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# Debate on regulation and professionalisation in the short-term rental housing market

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## ABSTRACT

Professionalisation in accommodation platforms is changing the short-term rental market worldwide. During the past decade, till today, Airbnb has been the leader in this economic sector, its spread has been a central issue in urban dynamics related to the several discomforts it has caused in cities. Recently, the professionalisation of its users has popped up as an additional issue to be dealt with. The professionalisation process has changed the internal structure of Airbnb from a peer-to-peer platform to a business-to-consumer one. Despite the growing attention to this trend, regulatory frameworks across cities still do not have policies to deal with this specific issue. This article proposes a data-driven methodology to identify the different economic approaches of professional hosts for contributing to the debate on professionalisation in short-term rental studies and provide new insights into the regulation debate. The proposed methodology consists of a cluster analysis applied to 2019 Airbnb data (from the AirDNA dataset) in eight Southern European cities: Lisbon, Porto, Madrid, Seville, Rome, Naples, Athens and Thessaloniki. The results highlight four clusters that describe different economic approaches of Airbnb hosts recognisable in each city. The findings offer a novel and clear entry point to understand the professional hosts' economic strategies, which can inform policies to regulate their market, as well as advancing knowledge in the field of critical geographies of housing.

## 1. Introduction

The professionalisation process in hospitality platforms (Bosma, 2022) has received growing attention in the debate on the short-term rental (STR) market. Many scholars have investigated the actors involved in the process of professionalisation. Corporate hosts, multi-listing hosts, and commercial-oriented hosts are some of the many terms used to identify them (Clancy, 2020; Cocola-Gant and Gago, 2019; Deboosere et al., 2019; Grisdale, 2021; Katsinas, 2021; Wachsmuth and Weisler, 2018). The literature has covered many aspects of the professionalisation process such as the actors involved, their way of functioning, and the strategies through which they lead the market. However, such growing attention has not influenced the regulation sphere so far, with professional hosts (PH) remaining in a regulatory grey area. Policies tailored to regulate PHs' economic behaviours are compelling due to their leading role in short-term accommodation markets worldwide.<sup>1</sup> The article is framed within this debate by questioning the lack of attention to professionalisation in the STR market in urban regulations and proposing a methodology that could help

disentangle PH's economic approaches. This paper contributes to the debate over the professionalisation of hosts in accommodation platforms to add evidence to inform and structure tailored regulatory frameworks. The platform under scrutiny is Airbnb, which represents the main channel that assumed a prominent role as a commercial intermediary for accommodation professionals. Far from being the "sharing economy poster child" (Baum, 2017: 40), within years, Airbnb has experienced an internal modification of the ecology of its users. Without changing its formal mission and statements of equal accessibility in the STR market, today, the platform is ruled mostly by professional hosts, rather than peers. In the last few years, research drawing attention to this broader trend of differentiation among Airbnb hosts has proliferated (Cocola-Gant et al., 2021a, 2021b; Deboosere et al., 2019; Dogru et al., 2020; Gil and Sequera, 2020).

The progressively commercial-oriented composition of the hosts has various implications. On the one hand, in the internal market generated through Airbnb, the majority of profits have been absorbed by PH at the expense of the non-professionals. Offers such as listings settled as hotel rooms, dynamic pricing strategies and additional professional services

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<sup>1</sup> Although this article focuses on the STR market, the trend of professionalisation is recognised in other housing rental sectors too, and often related to the wider processes of housing financialization (Beswick et al., 2016; Fields, 2014, 2018; Janoschka et al., 2019; Rogers, 2016; Rogers and Koh, 2017).

(cleaning, luggage storage, etc.), have made professional hosting the winning approach to gain a prominent economic role in the platform (Cocola-Gant et al., 2021a, 2021b). The economic strategies of pH strongly disadvantage non-professionals, although the latter represent the majority in the main European markets.

On the other hand, the rise of pH has several negative side effects that manifest spatially through intense urban exploitation, mostly related to an uncontrolled and unregulated management of tourism activities. Defined as over-tourism (Bouchon and Rauscher, 2019; Celata and Romano, 2022; Goodwin, 2017; Milano et al., 2019), the massive presence of Airbnb listings in cities has been recognised as a vehicle of this phenomenon (Sigler and Wachsmuth, 2020; Wachsmuth et al., 2018; Wachsmuth and Weisler, 2018). These dynamics proved to be problematic when the tourism monoculture (Caputi and Fava, 2019) absorbs other urban economies and alters socioeconomic equilibriums, activating the processes of gentrification, social displacement and spatial inequalities, as has been happening in several European cities (Amore et al., 2020; Ardura Urquiaga et al., 2020; Cocola-Gant, 2016; Cocola-Gant et al., 2021a, 2021b; Katsinas, 2021; Lestegás, 2019; Sequera and Nofre, 2018a, 2018b; Yrigoy, 2019). This is inevitably linked to the widespread housing crisis and found to be one of the causes of housing commodification, commercialisation and financialisation, which have been triggering issues like the rise of traditional rents and severe housing shortages in main touristic cities (Schäfer and Braun, 2016; Sheppard et al., 2016; Yrigoy, 2019). The professionalisation of hosts has also been recognised as a *trans*-scalar phenomenon, identifying the broad corporative structure of some of them (Cocola-Gant et al., 2021a, 2021b; Jover and Cocola-Gant, 2022).

Hence, the increasing professionalisation of hosts in the STR market is a process of primary relevance to be studied both in the internal market dynamics and in the spatial consequences that it triggers. Focusing on the figure of professional actors, academic studies have developed numerous methods to interpret the behaviours of PH. There have been attempts to define PH by the number of listings, economic indicators, or by tracing the profile of specific actors. Though all these represent valid entries in the debate, such efforts did not generate valid responses on the regulation side. Regulatory frameworks across countries suffer from a lack of consideration regarding professional hosting and this regulative void keeps aggravating the internal inequalities and perpetuating spatial exploitations. The lack of a wide understanding of the size of the PH phenomenon in the variegated panorama of STR actors has impacted the possibilities for comprehensive knowledge production concerning this spreading and impacting phenomenon. Providing additional evidence for the presence and behaviour of pH is intended to enrich and inform the debate over the shift in the internal platform composition. Such an acknowledgement aims to influence urban regulations and the management of the accommodation platforms.

This article contributes by providing a quantitative methodology based on economic and descriptive variables, which could further describe and differentiate the economic strategies of PH. The proposed methodology comprises a cluster analysis in which specific indicators (pricing, frequency, capacity and concentration) have been combined to delineate different clusters with similar economic behaviour. The analysis uses Airbnb data provided in 2019 by the commercial service AIRDNA on eight European cities, viz. Lisbon, Porto, Madrid, Seville, Rome, Naples, Athens and Thessaloniki. Although the professionalisation of hosts could be found in a variety of contexts (for example Berlin: Bosma and van Doorn, 2022; Amsterdam: Oskam et al., 2018; New York: Xie and Mao, 2019), here, Southern Europe has been chosen because of the rapid growth of its touristic sector and accommodation market.

The cluster analysis generates groups of hosts who manage their properties similarly; in this way, the dichotomy of professionals and non-professionals is being complexified, proposing a regulative methodology that bases its structure on tailored policies calibrated to specific market behaviours. By providing a more nuanced understanding of professional hosting, the findings contribute to the debate on the

management of such a phenomenon which is affecting urban dynamics severely, in particular regarding the housing sphere, through the tourism industry.

The data presented in this research are related to the period just before the breakout of the Covid-19 pandemic in January 2020, in which mass tourism was almost completely interrupted and STR platforms experienced a severe decline. Using 2019 data provides insight into the highest economic performances that PH and the STR market, in general, were experiencing at that moment. Even though at the beginning of the pandemic there were questions among scholars regarding the future of Airbnb (Dolnicar and Zare, 2020) due to the interruption of global mobility, Airbnb reacted promptly with new internal policies to adapt itself to the exceptional conditions of a pandemic (Dagkouli-Kyriakoglou et al., 2022). After almost three years, both international tourism arrivals and Airbnb's economic performance seem to have recouped their pre-pandemic levels, according to recent reports.<sup>2</sup> Therefore, the present study based on pre-pandemic data represents a valid picture of internal economic trends.

The following section provides evidence of the current debate over PH and the absence of suitable regulations to manage it across Europe. This part explains how the current debate on PH does not have an impact on the regulation side and how it is still in a regulative grey area where it could grow and flourish uncontrolled. The following section furnishes a context of the geographical area under examination. The methodology section describes the preliminary analyses and explains the construction of the cluster analysis, including the variable chosen and the methodological passage to prepare the database. The first empirical part is dedicated to dimensioning the phenomenon, classifying hosts within categories and discussing the relationship between the number of listings and annual revenues. The second part deals with the cluster analysis, highlighting the novelty of such methodology and its potential role in structuring the regulatory framework. The last section discusses the findings and the relative policy implications to synthesise how this methodology could enable the formulation of tailored regulations.

## 2. What are professional hosts and who defines them?

There is an ongoing debate on the analytical distinction between professional and non-professional hosts in academic and local government circles. The relevance of identifying the different economic approaches of Airbnb hosts is a matter of balancing the market to safeguard and regulate the urban dynamics related to the surfeit of tourist accommodations. Providing evidence regarding this differentiation could help the regulation-making process. It is hence an urgent necessity to discard the current narrative of Airbnb as a market for everyone. A recent report by the *Ethical Consumer* and the University of Manchester (Yates, 2021) denounces the activity of Airbnb financing lobbies of non-professional hosts to lobby for less strict regulations, deregulation, and a freer market, for their own benefit. This case shows the strategy of using a specific narrative to influence policies. It is hence important to provide evidential support for the counter-narrative of Airbnb as a market led by PH, describe their economic strategies and detect the actors involved.

Scholars worldwide are endeavouring to methodologically frame the issue of pH through both qualitative and quantitative studies. The main methodologies used to distinguish PH are the number of listings, the analysis of economic and descriptive variables and qualitative approaches.

Most of the studies analyse PH in terms of the number of listings they manage on the platform. Both Gibbs et al. (2018) and Li et al. (2019) refer to PH as those who manage more than one listing. Studies that

<sup>2</sup> <https://apnews.com/article/coronavirus-pandemic-business-health-travel-lifestyle-1e2cd9a366e552e5622700c5e3884bbd> [25/08/2023]. <https://www.unwto.org/news/international-tourism-back-to-60-of-pre-pandemic-levels-in-january-july-2022> [25/08/2023].

classify them by the number of listings also highlight better economic performances, compared to the single-listing hosts (Deboosere et al., 2019; Dogru et al., 2020). Li et al. (2019), for example, studied this phenomenon in Chicago from 2012 to 2013, when professional hosting was not yet prominent (PH represented just 18 % of the market); however, they found that both daily revenues and occupancy rates of property managed by PH were almost 15 % more than those managed by non-professionals. Dogru et al. (2020) analysed the activity of pH in 50 U.S. states and confirmed their domination over the market, absorbing 69 % of the overall revenues. Similarly, in New York, Deboosere et al. (2019) observed that hosts managing between two and ten listings had almost the same price per night as single hosts, but their monthly revenue was higher than 6.6 % (increasing the occupancy rate). Meanwhile, hosts with more than ten listings had a lower price per night than single hosts (-9.2 %) and an increase of 8.9 % in the monthly revenue; “These facts suggest that hosts who treat their listings as *de facto* hotels rather than opportunities for part-time ‘home sharing’ are considerably more successful in the Airbnb marketplace” (2019: 153). These scholars offered a primary classification of pH through this differentiation. However, such a classification does not consider the differences in the economic behaviour of hosts who manage two listings and those who manage more than 100; in most studies, they come under the same umbrella of pH with no further differentiation.

Another approach is to analyse the economic and descriptive variables to understand hosts’ behaviours. Gil and Sequera (2020) outlined five variables to detect professional hosts: the spatial distribution (city centre and rest of the city), type of lodging (assuming that the entire apartment is related to PH), the reserved and available days, the number of listings (single and multi-listing hosts), and the increase over time. Their accurate analysis of all these variables has the limitation of not aggregating the results and maintaining each variable separately, without triangulating the results and portraying a more complex definition of PH. Deboosere et al. (2019), on the other hand, provided a hedonic regression model combining several variables to demonstrate both the location impact and the economic superiority of professional attitude.

Other scholars (Cocola-Gant et al., 2021a, 2021b) used a qualitative methodology that consisted of isolating the companies (property managers, online travel agencies, vacation rental firms), defining their profile with desk research and using interviews to understand their business behaviour. Qualitative methodologies represent an accurate approach to understanding the economic strategies of pH but are limited in the identification of the whole entity of the phenomenon. Katsinas (2021) used a mixed methodology (both quantitative, with data analysis and qualitative, with interviews) to understand the link with the massive investment made by professionals in the housing market in central Thessaloniki.

All these methodologies contribute to the debate on the identification of PH. They provide original methodologies to describe an unbalanced market in which professionals capture most of the revenues and transactions in the STR sphere.

Although the professionalisation of hosts is an empirically recognised phenomenon, most of the regulatory frameworks across cities worldwide do not consider the role played by PH in the STR market. The need for differential regulations for professional and non-professionals has been raised by several authors (Cocola-Gant et al., 2021a, 2021b; Dogru et al., 2020; Miller, 2016; Wegmann and Jiao, 2017), who recognise the structural differences between the two economic approaches.

However, the efforts to regulate the STR market with a focus on professional actors have three limitations. (i) The first one lies in the current targeting of the existing policies. (ii) The second limitation rests in the different ways of identifying PH, which generate less precise methods to manage this phenomenon. (iii) The third concerns the non-collaboration between Airbnb and local governments.

Most of the adopted policies aim to limit the general trend and are

structured to regulate the listings, instead of the hosts who manage them. The existing policies measure mainly the performance of listings, the booking days, the location in the city, the apartment typology, and the legal status of the listing (primary/secondary residence). Although some of these policies also tend to impact PH (like mandatory registration or the rule of renting only the primary residence), there are no specific policies that directly target hosts, nor consider the different economic strategies in the market.

This leads to the second point, which accounts for the manifold ways of identifying PH. Regulations imply that there could be different economic strategies in the STR market, although a lack of a shared understanding to detect these strategies, highlighted in the first part of this section, makes policy-making less efficient in the identification of the best regulatory approach. Due to the spatial specificity in which the STR market spreads in cities, PH tends not to be directly defined and so not homogeneously regulated across cities. In Amsterdam, New York and Berlin, there are active limitation policies over the concession of renting out only the primary residency or a part thereof (von Briel and Dolnicar, 2021), while in Barcelona and Paris, renting out the secondary residence is allowed only with a licence or after the change of use from residential to commercial (Aguilera et al., 2021). Another policy that implicitly deals with the problem of pH is the mandatory registration with the municipality tourist office, in which in some cases, the listing is declared as commercial or not commercial. In Lisbon, Madrid and Athens, only those activities which are in tourist structures are declared as commercial activities, such as Bed and Breakfasts or Hostels. One aspect that has never been considered is the transnational nature of PH. The PH transnational approach is one of the distinguishing elements that professional hosts shared in a *trans*-scalar and cross-country way; Cocola-Gant et al. (2021a, 2021b) highlighted the corporate structure of the most powerful PH in Lisbon and Porto. As international corporates, they manage the properties in their charge with similar business strategies, including pricing, location and formal features such as housing interior design (Coricelli and Iacovone, 2022). Considering the transnational/corporative hosts would add other elements in the delineation of common strategies to regulate and differentiate professionals from non-professionals.

One of the main concerns for municipalities looking to better regulate PH is taxation. Fiscal policies are not well differentiated, and most of them are progressive (except for Italy, which has a flat tax for all listings). However, there have been many proposals to regulate fiscal entries. Dalir et al. (2021) proposed seasonal taxation for all the hosts, while Morales-Alonso and Núñez (2022) sought a territorial tax differentiation addressing tourist hot spots in main cities. The main concern is whether Airbnb listings should be considered a part of the hotel and tourist accommodation industry or a private form of revenue (Dogru et al., 2020).

The third limitation concerns a compelling problem that many municipalities are experiencing, viz. the lack of agreements with the platform. This situation affects many active policies, from permit checking to tax control. The general approach of Airbnb is to be negligent towards urban regulation. In Paris and Berlin, between 60 % and 80 % do not have a registration number, which is mandatory in both cities and in New York, 85 % of listings are illegal (Cox and Haar, 2020). Airbnb is now being pressurised to share its data with local governments to enable monitoring of the market activity. The European Union is preparing legal tools for this purpose, such as the Digital Service Act and the Short Term Rental initiative (Bei and Celata, 2023; Colomb and Moreira de Souza, 2021). Being in possession of updated data would enable local authorities to study the different economic strategies in the STR market and provide a proper differentiation among hosts.

After discussing the role of pH in the STR market and the lack of proper regulation of this category, the article now presents a case study and a novel methodology to provide new insights into structuring a tailored set of regulations.

## 2.1. Southern European Context

In the last decade, Southern Europe has experienced a tourist boom and major cities have struggled with this uncontrolled flow, facing problems related to over-tourism dynamics (Caputi and Fava, 2019; Cocola-Gant and Gago, 2019; Esposito, 2020; Lestegás et al., 2019; Mendes, 2018; Sequera and Nofre, 2020; Yrigoy, 2019). In 2019, tourism was thriving, and Southern Europe was experiencing peak tourist arrivals. The World Tourism Organisation published the January 2020 Tourism Barometer (UNWTO, 2020) highlighting Southern Europe among the top growth areas, with an increase of 5.5 % in tourist arrivals. The data published in the OECD Tourism Trend and Policies Report (2020) confirmed this upward trend in Southern Europe. Between 2017 and 2018, Greece had a growth of 9.7 % in international tourist arrival from OECD and partner countries, Italy 5.7 %, Portugal 7.5 % and Spain a stable growth of 1.1 %, which increased to 6.2 % between 2014 and 2018.

These numbers point out how Southern Europe has been a protagonist in the pre-pandemic touristic boom. This situation has been also boosted by a series of policies framed at local and country levels in Southern European nations. Jover and Cocola-Gant (2022) discussed the main reforms in Portugal that directly or indirectly favoured the tourist and STR sector, from the tax regime for non-regular residents and the Golden Visa (Montezuma and McGarrigle, 2019), to the end of rent control and the tax incentives for short-term leasing (Jover and Cocola-Gant, 2022). Post-crisis Athens, and Greece in general, liberalised many branches of the internal economy, activating savage processes of unregulated land grabbing and dispossession (Hadjimichalis, 2014), including the real estate sphere which became a profitable sector investment destination. In Naples, the promotion of the city's image has passed through extensive investments which contributed to the re-branding of the city (D'Alessandro et al., 2015) and the promotion of Naples as a unique tourist destination. In Spain, a restructuring of the housing finance system and the introduction of the Urban Rent Law facilitated international investors' entry into the real estate market (Alexandri and Janoschka, 2018; Janoschka et al., 2019). Sequera and Nofre (2018a) highlighted how, in Southern Europe, the increased interest in tourist real estate as a solid investment and the development of the tourism industry to overcome the several negative effects of the 2008–12 financial crisis, are two possible factors that could explain the consolidation of the touristic sector.

However, even far before the crisis, the European Mediterranean region carried out a series of market-oriented urban policies to enter the competitive European and Global markets. These policies were oriented mainly towards the commercial, cultural and tourism economies, insisting on the format of a *brandification* of the Mediterranean imagery, used as evocative tools to promote the territory (D'Alessandro, 2018). Moreover, the 90 s mainstream urban strategy of event promotion has been a relevant component in shaping urban attractiveness in Southern Europe (Cattedra et al., 2012).

These stratified policies and strategies have resulted in the consolidation of Southern Europe as a primary tourist destination. However, the wave of mass tourism in the 2000 s caused cities to suffer from unregulated management of the flows. The so-called over-tourism refers to the negative consequences of unregulated tourism in cities (Bouchon and Rauscher, 2019; Milano et al., 2019). Over-tourism dynamics are often related to the STR market explosion that followed hand-in-hand with this trend, expanding in the unregulated grey areas of tourism accommodation management.

## 3. Methodology

The study was conducted with Airbnb data from 2019 provided by the commercial service AirDNA in the eight Southern European cities of Lisbon, Porto, Madrid, Seville, Rome, Naples, Athens and Thessaloniki. The decisions to concentrate the analysis on the Southern European

region and to use the 2019 data were to address this research as an 'ideal' condition by considering the PH economic behaviour during a period of a positive trend in the tourist flows (OECD, 2020; UNWTO, 2020). Although the feature of pH exists not only within Airbnb but in all the accommodation platforms (and within the housing market broadly—see Fields, 2018), here, only Airbnb data were used because the platform still retains leadership of the STR market.<sup>3</sup> The analyses proposed here represent a methodology applicable to all sets of data with similar features.

The empirical section is organised into two parts, the first representing a preliminary analysis to show the extent of the multi-listing hosts in the cities analysed. The second proposes a cluster analysis to add clues to the debate on the identification of professional hosts.

The first section highlights the impact of multi-listing hosts on the market of Southern European cities by considering the dimensions and the annual revenues of 2019. This preliminary analysis uses the methodology that distinguishes hosts by their number of listings, classifying seven categories of hosts. This classification has been made to add specificity to the already practiced dichotomous distinction between single-listing hosts and multi-listing hosts.<sup>4</sup> The data are organised grouping hosts by the number of listings associated (host categories are listed alphabetically, (A:1 host with one listing; B: 2; C: 3–5; D: 6–10; E: 11–20; F: 21–50, and G > 50). The data include all the listing typologies, viz. entire apartments, single rooms and shared rooms, to frame the very dimension of the Airbnb presence in the chosen cities.

The second section proposes a cluster analysis. This statistical tool group data work similarly together, and for this reason, have been used to differentiate between the main economic strategies of hosts within the Airbnb market, combining different variables. The cluster analysis aims to complexify the identification of pH processing several indicators at a time and provide different groups that could describe the diverse attitudes of hosts in the STR market. Eight cluster analyses were performed (one for each city) using the same variables that could describe diverse economic trends, viz. pricing, frequency, capacity and concentration.

Before explaining the features of each variable, two clarifications are needed. First, because the pricing and frequency indicators (which correspond to the Average Daily Rate and the Occupancy Rate) are both variables highly dependent on the apartment feature and the location, some adjustments have been made to enable comparison of the data. The Average Daily Rate has been divided by the maximum of guests hostable for each listing, to have the price per bed and not per apartment, while to avoid location differences, both the pricing (ADR/bed) and frequency (OCC) indicators have been spatially normalised.<sup>5</sup> Secondly, all the variables have been organised referring to the hosts' performance, not those of properties. To do so, an average of the relative average listings' performance has been prepared per each host.

The following indicators are used in the cluster analysis:

<sup>3</sup> AirDNA dataset also contains information on HomeAway listings; however, for this study, it only Airbnb data also for a matter of data consistency (HomeAway data missed many records in the database).

<sup>4</sup> For instance, in this part, the hosts will be called 'multi-listing' and 'single-listing' hosts instead of professional and non-professional ones. This is to mark the different methodological approaches.

<sup>5</sup> Spatial normalisation has been made at a neighbourhood level. Each listing was matched to the belonging neighbourhood from the city districts' shapefile. The average values of ADR and OCC were taken from each neighbourhood. Then, each listing was compared with the geographical average to obtain a classification of positive and negative values. Positive values indicate listings above the relative average spatial rate, while negative values refer to listings below. Spatial normalisation was carried out to bring out the features of the properties despite their geographical location (located in hot spots or peripheral areas).

1. *Pricing* refers to the indicator Average Daily Rate per bed (ADR/bed spatially normalised).<sup>6</sup> The variable describes the median cost of a bed per host in 2019. This variable has been chosen to pick the variations in the pricing strategy between hosts. The index needs to be paired with the Occupancy Rate, and the combination of the two reveals specific economic approaches to the market.
2. *Frequency* refers to the Occupancy Rate (OCC spatially normalised). This indicator is relevant for monitoring the frequency of the booking rate and is paired with the Average Daily Rate. The index indicates the occupancy performances and is calculated by dividing the reserved days and the available days in 2019. It excludes listings with blocked days and those not booked for over a month.<sup>7</sup>
3. *Capacity* counts the properties in the European database. This information stresses the transnational nature of professional hosts; it counts all the listings that a host has in the whole Airbnb portfolio. This means that the listings linked to one host have been searched in the entire European database and not just in the referenced city.<sup>8</sup>
4. *Concentration* indicates whether the listings of a host are spatially concentrated in the city where the analyses were performed or their portfolio is spatially dispersed. Similar to the previous one, this variable emphasises the transnational nature of PH; it highlights a percentage of concentration/dispersion for each host. It has been calculated as the ratio between the number of listings a host has in a specific city and the number of listings in its international portfolio.

Once all the variables were verified, to generate the clusters, the analyses were carried out by the software SPSS Statistic, based on the two-step clustering method due to its ability to handle an extensive database. The cluster analysis grouped hosts with similar features through their performances and the composition of the analysed properties. Although a cluster analysis cannot be “wrong”, one main limitation of this model to be clarified is the various levels of approximation. As shown in this section, the two main approximations made are the host database (creating an average of all the listing of one host) and spatial normalisation. Although both approximations have been confirmed to maintain the model’s reliability, they represent an alteration of the original data.

#### 4. How to define professional hosts

##### 4.1. Preliminary dimensions

To frame the dimension of Airbnb and specifically of multi-listing hosts in the eight Southern European cities, two variables are confronted: the number of listings and the annual revenues. Fig. 1 compares the dimensions (graphs on left) and the annual revenues (graphs on right) divided by listings (top graphs) and hosts (bottom graphs). The graphs show a reverse trend in which a host with one listing still represents the majority, with an average of 70 % of single-host and 35 % of all the listings. However, looking at the mirror graph, host A collected on average 0.5 % of all the revenues produced in 2019, and listing A made 9.8 % of the total profits. On the other hand, host G represents 0.1 % of all the hosts but absorbed 62.5 % of all the revenues, which, in the case

of Rome, is equivalent to more than 1.5 million euros to each host.<sup>9</sup>

Fig. 1 shows the imbalance in the internal structure of the Airbnb market and evidences the need to identify multi-listing hosts and their professional behaviour. Such analysis has one main limitation—missing the international network of professional hosts. For instance, between 10 % and 20 % of single-listing hosts (host A) in all the cities analysed have an international network not detectable working on a one-city database at the time. An extreme case is a user called E-Domizil who has only one listing in Athens but manages 1446 listings in the rest of Europe. The international network of pH is a relevant feature to consider in the attempts at definition.

##### 4.2. Cluster analysis

The cluster analysis aims to shed light on the various economic strategies in the Airbnb market. Combining the four indicators shown in the previous section, the software SPSS Statistics clustered hosts with similar characteristics and performances, processing one city at a time. The software generated four clusters for each city, grouping the economic performances of hosts. The first remarkable result is that for all eight cities, the four clusters generated have similar characteristics; this means that there are *trans*-scalar economic strategies that characterise the STR market in different contexts.

Table 1 details the result of the four clusters in the eight cities through all the variables used (pricing, frequency, capacity, concentration and percentage of hosts in the cluster). Similarly, Fig. 2 shows the results of the analysis graphically. In the graph, the clusters are differentiated by colour and each variable has its unit of measure: for pricing and frequency, because have been spatially normalised, these have to be read as negative and positive values compared to the geographical average (which it is synthesised with the relative 0); capacity refers to the actual amount of listings, the average of properties which each host manage; the concentration varies from 0 to 1, in which 0 means dispersion; so, the majority of hosts’ listings are outside the city where the analysis was performed; 1 means full concentration; so all the hosts’ listings are in the city.

The clusters resulting from the analysis have the following features:

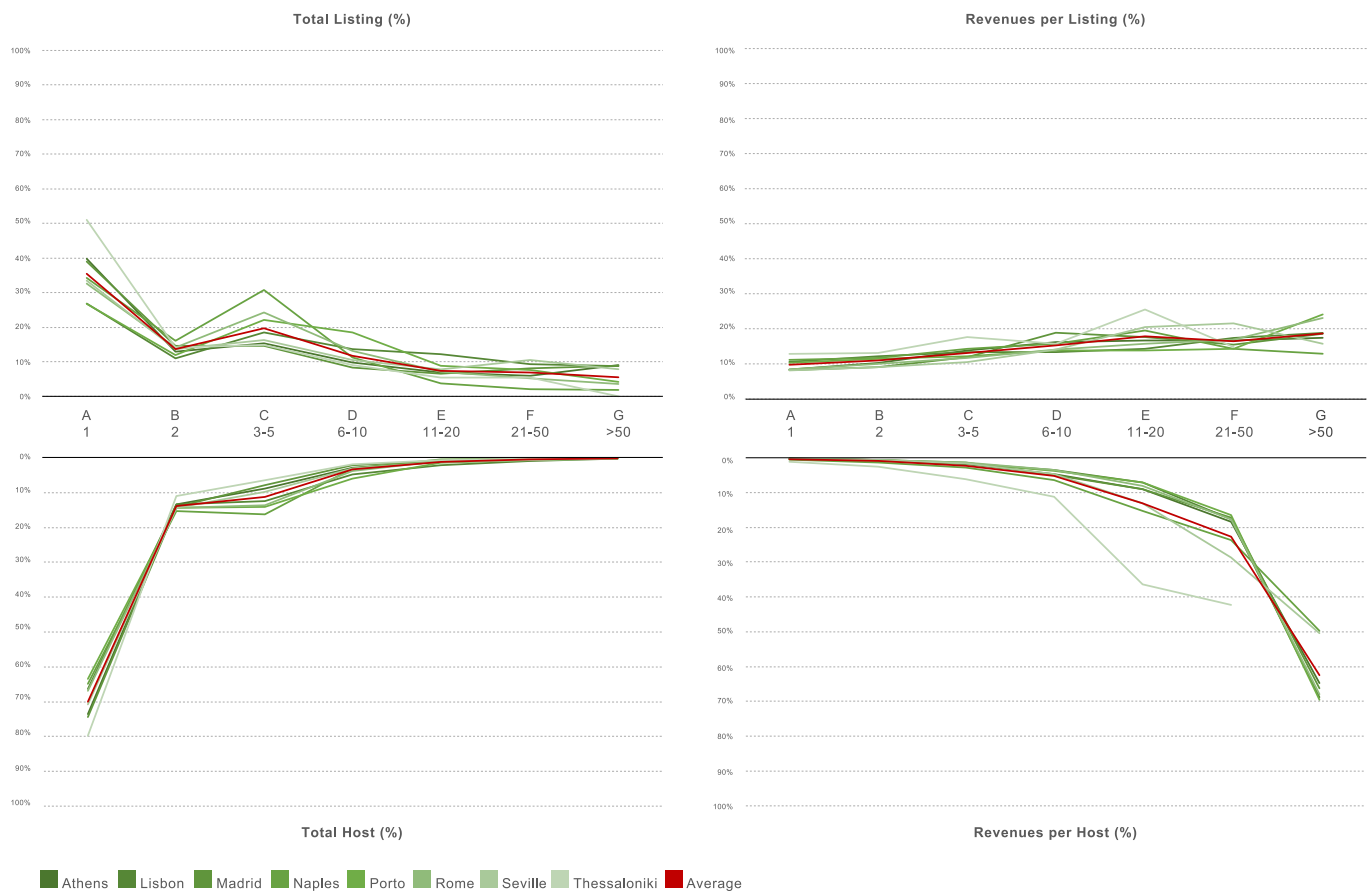
- Cluster 1 represents 40 %-50 % of all the hosts. While the ADR/bed (pricing) is slightly below the geographical average, the OCC (frequency) is much above the average (from 50 % to 80 % except for Porto which is still above the average but with a lower percentage, 36 %). This cluster group hosts have an average of 2 listings and a marked urban-based structure (concentration more than 0.9).
- Cluster 2 groups 30 %-40 % of the hosts who have an ADR/bed almost in the geographical average and frequency level 50 % less than the average, with two exceptions of Rome and Thessaloniki, which have less difference than the average (38 %-34 %). Similar to Cluster 1, the properties managed by the hosts are between 1 and 2 and are mainly concentrated in the city area.
- Cluster 3 groups 10 %-20 % of the hosts. The pricing capacity of these hosts is fixed around the geographical average and the frequency levels are all above it. The hosts manage between 4 and 6 listings and have a listings portfolio comprising properties outside the city concerned.
- Cluster 4 represents the extreme peak and gathers 1 %-3% of all the hosts who manage their listings with very high ADR/bed. While the occupancy rate varies between cities, almost all of them are below the geographical average (Madrid at -47 %, and Rome at -7%), the only exception being Naples with a positive OCC (57 %). This is the

<sup>6</sup> ADR/bed = (2019 Revenues / 2019 Number of booked nights) / Max Guest.

<sup>7</sup> OCC = Count of 2019 Reservation Days / (Count of 2019 Reservation Days + Count of 2019 Available Days).

<sup>8</sup> The countries included in the European AirDNA database are Albania, Andorra, Austria, Belarus, Belgium, Bosnia- Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Faroe Island, Finland, France, Germany, Gibraltar, Greece, Guernsey, Hungary, Iceland, Ireland, Isle of man, Italy, Jersey, Kosovo, Latvia, Lichtenstein, Lithuania, Luxembourg, Republic of Macedonia, Malta, Moldova, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and the United Kingdom.

<sup>9</sup> Considering hosts G (professional hosts), mostly property manager companies, the estimation does not correspond to the net revenue of PH. These companies earn a fixed commission ranging between 20% and 30%, plus cleaning and management expenses.



**Fig. 1.** Percentage of total listings (top left) and total hosts (bottom left) compared with Annual Revenues as per listings (top right) and Annual Revenues as per hosts (bottom right) in 2019 filtered by host’s typologies - Elaboration by the author.

cluster of the multi-listing hosts, most of them managing more than 50 properties (Lisbon and Madrid have a median of 25 and 21 listings). Further, the concentration has some variation: Athens, Lisbon, Madrid, Porto and Seville have a concentration ratio that exceeds half, while the ratio for Rome, Naples and Thessaloniki shows more dispersion.

These clusters show specific economic behaviours in hosts; they do not provide a dichotomic definition of professionals and non-professionals but show the varieties of economic approaches that hosts can have in the Airbnb market.

**5. Findings and policy implications**

The impossibility of delineating a common regulatory framework across countries (or even across cities of the same country) has been driven by the spatial specificity of the negative side effects and the differentiated tourist demands (Ferreri and Sanyal, 2018; von Briel and Dolnicar, 2021). The problem is also compounded by the different levels of jurisdiction by which the regulations are made (urban, national, or regional levels), and the lack of cooperation between them, as noted by several scholars (Colomb and Moreira de Souza, 2021; Guttentag, 2019; Tham, 2016). This has generated a fragmented and local response to a broader multi-scalar problem (Smigiel, 2020).

The paper contributes to this debate by proposing a novel way of approaching short-term rental regulation. First, it proposes addressing the policies to hosts rather than to listings. The first analysis showed how a minority of hosts who manage between 6 and more than 50 properties can absorb the majority of the revenues produced by this market. These findings firstly contradict the market rhetoric of Airbnb of a marketplace

accessible and profitable for everyone; and secondly, they shift the focus on hosts who manage multiple properties, since they contribute more to the economic expansion of the market.

The second way to adopt a different conceptualisation of regulation is to acknowledge that hosts behave differently in the STR market and there is not only one type of professional host. From this statement, the cluster analysis represents a tool for the identification of the different market strategies among hosts, grouping those with similar features within the chosen variable. The analysis was set including the variables of pricing (ADR/bed), frequency (OCC), capacity (number of properties) and concentration (level of internationalisation) and performed in the eight cities. The first main finding is that all the hosts in the cities analysed perform similarly (the four clusters for all the cities have very similar characteristics). This means that, despite the spatial specificities every city experiences, there is an actual transversal economic attitude among hosts which offers room for possible shared regulations between countries and cities. The results of the cluster analysis provide further details about the different attitudes, each group having specific features that describe the kind of economic strategy the hosts adopt. Knowing these behaviours could facilitate local governments to create tailored policies through targeted intervention.

The analysis of the results provides new insights to be addressed to modify and amake more suitable regulations to control the activities of the various professional actors regarding the variation in the daily rate, occupancy rate, the number of listings and the international network. Because of the limitation concerning the spatial specificity highlighted in the various regulatory frameworks, one possible direction in which policymaking could work is the differentiation of various kinds of hosts in framing the relative regulations. The cluster analysis indicates that in each city, specific existing policies could be addressed to the relative

**Table 1**  
Results of the cluster analysis.

CLUSTER 1	Pricing (Avr. ADR Norm)	Frequency (Avr. OCC Norm)	Capacity (Avr. Property DB)	Concentration	%	CLUSTER 2	Pricing (Avr. ADR Norm)	Frequency (Avr. OCC Norm)	Capacity (Avr. Property DB)	Concentration	%
Athens	-21.10 %	81.70 %	1.95	0.995	44.9 %	Athens	6.00 %	-50.40 %	1.98	0.995	35.3 %
Lisbon	-12.70 %	48.10 %	2.34	0.995	51.3 %	Lisbon	5.20 %	-43.20 %	2.29	0.994	31.2 %
Madrid	-22.70 %	88.10 %	2.07	0.998	48.7 %	Madrid	-1.70 %	-44.00 %	2.04	0.998	37.3 %
Rome	-17.80 %	81.00 %	2.24	0.996	43.3 %	Rome	5.60 %	-38.80 %	2.32	0.997	43.7 %
Thessaloniki	-19.40 %	81.00 %	1.62	0.996	38.3 %	Thessaloniki	5.90 %	-34.40 %	1.58	0.996	41.3 %
Porto	-14.70 %	36.40 %	2.6	0.997	68.9 %	Porto	3.40 %	-63.40 %	2.48	0.996	18.2 %
Seville	-16.30 %	50.10 %	2.54	0.998	58.9 %	Seville	4.70 %	-46.40 %	2.33	0.996	28.6 %
Naples	-19.90 %	67.70 %	2	0.998	54.8 %	Naples	7.60 %	-62.90 %	2	0.998	34.7 %
CLUSTER 3	Pricing (Avr. ADR Norm)	Frequency (Avr. OCC Norm)	Capacity (Avr. Property DB)	Concentration	%	CLUSTER 4	Pricing (Avr. ADR Norm)	Frequency (Avr. OCC Norm)	Capacity (Avr. Property DB)	Concentration	%
Athens	-6.50 %	19.00 %	5.73	0.455	18.2 %	Athens	264.70 %	-29.50 %	98.29	0.622	1.6 %
Lisbon	-2.20 %	6.80 %	2.13	0.455	15.3 %	Lisbon	232.10 %	-22.90 %	25.52	0.923	2.2 %
Madrid	-6.70 %	24.80 %	4.5	0.465	9.7 %	Madrid	405.20 %	-47.40 %	21.48	0.943	4.3 %
Rome	0.80 %	9.70 %	5.2	0.465	12.6 %	Rome	930.30 %	-7.40 %	469.38	0.122	0.4 %
Thessaloniki	-4.20 %	3.70 %	4.98	0.449	19.5 %	Thessaloniki	452.60 %	-35.70 %	87.89	0.494	0.9 %
Porto	-8.20 %	10.40 %	6.22	0.468	10.9 %	Porto	217.50 %	-22.20 %	82.17	0.844	2.0 %
Seville	-8.60 %	14.10 %	5.41	0.475	11.1 %	Seville	265.60 %	-19.20 %	158.24	0.534	1.4 %
Naples	-0.50 %	12.30 %	6.16	0.468	9.8 %	Naples	448.60 %	57.00 %	416	0.418	0.6 %

specific economic approach. Table 2 portrays cluster-specific policies that produced a tailored regulative framework based on the hosts' economic strategies.

For instance, hosts in Cluster 1 manage a few listings, have an average below ADR but a high occupancy rate, and have a mostly urban portfolio. For these hosts, a restriction on the number of properties would not be effective. Instead, the restriction on the maximum number of bookings would be more suitable. Clusters 1 and 2 together represent 70 %-80 % of all the hosts and are both mostly urban-based. This means that these are the main ones spread in the city. For them, a suitable policy could be the geographical restriction in urban areas and urban density monitoring.<sup>10</sup> On the other hand, for hosts in Clusters 3 and 4, with an international economic approach, a possible intervention could be a policy that limits the maximum number of listings per host, mandatory licensing to register their commercial status and a restriction of renting only the primary residence. Moreover, policies oriented to regulate the transnational features of some of the hosts in accommodation platforms are present neither in the current literature nor in the regulative panorama.

Such methodology for reviewing the internal Airbnb market could be a strategy for local governments to define the main economic

approaches among the hosts and define the relative policies to reduce and regulate the market. In a fast-changing market like the STR, tailoring the policies to different kinds of hosts could be a solution for balancing the uncontrolled market.

## 6. Conclusion

This article investigates the issue of regulating professional hosts (PH) in accommodation platforms, specifically Airbnb. Professional hosting has been proven to be the most successful way to access the STR market. PH marked a shift in the structure of Airbnb, transforming the market from local P2P activity to a global network of international players. The article shows how, despite the acknowledgement of this shift in the STR market, well present in the academic debate, most of the local governments still do not consider this fact in the regulatory framework for the accommodation platforms. Most of the policies that attempt to regulate the STR market do not consider the professional actors and their economic strategies.

To recall the primary relevance of this matter, recent studies (Bei and Celata, 2023; Koster et al., 2021) demonstrate how restrictions and regulations could make a difference in limiting the negative side effects of the STR market in cities. However, the monitoring of existing regulations and the experimentation with new ones are very much linked to the possibility for governments to manage data updated from the platform. Such collaboration is advocated by several scholars (Aguilera et al., 2021; Bei and Celata, 2023; Cocola-Gant et al., 2021a, 2021b; Cox

<sup>10</sup> The policy categories presented here are those proposed by Nieuwland and van Melik (2020), viz. quantity restrictions, location restrictions and density monitoring.



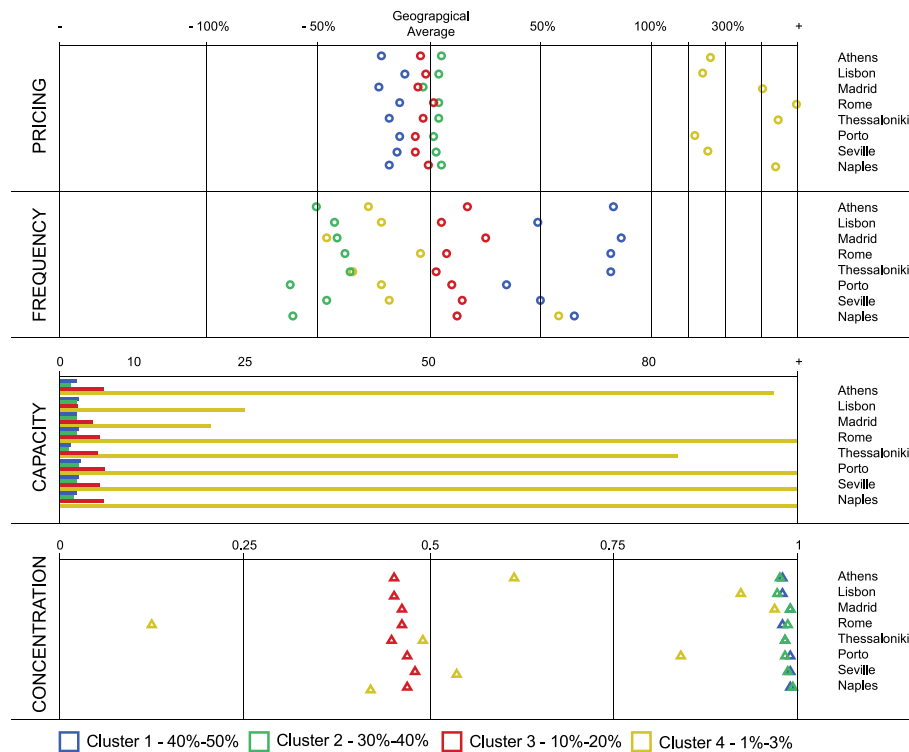


Fig. 2. Graphic representation of the cluster analysis. Elaboration by the author.

Table 2

Proposed tailored policies based on specific host’s market strategies resulting from cluster analysis.

Hosts’ economic behaviour	Tailored policies
Host in Cluster 1 Pricing: slightly below average Frequency: much above average Capacity: average of 2 listings Concentration: urban-based market	<ul style="list-style-type: none"> <li>Temporal restriction. Limits the maximum days of renting the listing</li> <li>Location restriction. Limitations in urban areas</li> <li>Density monitoring</li> </ul>
Host in Cluster 2 Pricing: at average Frequency: below average Capacity: average of 2 listings Concentration: urban-based market	<ul style="list-style-type: none"> <li>Location restriction. Limitations in urban areas</li> <li>Density monitoring</li> </ul>
Host in Cluster 3 Pricing: at average Frequency: above average Capacity: average of 6 listings Concentration: international market	<ul style="list-style-type: none"> <li>Quantity restriction. Maximum number of listings per host</li> <li>Primary residence restriction</li> <li>Transnational restriction</li> <li>Density monitoring</li> </ul>
Host in Cluster 4 Pricing: much above average Frequency: below average Capacity: average of more than 50 listings Concentration: international and urban-based market	<ul style="list-style-type: none"> <li>Quantity restriction. Maximum number of listings per host</li> <li>Registration. Mandatory license to register commercial status</li> <li>Primary residence restriction</li> <li>Transnational restriction</li> <li>Density monitoring</li> </ul>

and Haar, 2020; Ferreri and Sanyal, 2018). The recent Barcelona Tourism Plan (2020) delegated the monitoring of tourism activity and STR market performances (Tourism Data System) by the Tourism and Recreation Laboratory by using big data at the University of Rovira i Virgili, although not through the collaboration of the platforms. The European Commission has recently drafted a series of policies that regulate the formal sharing of aggregate data of the main STR platforms with the local governments (Digital Service Act). Potentially, this could be a turning point for the management of accommodation platforms in

cities opening up to data-driven and tailored policies.

By proposing a novel methodology to manage regulatory frameworks, this study focuses attention on how such experimental research could inform policy makers. The present methodology might be implemented and developed in future research by adding and varying variables, as well as including other datasets and other cities as case studies.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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