, in the new digital and cosmopolitan era a further option is represented by short-term rentals. As a consequence, short-term rentals can be considered as a new function that the residential unit assumes in its life cycle in relation to the cycle of life of its owner. As underlined in other paragraphs, even though short-term rentals may present some risks, the benefits stemming from them can be multiple, included the maintenance of the access to the property and the obtainment of a profitability that –in presence of an adequate demand curve- may be higher than the one related to long-term rentals. The retention of the property in owner's hands also entails that possible decisions about longer-term end uses of the property itself are postponed, and it can not be excluded that they might be converted into new residencies for the owner or other members of his/her family once new conditions and needs emerge. As a consequence, it might be advanced that short-term rentals should be considered

not only *temporary accommodation* solutions for tourists and visitors in general but also – in owners' perspective- as *temporary end use* solutions. In this sense, the word "accommodation" could refer to the residential unit too, since it is accommodated for a new –and maybe temporary- use.

The word *"commodification"* refers to the transformation of the private and intimate space (the house) into a place that can be easily rent out for profit, even on a need-basis. The concept can be extended to the neighbourhood too, implying that the resources of a given urban area are exploited for their functionality (e.g. access to transports, availability of shops and services, vicinity to urban amenities), regardless of the pre-existing social bounds, social fabric and local identity. In this sense, commodification can be applied both to hosts – that commodify their property and neighbourhood- and guests – who may use both the property and neighbourhood in a commodified way, i.e. without paying particular attention to the deeper characteristics of the area-.

Finally, the suffix –*cation* indicates that the described phenomenon is a process.

Whereas in "gentrification" the accent was on "gentry", i.e. on the socio-economic and cultural characteristics of the new comers, in the "accommodification" concept stress is put on the new – or at least hybrid, partially different- functions that single residential units or neighbourhoods as a whole take on through the process. In fact, whereas the gentrification process – at least in its original meaning- involved the substitution of people belonging to different social classes, in the case of the "accommodification" process the new, temporary comers are likely to belong to the same middle class – or even cosmopolitan urban tourism class- of the owners. If this might apply to the "middle class", this might be true also for other segments of society. In fact, the literature has noted that a certain degree of affinity usually exists between hosts and guests, and consequently it is likely that the new comers (guests) are to a certain degree similar to the owners (hosts).

Considering that it has been pointed out that current urban tourism consumption patterns are similar to the ones performed by tourists in their everyday life, and that they are also hardly separable from the ones performed by permanent residents, it is likely that to some extent the neighbourhoods interested by accommodification really benefit from it in economic terms; however, as already noted by other authors, negative consequences may concern the social sphere, since less residents may implicate less social bonds, both in qualitative and quantitative terms.

In the specific case of Turin, the areas that have manifested so far a higher density of properties listed on Airbnb are zones that were interested by gentrification, such as the Quadrilatero Romano and San Salvario. On the basis of the analysis of the available data and for the reasons explained in the above paragraphs, the accommodification process might thus be interpreted as the next

phase of the gentrified neighbourhoods of the city, following a process facilitated by the combination of ICT, urban tourism and gentrifiers' cycle of life.

Then, considering the degree of spatial correlation existing between the density of Airbnb listings and the density of bars, restaurants etc., some reflections on possible future scenarios can be advanced. In fact, the presence of tourists may induce the opening of new businesses devoted to the administration of food and beverages, since these activities might be more remunerative than other types of businesses; however, it can not be excluded that the substitution of local shops of various categories with these types of businesses may further encourage the adaptation of residential units into short-term rentals, since the unavailability of services and the cons related to the *movida* may further disincentivize permanent residentship in favour of temporary residentship.

# Conclusions, limits of the study and future steps of research

This study has tried to investigate the relationships occurring between Turin's built heritage resources and Airbnb listings, particularly adopting a spatial perspective. More precisely, the research has tried to explore which are the socio-economic effects that can be indirectly engendered by built heritage resources in the digital economy era and to enrich the debate about the effects of digitally-enabled short-term rentals on urban contexts and historic centres in particular.

In summary, the analysis of the spatial distribution of Airbnb accommodations throughout Turin - by the means of visual exploration and ESDA techniques- has pointed out that short-term rentals are particularly located in residential neighbourhoods situated in the proximity of the city centre, which is characterised by a high density of built heritage resources, commercial activities, services and also by a high degree of accessibility. These results seem overall to confirm also for Turin – i.e. a large city of Northern Italy which has only relatively recently emerged as a tourist destination – a distribution pattern already highlighted for leading European cities, with particular regard to Berlin. In fact, also in these cases Airbnb listings are not usually located in spatially and socio-economically disadvantaged areas – as the sharing economy paradigm would suggest- but rather in the proximity of the most attractive centre/centres of the urban realm. These considerations, combined with the fact that the vast majority of the accommodations available on the short-term rental market is represented by entire homes/apartments and not by single/shared rooms, corroborate the research line which interprets Airbnb as an entrepreneurial initiative that may contribute both to the pressure on historic centres and to the modification of the nature of specific areas of cities, i.e. favouring the allocation of residential units to short-term rentals rather than to permanent residency, the alteration of the real estate and long-term rental markets but also the change of the social fabric. If the substitution of residents with tourists has been defined in the literature as a "*touristification*" process, the specific attributes of the neighbourhoods mainly interested by Airbnbs in Turin incentivate to read the phenomenon through the lense of an original interpretative key, summarised with the neologism "*accommodification*". In fact, the research has pointed out that some of the neighbourhoods that have been mainly interested by short-term rentals are either

areas that have undergone regeneration processes or that were interested by gentrification in the recent past. Even though some authors refer to short-term rentals as a reality that contributes to gentrification, with the *accommodification* concept it is suggested that short-term rentals may represent instead –at least in some contexts- the next phase of gentrification processes: the changing conditions of gentrifiers (e.g. enlargement of the family, desire to settle out of town….) and of the neighbourhood (e.g. accentuation of the nighlife scenario), together with the growth of tourism and of a general attitude towards mobility, may in fact act as catalysts for change. Within this framework, residential units become lodgings that host temporary visitors (*to accommodate = to host, to welcome*) but that at the same time satisfy the new needs felt by owners due to their own (and to their neighbourhood's) life-cycle (*to accommodate = to fit, to adapt*). Given that, with a minimum level of demand, short-term rentals are a particularly profitable solution -especially if the residential units are small and are located in the proximity of spots appreciated by tourists-, the hosting activity may more and more become a convincing and convenient alternative to a binding long-term rental or to an unfavourable – given the current level of depreciation of the real estate market- selling of the property.

As evidenced by the literature review and by first-hand data analysis, Turin is one of the Italian cities that presents the lowest rates of multi-listings hosts: this means that, up to now, the short-term rental activity has been mainly conducted as an individual entrepreneurial initiative and not as a massive investment operation. However, it can not be excluded that also in this city – as already happened in many contexts worldwide- the high profitability of short-term rentals will induce real estate actors to make investments in this sector, acquiring at favourable conditions apartments to be specifically devoted to short-term rentals. Then, it can not also be excluded that the current depreciation of the real estate market, combined with the persisting economic crisis, will induce private citizens too to buy properties to be devoted to temporary stays. The conduction of short-term rentals as an effective strategy to integrate the yearly income could then stimulate some residents currently living in the proximity of the city centre to transform their current house into an accommodation and to move in cheaper neighbourhoods. These last scenario is not totally unrealistic if we consider that the massive presence of tourists favours the conversion of a variety of every-day life commercial activities into businesses that are mainly tourist-oriented (e.g. bars, wineries, restaurants, shops distributing local products…), impoverishing the services available for residents and at the same time possibly increasing the impacts related to an intense nightlife. Considering that the number of tourists seems to be one of the most reliable predictors of the future increase of Airbnb listings, it must be said that an important role in the transformation process of the city will be played not only by private actors but also by public investments and by the policies pursued by the public administration: in fact, the ability to make Turin a more and more attractive destination (by multiple points of view) will indeed influence future scenarios. The enhancement and diversification of the cultural, eno-gastronomic, event-related, environmental and outdoor offer,

together with the improvement of the physical environment and of the overall liveability of the city, will be in fact fundamental to encourage forms of temporary residentship, being them related to leisure or to other main goals (e.g. work mobility, study, etc.). In this sense, investments in regeneration projects aiming at creating multiple city-centres will be particularly important too, as to facilitate the sustainable growth of the city and at the same time contain the possible pressure on the historic centre and limit the depauperation of the social fabric. In fact, at this stage it seems that - contrary to what promoted by big digital economy players- especially economic actors operating in central areas benefit from the spread of digitally-enabled peer-to-peer accommodation systems.

In the last few years, the Airbnb phenomenon has definitely increased, assuming the forms described above; however, it must be noted that Turin is one of the cities that registers the lowest rates of Airbnbs (calculated either on the basis of the resident population or on the surface of the Municipality). This thus seems to suggest that up to now short-term rentals have represented an opportunity for growth rather than a threat, especially for a city that has set among its objectives the diversification of its hospitality offer.

With respect to the research questions outlined in Section 4.5, the following points provide more details on the findings of this piece of work:

*a)* The distribution of Airbnb listings throughout Turin is not random, but it is rather concentrated in central and semi-central areas of the city; these urban portions are characterised by the presence of built heritage resources, services and commercial activities, and also by a high degree of accessibility. The application of ESDA techniques to the analysis of the density values of short-term rentals in homogeneous spatial units of analysis (i.e. statistical zones) has pointed out that spatial autocorrelation patterns exist: whereas central areas show High-High correlation patterns, the most peripheric (and socio-economically disadvantaged) ones manifest Low-Low trends. Spatial autocorrelation was identified also when calculating the Bivariate Local Moran's I between the density of Airbnb listings and the density of built heritage resources in statistical zones. Then, the analyses performed considering the resident population pointed out that the statistical zones characterised by high population density values do not necessarily show high density values of Airbnb listings, suggesting that the relationship between these two variables is not regular. An interesting correlation was found between the density of Airbnb listings and the percentage of inhabitants having at least a high school degree instead (education index); given that this variable is frequently considered as a proxy for socio-economic conditions, it is possible to advance some considerations. Firstly, it is remarkable to note that Airbnb accommodations are located in areas also favoured by educated – and likely in good economic state- people, which is a fact that indirectly confirms the overall quality and desirability of the zones. Secondly, it can not be excluded that the hosts renting their whole apartments through peer-to-peer accommodation systems are (at least relatively) well-to-do inhabitants that own a second home in those areas and that

have deliberately chosen to use short-term rentals as a revenue strategy allowing to get higher profits than long-term rentals while maintaining access to the property. In light of these reflections, it is thus possible to affirm that in Turin, as in other urban contexts, Airbnb is only partially used by disadvantaged segments of the population as a source of additional income, whereas it is an entrepreneurial initiative that allows privates to make revenues from their under-used real estate properties (which may be particularly welcome especially in a time of economic crisis and uncertainty); this statement is also supported by the fact that the vast majority of listings is represented by entire homes/apartments. Then, the analysis of the Airbnb distribution from the appearance of the platform onwards has pointed out that the areas mainly affected by the phenomenon since the very beginning were the ones located in the heart of the city or in its immediate surroundings, suggesting that both the physical and socio-economic characteristics of the areas may have played a role; given that, with the passing of the years, parts of the cities located between these areas have started to be more interested by short-term rentals, it could also be advanced that not only diffusive but also imitative processes may have taken place, as it usually happens -for instance- during gentrification. Even though both hotels and Airbnb accommodations are mainly located in the city centre, short-term apartments seem more able to permeate areas conveniently located in the proximity of the city centre and having a residential or at least mixed vocation.

*b)* The simple and multiple regressions performed with the aim of identifying linear relationships between certain characteristics of statistical zones (included the presence of built heritage resources) and dependent variables such as average Airbnb daily rates and occupation rates were not able to satisfactorily explain neither offer nor demand patterns. On the one hand these results seem to suggest that the inclusion in the model of intrinsic characteristics of the residential units (e.g. coding of qualitative aspects such as the style of the furniture, presence/absence of renovation works, etc.), of management aspects (e.g. cancellation policies, instant booking option, etc.) and of elements related to the digital experience (e.g. number of photos, degree of trust fostered by the host, etc.) could lead to better results, as evidenced by the literature; on the other one these results seem also to suggest that, even though Airbnb provide reccommendations and suggestions on daily prices, it is possible that hosts manage their listings according to personal –and not professional- logics; additionally, it must also be noted that the algorithms implemented by the Airbnb platform probably play a role that at the current stage of research is difficult to estimate. Moreover, listings are available on the market for a different number of days per year and in different periods, and these inconsistencies may affect the relative success of the properties too. Given these limitations, a more satisfactory overview of the offer and demand patterns – also in relation with the spatial dimension- has been provided through the means of descriptive statistics and the analysis of choropleth maps: in general terms, central and semi-central areas are the zones that not only present the highest density of Airbnb listings, but that –on

average- obtain the highest number of bookings per year and the highest annual revenues, suggesting that areas conveniently located in the proximity of the most attractive spots of the city are favoured both by the offer and demand.

*c)* The comparison of the average annual revenues generated by long-term rentals with the ones stemming from the Airbnb hosting activity has highlighted that short-term rentals are a particularly profitable investment solution, especially if applied to small residential units located right in the city centre or in its proximity. Interestingly, it was also found that short-term rentals are a particularly advantageous strategy in central neighbourhoods that present problematic environmental and socio-economic conditions: in fact, if on the one hand these areas are not greatly favoured for permanent residency, on the other one their proximity to the most historic and attractive areas of the city make them appealing for temporary stays, since possible disadvantages and uncomfortable conditions are compensated by the proximity to the city centre. Whereas real estate prices and long-term rental rates are generally low in these areas, Airbnb prices per night are higher than the ones registered in zones usually considered more prestigious instead, meaning that –with a minimum level of demand- the short-term rental strategy becomes greatly rewarding. Then, it must also be noted that these accommodations may particularly meet the desires and preferences of the main target audience of the platform, i.e. tech-savvy young people willing to authentically explore places at reasonable costs. Even though the statistical zones that have been more interested so far by the Airbnb phenomenon are not necessarily the ones that have registered an increase of monthly lease rates, it must be noted that the Porta Palazzo area – which is still described by some sources as an urban blight zone- has actually experienced both an increase of Airbnb listings and of monthly rates of long-term rentals. Even though the relationships between the change of real estate values, the variation of long-term rentals rates and the density of Airbnb listings in sub-portions of the city have not been regular so far, the monitoring of these variables in the near future seems worth-exploring: in fact, the intensification of the phenomenon may induce a more visible effect on the long-term and real-estate market; additionally, these two last markets may show effects with a certain delay, i.e. over a longer period of time. Additionally, it must be noted that, while it is undeniable that the Airbnb phenomenon has recently increased in Turin too, the percentage of residential units interested by these short-term rentals amounts to about 0.7%; a percentage that-according to some figures available in the literature- rises to 2.8% when considering only the housing stock of the city centre: as a consequence, more noticeable effects could emerge with a further growth of the phenomenon and with reference to the areas of the city where the density of these lodgings is higher (e.g. San Salvario). These areas could also experience a substitution of permanent residents with temporary residents, influencing also the types of shops and services available in historic zones of the city.

In order to take the research questions presented in point *a)* to a next level, it would be particularly beneficial to investigate the relationship between the Airbnb phenomenon and the number and characteristics of the buildings existing in the various statistical zones (e.g. number of residential units, prevalent building period, architectural style, dimensions of the buildings and of the single residential units, etc.). These analyses could be performed after getting access to data either collected by the *Osservatorio del Mercato Immobiliare* managed by *Agenzia delle Entrate* or registered by the local cadastre (even though some privacy issues may arise): they could be fruitful not only to detect which are the types of buildings more interested by short-term rentals (and indirectly not favoured for permanent residency) but also to make forecasts on the development of short-term rentals in the city. These forecasts should particularly take into consideration variables such as the local residential stock, the number of tourists of the previous year and the attendance of museums and other cultural institutions: if combined with information on the local residential stock, data about Airbnb listings would particularly allow to create new indexes (e.g. "short-term rental index", "accommodification index" and so on); overall, the number of tourists could be used as a predictor for the future expansion of the Airbnb phenomenon, whereas the number of vistors/tourists attending museums and other cultural venues located in different statistical zones of the city could be used to elaborate a "cultural attractiveness" index.

Additionally, some considerations concerning the technology adoption curve, the diffusion of an "Airbnb mental habit" and the evolution of general economic conditions should be performed too. In fact, even though a certain stabilisation of the phenomenon has been envisioned, theoretical limits to the spread of short-term rentals are represented only by the availability of residential space, technology skills, a certain attitude towards entrepreneurial economy, local regulations and the presence of a certain level of demand.

Then, more detailed investigations could be performed analysing by a qualitative point of view the information (i.e. text and images) provided by hosts on the Airbnb platform and concerning the characteristics of both the buildings and of the residential units: in fact, this approach would allow to identify –for instance- whether the historicity of a building is valued and promoted by the hosts and whether renovation works were recently performed. This investigation would allow both to better understand the economy correlated to the short-term rental sector and to evaluate to what extent buildings with certain characteristics are valued by the offer and demand.
Taking into account a larger variety of intrinsic characteristics would also enable the elaboration of more refined regression models better explaining which are the elements that contribute the most to the offer and demand patterns (see research questions outlined in *b)*.

Given the results and considerations emerged from point *c)*, a logical progression of the research would be the conduction of in-depth analyses regarding areas such as San Salvario and Porta Palazzo: these investigations could

take advantage both of data-mining procedures concerning the real estate and the free long-term rental market and of qualitative approaches such as interviews to stakeholders (e.g. hosts, guests, inhabitants of the neighbourhoods, business owners, etc.). Interviews could be performed to better investigate patterns of change - also in relation to the *accommodification* hypothesis- and also to map guests' consumption patterns, as to calculate multiplier coefficients. Then, image and text analysis techniques could help shed light on the characteristics of guests/hosts and on their perception of the listings and of the urban areas involved.

By a methodological perspective, the identification of built heritage resources and other urban amenities could be enriched taking into account the spots listed on online travel platforms (e.g. TripAdvisor), as to better combine the expert approach with the tourist perspective. Then, procedures aiming to give different weights to the identified resources could also be implemented: criteria at the basis of the weighting could be represented – for instance- by their historic-artistic quality, the appreciation they receive from tourists or even their contextual characteristics (e.g. being a single monument/building or an ensemble of multiple items). Additionally, further approaches aiming at better weighting built heritage resources could entail the calculation of the surfaces of the buildings and/or of the length of their façades, with particular regard to the ones that are hardly excludible from the enjoyment of the public and that thus generally contribute to the local environmental quality. The interpretation of the results stemming from these approaches in light of other urban data (e.g. width of statistical zones, surface of built areas, number of buildings in a given zone, etc.) would also allow to create specific indexes (e.g. "built heritage index", "historical urban fabric index" and so on), to be interpreted on their own or to be possibly integrated into further analyses.

As evidenced in relevant sections, a limit of the research is also represented by the fact that the majority of the socio-economic data included in the analyses date back to 2011, i.e. to the last census performed by ISTAT. As a consequence, in order to make interpretations more accurate, the inclusion of more updated figures would be recommended: it is likely that this will be feasible in the near future, since at the end of 2018 ISTAT has started to make continuous data collection campaigns on selected samples of the population.

Overall, this dissertation has tried to provide satisfactory answers to the research questions, but at the same time - coherently with an approach that incorporates exploratory spatial data analysis techniques- it has also found empirical evidence that leads toward the conduction of further investigations. Given that short-term rentals are deeply interwoven with the evolution of urban contexts, additional analyses would benefit from the integration of different types and sources of data, as the ones listed above. These approaches would allow not only to better identify which are the actors involved and to understand socio-

economic changes, but also to estimate the economic impact enabled by digital platforms and to determine whether these systems are able to extend and diversify the types of targets visiting evolving urban contexts and valuing assets such as built heritage resources.

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Abbonamento Musei Torino Piemonte: https://piemonte.abbonamentomusei.it/L-Abbonamento/Tariffe

Agenzia delle Entrate (reports on real estate): https://www.agenziaentrate.gov.it/wps/content/nsilib/nsi/schede/fabbricatiterreni/omi/pubblicazioni/rapporti+immobiliari+residenziali/archivio+rapporti+immobiliari+residenziali

Airbnb (business ready option): https://www.airbnb.it/work

Airbnb (cancellation policies): https://www.airbnb.it/home/cancellation_policies#flexible

Airbnb (charges and payments): https://www.airbnb.it/host/homes?from_nav=1

Airbnb (fast facts): https://press.airbnb.com/fast-facts/

Airbnb (France):  https://www.airbnb.fr/

Airbnb (Italy): https://www.airbnb.it

Airbnb (location of the listings on maps): https://www.airbnb.co.uk/help/article/2141/how-will-my-listing-s-location-be-shown-on-the-map

Airbnb (new products): https://press.airbnb.com/airbnb-launches-new-products-to-inspire-people-to-live-there/

Airbnb (UK): https://www.airbnb.co.uk/

Airbnb brand evolution: https://all-about-airbnb.com/post/143221488726/airbnb-brand-evolution-live-there

Airbnb Citizen: https://www.airbnbcitizen.com/

Airbnb Citizen (data): https://www.airbnbcitizen.com/data/#/en/

Airbnb Plus: : https://www.airbnb.it/plus

Airbnb vs Berlin: ://airbnbvsberlin.com/

Airdna: www.airdna.co

Airdna (methodology): https://www.airdna.co/methodology

ArchitetTour App (Apple Store): https://itunes.apple.com/it/app/architettour/id1001173389?l=it&ls=1&mt=8) markets

ArchitetTour App (Google Play):
https://play.google.com/store/apps/details?id=it.studioand.architettour&hl=it

Booking.com: https://www.booking.com/index.it.html

City population: https://www.citypopulation.de/

Codice dei Beni Culturali e del Paesaggio:
http://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dat
aPubblicazioneGazzetta=2004-02-
24&atto.codiceRedazionale=004G0066&elenco30giorni=false

Decreto del Presidente della Repubblica 138/98:
http://def.finanze.it/DocTribFrontend/getAttoNormativoDetail.do?ACTION=getSommari
o&id={CE130656-7850-4531-9B95-F17CC19790C4}.

ESRI:
http://resources.esri.com/help/9.3/arcgisdesktop/com/gp_toolref/spatial_statistics_toolbox
/modeling_spatial_relationships.htm

Geoportale del Comune di Genova:
https://mappe.comune.genova.it/MapStore2/#/viewer/openlayers/1000000789

Geoportale del Comune di Torino (open data):
http://geoportale.comune.torino.it/geocatalogocoto/?sezione=catalogo

Geoportale del Comune di Torino: http://geoportale.comune.torino.it/web/

Inside Airbnb: http://insideairbnb.com/about.html

InsideAirbnb: www.insideairbnb.com

IRES Piemonte: https://www.ires.piemonte.it/index.php

Live like a local in Venice (video): https://www.youtube.com/watch?v=pXvpfyfF_kg

Open Street Map (Turin):
https://www.openstreetmap.org/relation/43992#map=15/45.0739/7.6800

Osservatorio Culturale del Piemonte (Reports):
http://www.ocp.piemonte.it/report_annuali.html

Osservatorio Immobiliare della Città di Torino (Microzones):
http://www.oict.polito.it/microzone_e_valori/cosa_sono_le_microzone.

Osservatorio Immobiliare della Città di Torino (Microzones and their values):
http://www.oict.polito.it/microzone_e_valori

Piano di Governo del Territorio (Milan): http://www.pim.mi.it/pgtonline/

Piemonte Marketing (Statistics): http://www.piemonte-turismo.it/documenti/market-
research-statistics/rapporti-statistici-dei-flussi-turistici-in-piemonte/

Streeteasy (degree of safety of USA's neighbourhoods):
https://streeteasy.com/blog/safest-areas-nyc/

Tom Slee (data on Airbnb): http://tomslee.net/category/airbnb-data

TripAdvisor: www.TripAdvisor.com

Turismo Torino e Provincia (Tourist cards): https://www.turismotorino.org/en/your-
trip/our-cards/torinopiemonte-card/tariffs

Visit Copenhagen: https://www.visitcopenhagen.com/wonderful-copenhagen/copenhagen/who-we-are

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