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The proliferation of lockers and luggage storage facilities and their relationship with the touristification of the city: a spatial analysis for Madrid (Spain)

La proliferación de lockers y consignas de equipaje y su relación con la turistificación de la ciudad: un análisis espacial para Madrid (España)

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Abstract

In recent years, the growth of tourist activity and the touristification of many cities have led to the proliferation of establishments offering luggage storage services in urban areas. This paper seeks to analyse the spatial distribution of these establishments in Madrid and the possible factors that explain it. To do so, we reviewed all the businesses offering luggage storage services in Madrid and its metropolitan area, classifying them according to the type of service that they offer: lockers, traditional left-luggage stores, and digital platforms that offer luggage-storage services through local businesses. We obtained data about their location and potential use through the information provided by their respective websites, including customer reviews. Using the data collected, we generated maps to examine the spatial distribution of these services and compare it with the location of (a) Madrid's tourist resources, (b) the

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main transport hubs and infrastructures, and (c) the supply of Short-Tem Rental (STR) accommodation. The results show that Madrid has a high number of establishments offering luggage storage, most of which have a main commercial activity other than luggage storage. Most of these establishments are concentrated in the historic and tourist centre of the city, as well as around key transport facilities, particularly the high-speed train stations and the airport.

Keywords: urban tourism; lockers; luggage storage; platform economy; touristification.

Resumen

En los últimos años, el crecimiento de la actividad turística y la turistificación de muchas ciudades han impulsado la proliferación de establecimientos que ofrecen servicios de almacenamiento de equipaje en zonas urbanas. Este artículo busca analizar la distribución espacial de estos negocios en Madrid y los posibles factores que la explican. Para ello, se revisaron todas las empresas que ofrecen servicios de almacenamiento de equipaje en Madrid y su área metropolitana, clasificándolas según el tipo de servicio: lockers, consignas tradicionales y plataformas digitales que ofertan los servicios de consigna a través del comercio local. Se obtuvo información sobre su localización y uso potencial a través de la información facilitada en sus páginas web y las reseñas de sus clientes. Con los datos recopilados, se elaboró una cartografía que permite estudiar la distribución espacial de estos servicios y compararla con (a) la localización de los recursos turísticos de Madrid, (b) los principales nodos e infraestructuras de transporte de la ciudad, y (c) la oferta de Vivienda de Uso Turístico (VUT). Los resultados revelan un alto número de establecimientos que ofrecen almacenamiento de equipaje en Madrid, la mayoría de los cuales tienen una actividad comercial principal diferente a la de consigna. La mayoría de estos establecimientos se concentra en el casco histórico y centro turístico de la ciudad, así como en torno a las principales infraestructuras de transporte, especialmente las estaciones de tren de alta velocidad y el aeropuerto.

Palabras clave: turismo urbano; consignas; lockers; economía de plataforma; turistificación.

1 Introduction

In the last decade, the Short-Term Rental (STR) accommodation market has experienced exponential growth, driven by the rise of online platforms such as Airbnb, a STRs management platform operating since 2009 (Guttentag, 2015). Unlike traditional tourist accommodations like hotels, hostels, or tourist apartments, STRs typically do not provide services such as restaurants, cleaning, laundry, or luggage-storage (Pool-Estrada et al., 2020; Kordel et al., 2024). This has facilitated the emergence of “auxiliary” businesses that commercialize services not covered by these types of accommodation, such as luggage-storage facilities (Eckhardt, 2020).

Previous research on luggage has often focused on a limited number of topics, such as its use on public transport or tourists' behavior with luggage (Kaburagi & Aihara, 2023). However, few studies have analysed commercial activities focused on this type of service. This research aims to offer a new contribution to this line of inquiry by examining the spatial distribution of different luggage-storage facilities in Madrid, identifying the possible variables that explain such distribution, including their relationship with tourism activity, and the role this activity plays in transforming urban landscapes and their growing touristification.

To this end, based on the case study of Madrid, we conducted a search for luggage-storage companies operating in the city and produced a map of the advertised storage points. Businesses offering luggage storage were classified into three categories: traditional staffed facilities; automated lockers, which are technical solutions usually unmanned (Kordel et al., 2024); and businesses with another primary activity (commercial, food service, accommodation, etc.) that provide luggage storage as a complementary service. In the latter case, the luggage-storage activity is offered through a digital platform that mediates between the platform and the local business managing the service, with profits shared between the two parties. This represents a new form of so-called platform capitalism, in which a digital platform, acting as an intermediary, creates a global market around a service based on an existing local asset (Sequera et al., 2024), in this case the city's commercial fabric. Finally, we analysed the potential relationships between the locations of storage facilities and lockers and various spatial factors, including the distribution of tourist accommodation and proximity to major mobility hubs and tourist attractions in the city.

2 State of the art

As indicated above, studies on tourists' luggage have been limited to a set of topics that differ from the distribution and characterization of commercial activity related to luggage storage and the implications of this activity for the transformation and touristification of urban landscapes. Under this approach, only one study published in 2024 has been identified, which analyses the relationship between lockers and touristification in Málaga (Kordel et al., 2024), showing the concentration of these automated, unmanned facilities in the city center.

No studies have been found that analyze traditional staffed luggage-storage services, nor the new role assumed by many local businesses as part of the expansion of intermediary digital platforms that commercialize these services online. Although there is extensive literature characterizing the supply and implications of similar platforms for the commercialization of other tourism services, such as accommodation (Perinotto et al., 2021), no research has been found that specifically addresses the emergence, implementation, and implications of digital platforms specializing in the commercialization of luggage-storage services.

As pointed out by Kordel et al. (2024), luggage-storage facilities or lockers offer clear benefits for tourism activity, as they allow tourists to move freely without their luggage, facilitating the exploration of the city. However, this activity may also entail a series of negative consequences, such as the displacement of traditional retail or food-service establishments from the city center, or increased noise from suitcases and trolleys around these facilities. That is, they may also contribute to touristification processes in historic city centers, which are characterized by increased visitor numbers, especially in central areas, the rise of consumption-oriented activities targeting tourists, the tertiarization of housing, and the transformation of the urban and commercial landscape into a standardized global tourist landscape (Calle Vaquero, 2019).

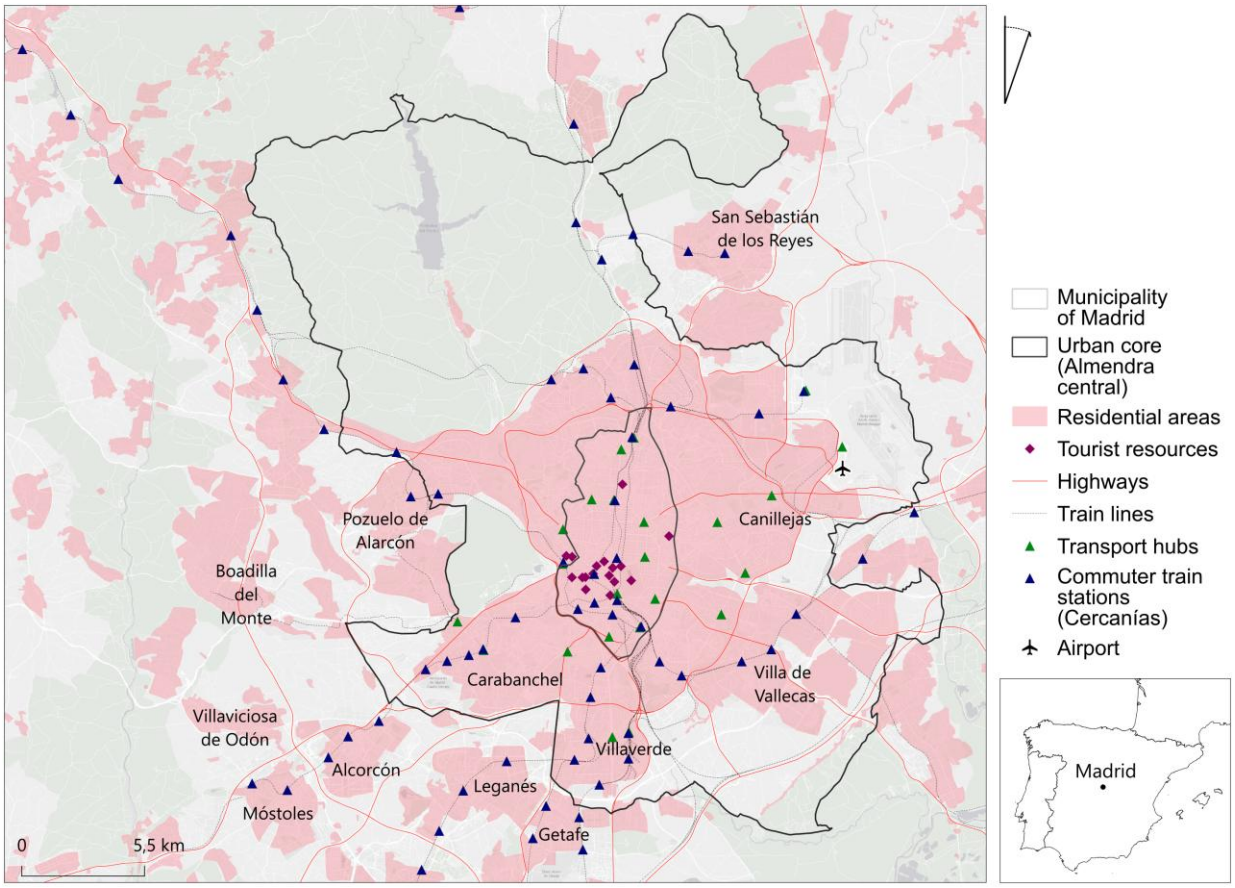
Several authors have demonstrated the association between the concentration of STRs and different processes of urban transformation, such as the displacement of resident populations to the peripheries or the proliferation of businesses focused on providing services to tourists (Cócola-Gant, 2015; Parralejo Sánchez & Díaz Parra, 2021; Macias Mendoza & Russo, 2020; Jiménez-Bravo, 2020). In this regard, the relationship between the growth of STRs and the increase in luggage-storage businesses appears evident. In fact, industry operators themselves identify STR users as their potential clients (Echardt, 2020; López, May 2, 2019).

3 Study area

For the analysis of the spatial distribution of luggage-storage businesses, this study focuses on the city of Madrid and its metropolitan area (Figure 1). Madrid is the capital of Spain and a leading urban tourism destination (Exceltur, 2023). Recently, significant touristification processes have been identified in the city, particularly related to commercial activity (Crespí Vallbona & Domínguez-Pérez, 2021). This trend has been reinforced by the growing supply of STRs, marking a departure from Airbnb's original collaborative-economy model, as the sector has become increasingly professionalized, with firms specializing in short-stay accommodation (Gil & Sequera, 2020).

Most tourism activity in Madrid is concentrated in the historic city center and its surroundings, where the main tourist attractions are located. However, the high presence of STRs, as in most global and tourist-oriented cities worldwide (Cerdá-Mansilla et al., 2021; Gil & Sequera, 2018), has expanded the city's tourism footprint toward its periphery, where the presence of tourism-related services was less common. Nevertheless, signs of touristification and commercial change in Madrid's peripheral areas remain weak or nonexistent (Martínez-Caldentey et al., 2020).

Figure 1. Location map of the municipality of Madrid and its immediate metropolitan area



Source: Own elaboration based on ESRI maps, municipal boundaries of Madrid (IDEM Comunidad de Madrid), and the National Topographic Database BTN100 (Instituto Geográfico Nacional).

The choice of Madrid as a case study is justified by three primary factors: a) digital platforms are preferentially allocated in urban environments and specially in those highly accessible and short stay destinations (Sequera, 2024; Gutiérrez et al., 2017); b) its position within the top ten cities with more platform mediated luggage storage points based on the collected data, and c) the authors' firsthand knowledge of this case study.

The findings obtained for Madrid are not merely case-specific, but are generalizable to a distinct typology of tourist destinations: metropolitan gateway cities characterized by high-density historic centers and a dominance of short-stay urban tourism (or 'city breaks'). In cities that share this structural profile, such as Paris, Rome, London, or Barcelona, the spatial logic of digital luggage platforms is expected to behave similarly. This extrapolability is justified by the fact that these destinations rely on identical operational drivers: highly capillary public transit networks, a dense concentration of STRs, and pedestrianized commercial cores. Therefore, the spatial patterns decoded in Madrid provide a replicable framework for understanding how platform capitalism impacts the physical infrastructure of contemporary historic capital cities facing intense tourism pressure.

4 Materials and methods

This study employed an integrated mixed-methods approach, systematically dividing the analysis into quantitative and qualitative variables. The quantitative variables included the number of luggage-storage establishments and their spatial concentration. In contrast, the qualitative variables encompassed the establishment type and the operational dynamics of the managing company. In addition, we qualitatively analysed spatial maps to identify the explanatory drivers behind this distribution, which were selected based on a qualitative literature review.

To better explain the spatial distribution of the luggage storage services of Madrid, we defined three units of analysis (Figure 1): (1) the Madrid urban core (Almendra Central), the city's primary socio-economic hub where residents and economic activities are concentrated; (2) the municipality of Madrid, the expanded central area governed by the City Council; and (3) the Madrid Metropolitan Area, which includes all other territories within the Functional Urban Area (FUA) that lie outside the municipal boundaries.

To understand both the supply and demand of luggage storage services in Madrid, we analysed not only the number of establishments, but also the reviews associated with each one. Online reviews were used as a proxy for level of user engagement. The use of this metric requires a cautious interpretation. In some cases, it may reflect a reaction to poor service quality or active digital marketing strategies by the business. Furthermore, this variable is subject to availability, as some establishments in our sample did not participate in review systems or had no public data. However, it is currently the most reliable proxy for potential service usage and reveals a clear geographical pattern of demand or usage that is conceptually consistent with the authors' knowledge of the phenomenon. In addition, it is a common tool in academic research for analysing the demand for digital services (Quattrone et al., 2022; Hati et al., 2021).

Furthermore, to understand the spatial distribution of luggage-storage establishments, we assessed their relationship with three variables qualitatively using maps: (a) accessibility to public transport (location of key transport infrastructures); (b) proximity to major tourist attractions (location of major tourist resources); and (c) density of Short-Term Rental (STRs) supply. The variables selected for the spatial analysis were identified based on the literature review discussed in the introduction. As it was stated, transport accessibility and STRs represent the primary drivers of demand for luggage storage services, whilst proximity to major tourist attractions can be a determinant of touristification in the city center.

4.1 Identification of companies operating in the luggage-storage sector in Madrid

To identify the companies and establishments offering luggage-storage services in Madrid, a manual Google search was conducted using the keywords "Madrid", "Consigna", "Equipaje", and "Locker", selecting all companies currently operating in the city of Madrid and its metropolitan area (Table 1).

Table 1. Companies offering luggage-storage services in Madrid included in the study

Locker companies	Traditional staffed luggage-storage services	Digital platforms offering luggage-storage services
Bags resort	Bag and Laundry	Bounce
Lock and be free	Fun and Tickets	Luggage Hero
Lock and enjoy	Naturanda	Nannybag
Lock and go mad		Qeepl
Locker4rent		Radical storage
Locker in the city		Stasher
Locking		
Madrid Lockers		
Stow your bags		
The yellow lockers		

Source: Own elaboration

Google was chosen because of its dominant market share in Spain, which ensures that the vast majority of formal and informal luggage storage providers (including specialized stores and intermediary platforms) prioritize visibility on this search engine to reach international tourists. Given that these services primarily target international and domestic travelers, presence on Google is a commercial necessity for visibility. Consequently, the identified establishments are considered to represent the vast majority of the 'universe' of storage providers in the city. However, certain biases must be acknowledged. Relying on a single platform may introduce a platform-dependence bias, potentially excluding smaller, traditional establishments with limited digital footprints. Furthermore, search results are subject to algorithmic filtering based on keywords. To mitigate this, a multi-criteria search strategy was employed, using varied terminology in both Spanish and English to ensure the inclusion of diverse business models, from specialized local bussineses and lockers to intermediary platforms.

It is worth noting that the identified luggage storage platforms are not local providers, but rather global digital platforms. These intermediaries operate in hundreds of cities worldwide, with headquarters in various international hubs, including the United States (Bounce), Denmark (LuggageHero), France (Nannybag), Italy (Radical Storage), and the United Kingdom (Stasher). Their presence in Madrid is part of a standardized expansion strategy that integrates local commercial assets into a globalized service network, a hallmark of platform capitalism in the tourism sector. This corporate strategy allows transnational platforms to scale rapidly by externalizing operational costs and risks onto pre-existing local businesses, converting diverse neighborhood shops into homogenous, tech-driven nodes of a global infrastructure (Srnicek, 2017).

4.2 Data collection

After listing all companies operating in Madrid, we obtained a record of the establishments providing luggage-storage services affiliated with each company, including information on their location (coordinates) and, when available, the number of reviews.

For companies with a limited number of associated establishments that do not operate as intermediary digital platforms, information was manually collected from their websites. In addition, when the number of reviews was not provided on the company's website, it was obtained manually from Google Maps. For digital platforms that commercialize luggage-storage services for a significant number of establishments, acting as intermediaries, the information was obtained through a web-scraping procedure (i.e., automated data retrieval using lines of code).

In total, we collected information for 20 different companies operating through 515 establishments. All the data was obtained in June 2024. Regarding the temporal framework, while tourist flows fluctuate significantly due to seasonality, the physical infrastructure and spatial distribution of these businesses remain stable throughout the year. Therefore, the data captured in this period represents the permanent structural supply of the service, regardless of seasonal demand peaks.

Regarding the data for the three analytical variables, information on the location of public-transport infrastructure was obtained from the official geoportals of the Madrid City Council and the Community of Madrid. For Short-Term Rentals (STRs), we used the list of tourist accommodations offered on the Airbnb platform during June 2024 for the city of Madrid, as provided by InsideAirbnb. Finally, the selection of main tourist resources was based on two sources: (a) the top 10 recommended attractions on Tripadvisor; and, (b) the "must-see places in the city" listed on the official tourism website of the Madrid City Council. The choice of these sources, rather than official visitor counts (which are often restricted to ticketed monuments), is justified by the need to include iconic public spaces and landmarks (e.g., Plaza de Cibeles or Puerta del Sol). These sites, while lacking formal counting mechanisms, act as major nodes of tourist flow. Table 2 presents the final selection of resources. For each one, geographic coordinates were extracted using information available on Google Maps.

Table 2. Main tourist attractions in Madrid based on Tripadvisor and the "must-see places" listed on the official tourism website of the Madrid City Council

Tripadvisor	Madrid City Council
Royal Palace	Royal Palace
Santiago Bernabéu Stadium	Santiago Bernabéu Stadium
Plaza de Cibeles	Plaza de Cibeles
Plaza Mayor	Plaza Mayor
Puerta del Sol	Puerta del Sol
Palacio de Cristal (El Retiro Park)	El Retiro Park

Temple of Debod	Puerta de Alcalá
Gran Vía	Reina Sofía Museum
Cerralbo Museum	Thyssen-Bornemisza National Museum
Las Ventas Bullring	Prado Museum
	El Rastro
	San Miguel Market
	San Antón Market

Source: Own elaboration

4.3 Data processing and typology definition

First, the dataset underwent a rigorous manual and automated validation process to ensure its quality and consistency. For the data obtained via web scraping, a detailed cleaning protocol was applied to identify and remove entries showing errors, duplicates, or inconsistencies. This ensured that the information stored for statistical processing reflects a verified and reliable universe of luggage-storage establishments in the study area. The information was stored in a spreadsheet to facilitate subsequent statistical processing.

Second, the luggage-storage establishments were classified into three categories, according to the following definitions:

- **Lockers**: companies that operate premises equipped with technical, automated solutions. They are usually unstaffed. The booking process is managed online through access codes provided to customers, first to enter the premises and then to access the locker where belongings are stored. In some cases, lockers are installed inside other businesses offering different services, either tourism-related or oriented toward residents, such as laundromats. In all cases, prices generally vary according to locker size.
- **Luggage storage offered in local businesses through digital platforms**: local businesses in the city (shops, bars, restaurants, food stores, etc.) that store luggage as a commercial activity complementary to their main activity. Their service is commercialized through digital platforms, companies that operate online as intermediaries between end users and these businesses. This type of establishment typically charges based on the number of items to be stored.
- **Luggage-storage counters**: traditional luggage-storage businesses whose main activity is storing baggage. They are staffed. Pricing usually depends on the number and size of items or on storage time. Many of these businesses offer complementary services, such as boarding-pass printing, souvenir sales, or device charging.

4.4 Spatial representation and analysis

Based on the location coordinates, we created a point vector layer of establishments offering luggage-storage services using the QGIS Geographic Information System (GIS). This layer enabled the cartographic

representation of the analysed establishments and the study of their spatial distribution. The same procedure was applied to map the main tourist attractions in Madrid.

Additionally, using QGIS, we mapped the supply of luggage-storage establishments by typology, as well as the relationship between this supply and the three analytical variables considered: the location of major transport infrastructures (short-, medium-, and long-distance train stations; key transport hubs; and the airport); the main tourist attractions in the city; and the distribution of STRs. No spatial transformations of the original vector data (points, lines) were applied for map design and composition. Therefore, all maps used in the analysis were produced directly from the visualization of the datasets described above, using different types of symbology (simple points, proportional symbols, and heat maps).

We also performed spatial counts in QGIS of the number of establishments of each type and company located inside each of the three areas of analysis: the urban core or "Almendra central", the municipality of Madrid, and the metropolitan area. To this end, we first clipped the initial point vector layer by the boundaries of the urban core and municipality of Madrid and then calculated the number of establishments per type and company in each layer.

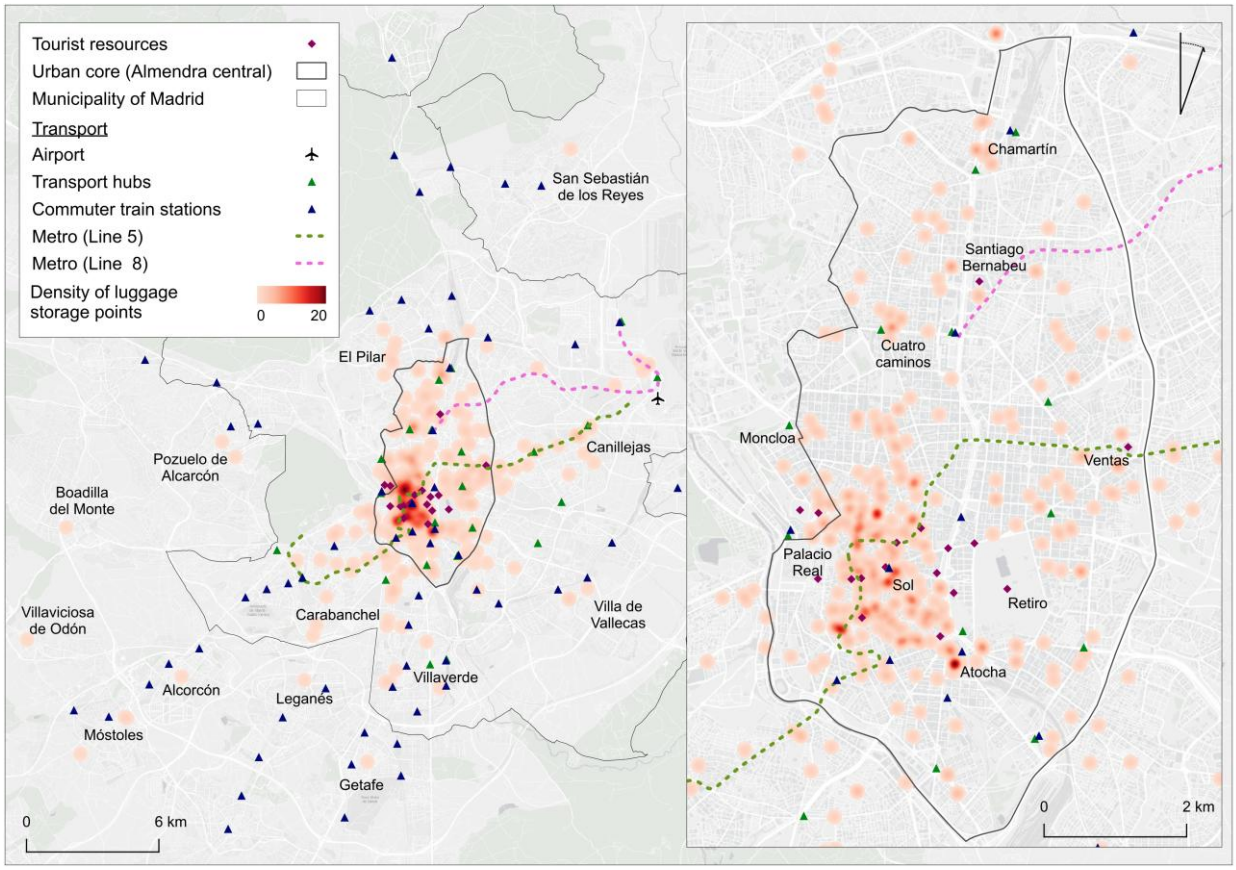
5 Results

This research analysed the spatial distribution of luggage-storage establishments in the city of Madrid and their relationship with the three analytical variables considered (Section 5.1), characterized the typology of establishments providing these services (Section 5.2), and, finally, examined their potential demand (Section 5.3). The results for each of these aspects are presented in detail below.

5.1 Spatial distribution of luggage-storage establishments and their relationship with accessibility to public transport, tourist resources, and the supply of STRs

As shown in Figure 2, luggage-storage businesses advertised within the city of Madrid extend beyond the municipal boundaries, with a notable presence in municipalities to the south and west of the city. However, these locations account for only a minority of the overall supply (Table 3). Most establishments are concentrated in the historic city center, as well as within the M-30 ring road, the orbital road surrounding Madrid's "almendra central," which constitutes the city's economic and functional core (Figure 2, Table 3).

Figure 2. Spatial distribution of luggage-storage establishments in the city of Madrid in relation to key tourist attractions and transport infrastructures



Source: Own elaboration based on ESRI maps and administrative and transport-infrastructure information for Madrid (IDEM Comunidad de Madrid)

A strong concentration of luggage-storage services is observed around the main transport infrastructures in the city: the two high-speed train stations (Atocha and Chamartín) and Adolfo Suárez Madrid-Barajas Airport. In contrast, at bus stations such as Méndez Álvaro or at the various intermodal hubs in the city (e.g., Avenida de América, Príncipe Pío), the presence of establishments is marginal. The Moncloa intermodal hub constitutes a partial exception, with a small number of surrounding establishments. However, this appears to be more closely related to its central location in the city, adjacent to major tourist and functional areas, than to its role as a transport node.

Around Barajas Airport, several establishments are located in nearby neighborhoods that are not primarily tourist-oriented, such as Barajas and Canillejas. This pattern can be explained by their physical proximity to the airport and, to some extent, by their strong public-transport connectivity: Metro Line 8, the only line connecting the airport to the city, includes a station in Barajas between the airport terminals (T1–T3 and T4); the Canillejas roundabout, in addition to a station on Metro Line 5, which connects eastern Madrid to the city center, hosts stops for municipal buses serving the airport and functions as a major interchange for regional buses operating in the eastern part of the Community of Madrid. Furthermore,

a high density of luggage-storage establishments is also observed along the Castellana axis, associated with business activity and the corridor linking two key transport nodes for short- and medium-distance travel: Nuevos Ministerios and Chamartín stations (Figure 2).

Table 3. Number of luggage storage establishments by type and area of the city. For the services offered through digital platforms, data are disaggregated by operating company. Values in brackets indicate establishments located exclusively within that specific area.

	Total	Counters	Lockers	Digital platforms					
				Bounce	L.hero	Nannybag	Qeepl	Rad.St	Stasher
Urban core (Almendra central)	396	3	27	99	11	69	11	97	79
Municipality of Madrid	500 (104)	3 (0)	27 (0)	113 (14)	12 (1)	81 (12)	17 (6)	131 (34)	116 (37)
Metropolitan area of Madrid	515 (15)	3 (0)	27 (0)	113 (0)	12 (0)	86 (5)	17 (0)	133 (2)	124 (8)

Note: Establishment types include: luggage-storage counters; lockers; luggage storage offered in local businesses through digital platforms. Operating companies include: Bounce; Luggagehero; Nannybag; Qeepl; Radicalstorage; Stasher.

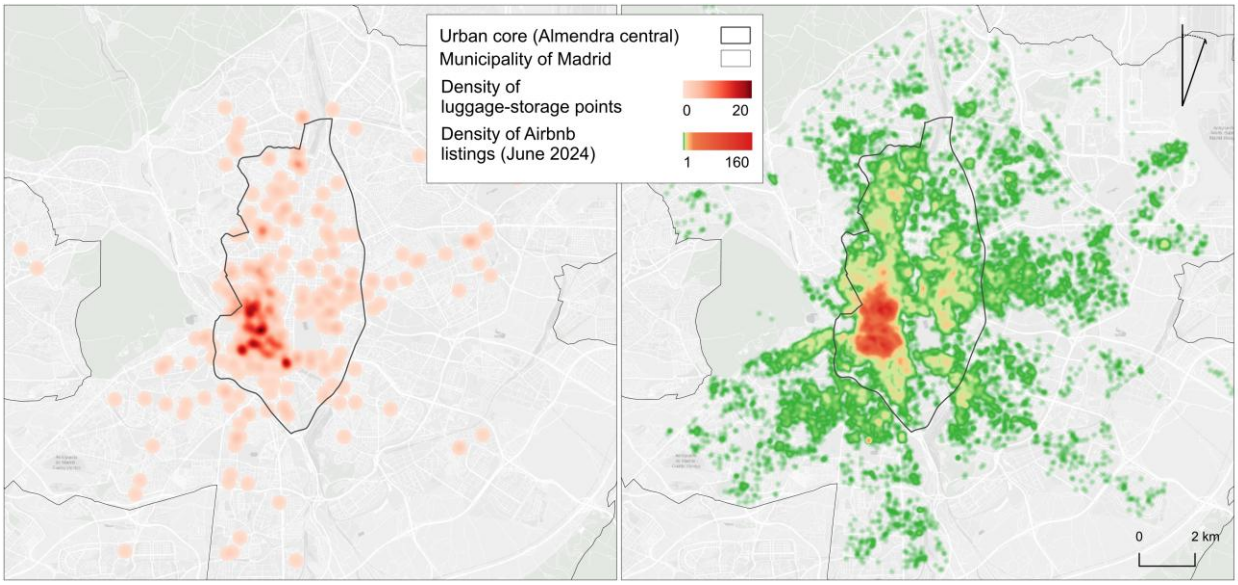
Source: Own elaboration

As expected, there is a clear relationship between major tourist attractions and luggage-storage locations (Figure 2). For example, establishments are found near venues such as the Santiago Bernabéu Stadium and Las Ventas bullring, both associated with leisure and short visits for events. These two attractions lie outside the historic center, where most tourist sites and luggage-storage services are concentrated.

Three major tourist sites show no nearby storage facilities: the Royal Palace, Plaza de Cibeles, and Puerta de Alcalá. The Royal Palace's location within a monumental complex away from commercial premises helps explain this pattern. On the other hand, the absence of facilities around Plaza de Cibeles and Puerta de Alcalá applies throughout the Castellana axis (up to the Bernabéu Stadium) and the Paseo del Prado. In the latter case, the lack of facilities is linked to the monumental character and limited commercial development of the corridor. This pattern can be extended to much of the Castellana corridor, which features public-sector and office functions rather than commercial uses suitable for luggage-storage businesses.

Finally, the spatial distribution of luggage-storage establishments in Madrid closely mirrors the concentration of STRs in the city (Figure 3). In both cases, the highest concentration occurs in the historic core, Madrid's main tourist area, which confirms the logic of a co-location pattern for services aimed at tourists. In the areas surrounding the historic center, particularly along the Castellana axis and in neighborhoods such as Salamanca, Goya, and Arganzuela, a similar spatial clustering is observed between STRs and luggage-storage facilities.

Figure 3. Visual comparison between the spatial distribution of luggage-storage services and the number of Short-Term Rentals (STRs) listed on the Airbnb platform in June 2024 for the municipality of Madrid



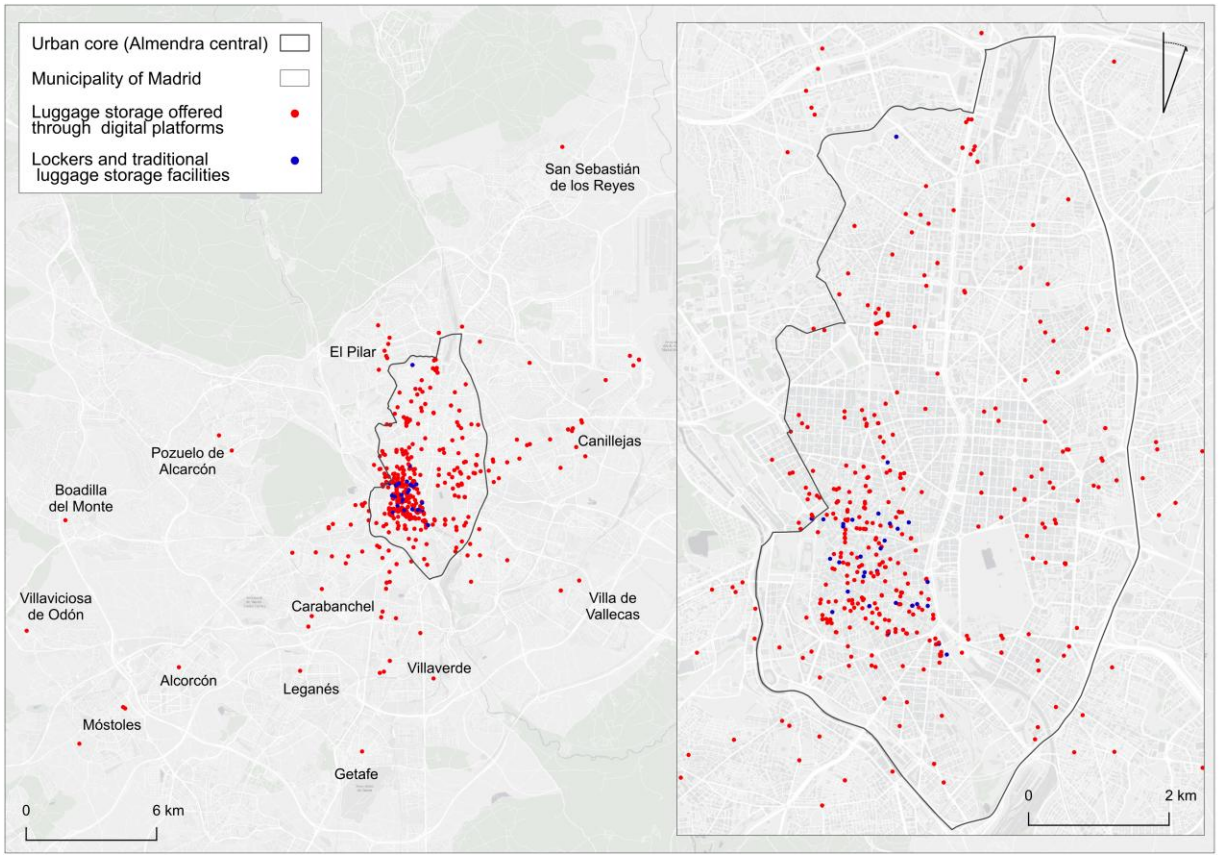
Source: Own elaboration based on ESRI maps, municipal boundaries of Madrid (IDEM Comunidad de Madrid), and listings on Airbnb in June 2024 (InsideAirBnB)

A certain degree of correlation can therefore be observed between both phenomena, as they exhibit a similar spatial distribution and appear to share the user base, as suggested by some of the media sources cited in the introduction. However, it is important to note that the strength and intensity of this correlation require further clarification, since both services are also strongly associated with proximity to the city's main tourist areas and attractions, as previously analyzed.

5.2 Characterization of luggage-storage establishments

Three types of luggage-storage establishments were identified: traditional storage facilities that offer this service along with other tourism-related services; commercial establishments that provide storage through digital platforms; and lockers, which are automated and unattended. As shown in Figure 4, lockers are mainly concentrated in the historic center and around Atocha high-speed train station, similar to traditional luggage-storage facilities, although the latter are very few. In contrast, facilities offered through digital platforms are dispersed throughout the city.

Figure 4. Spatial distribution of luggage-storage establishments in Madrid by type: lockers and traditional storage facilities vs. storage services offered through intermediary digital platforms



Source: Own elaboration based on ESRI maps and municipal boundaries of Madrid (IDEM Comunidad de Madrid)

The diffusion patterns of those establishments offering luggage-storage services as a complementary activity through digital platforms vary according to the considered company, with significant differences in the number of associated establishments (Tables 3 and 4). For example, Figure 5 shows that Luggage Hero follows a pattern similar to lockers and is only present in the historic center, with a very limited number of associated locations. Bounce and Qeepl operate exclusively in the city of Madrid (Table 3) and are mainly found within the inner core and along the axis leading to the airport (in the case of Qeepl), or directly at the airport (in the case of Bounce). Bounce has a large number of associated establishments, unlike Qeepl. Nanny Bag follows a similar spatial pattern to the previous companies within the municipality, but it is also present in more peripheral municipalities, such as Móstoles (3), Alcorcón (1), and Villaviciosa de Odón (1). Stasher and Radical Storage, both with a substantial number of associated establishments, spread across the entire city and reach peripheral neighborhoods and districts, particularly in the south. Additionally, like Nanny Bag, Stasher extends beyond Madrid's municipal boundaries and has luggage-storage points in Getafe (1), Leganés (1), Boadilla (1), Pozuelo (2), and San Sebastián de los Reyes (1).

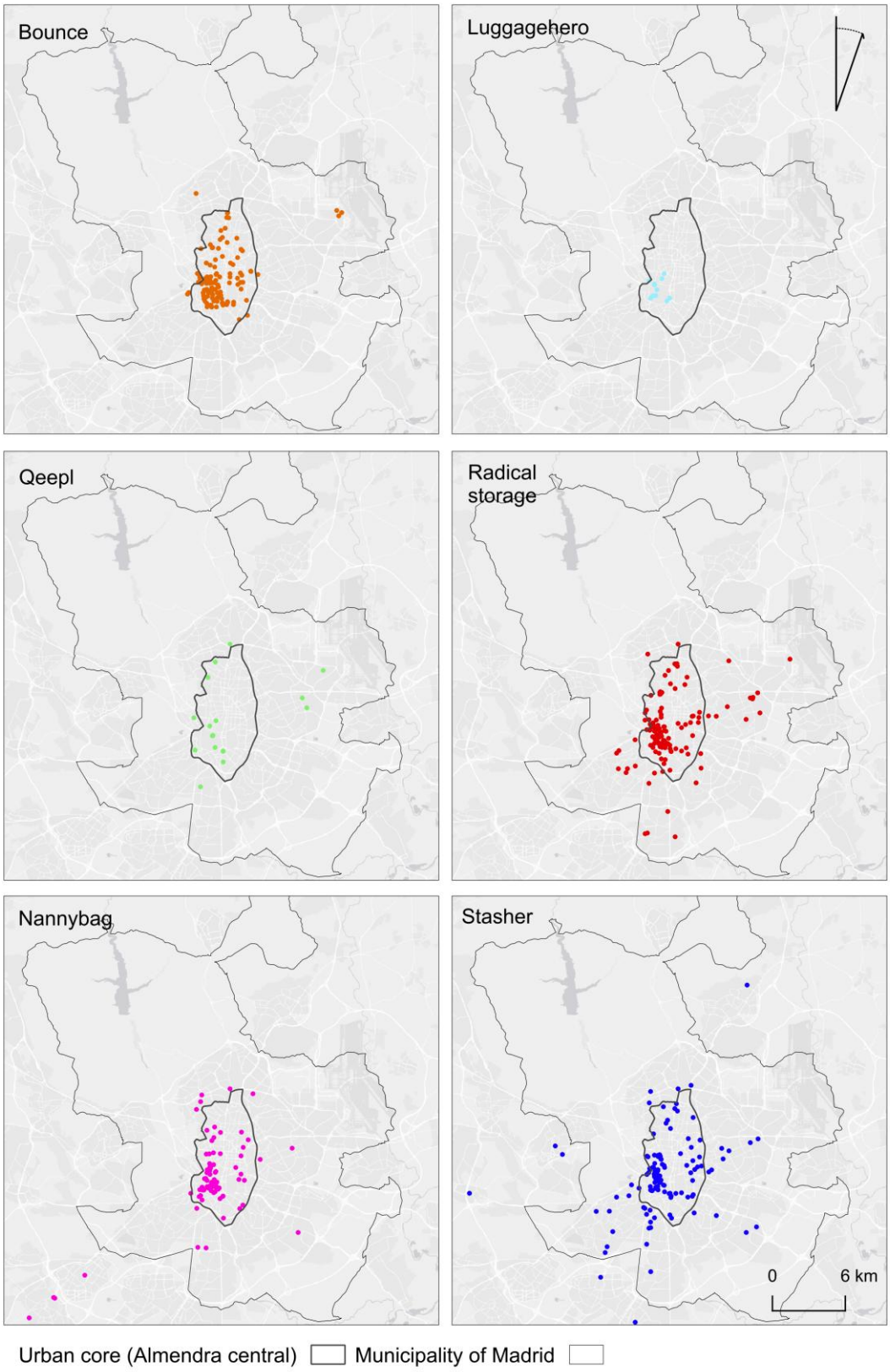
Table 4. Selected luggage-storage companies operating in Madrid, with the number of establishments managed by each

Type of company	Company name	Number of establishments
Lockers	Bags Resort	1
	Lock and Be Free	6
	Lock and Enjoy	2
	Lock and Go Mad	1
	Locker4rent	1
	Locker in the City	10
	Locking	1
	Madrid Lockers	1
	Stow Your Bags	3
	The Yellow Lockers	1
Digital platforms offering luggage-storage services	Bounce	113
	Luggage Hero	12
	Nannybag	86
	Qeepl	17
	Radical Storage	133
	Stasher	124
Traditional luggage-storage facilities	Bag and Laundry	1
	Fun and Tickets	1
	Naturanda	1

Source: Own elaboration

Finally, it is worth noting that that there appears to be little overlap in supply among the different companies; instead, their services seem to complement each other. In other words, a single business does not appear to offer its luggage-storage services through multiple digital platforms (Figure 5).

Figure 5. Spatial distribution of luggage-storage establishments operated through digital platforms, by platform

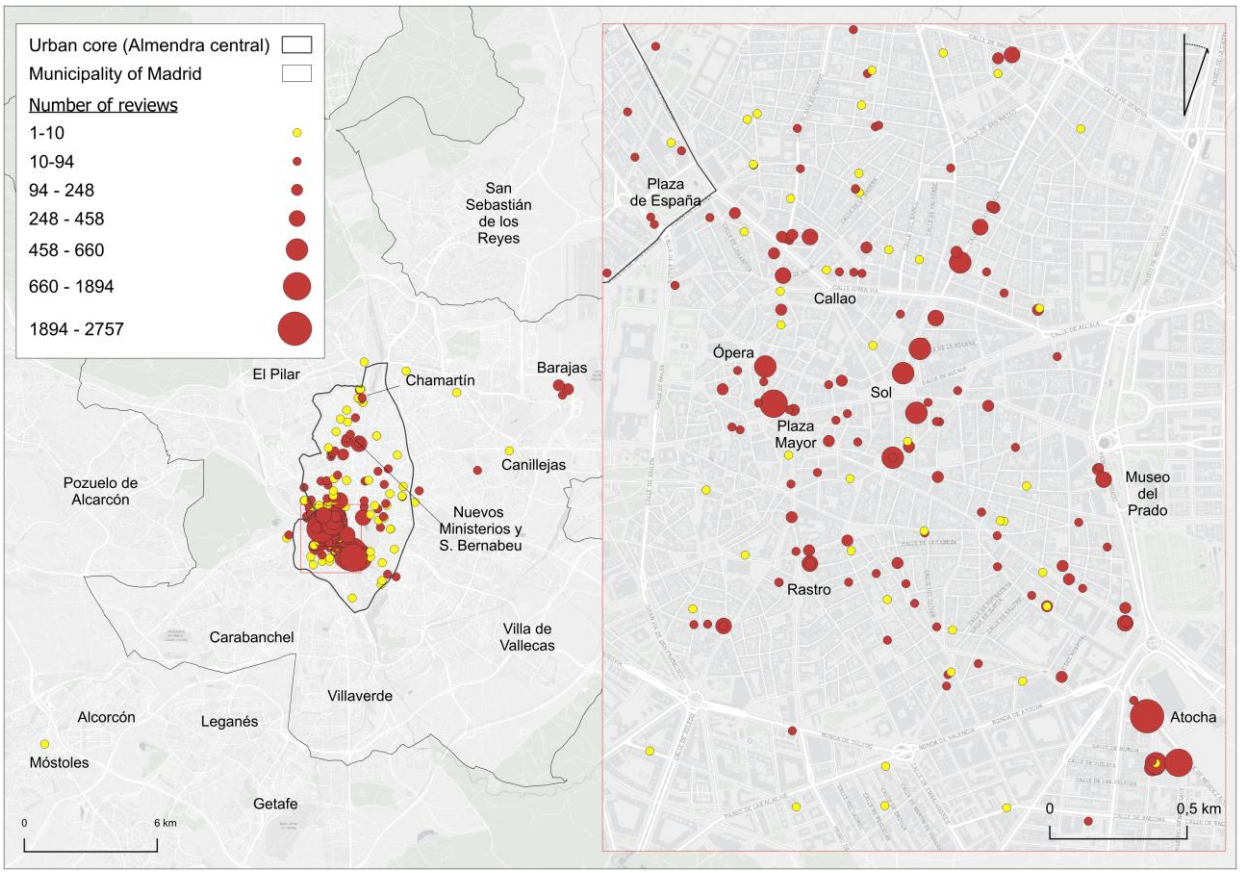


Source: Own elaboration based on ESRI maps and municipal boundaries of Madrid (IDEM Comunidad de Madrid)

5.3 Demand for the establishments

To analyze the intensity of use of the different establishments, the number of reviews available for each location was used. However, the platforms Qeepl, Radical Storage, and Stasher do not provide information on customer reviews, so the potential use of their establishments remains unknown.

Figure 6. Demand for luggage-storage establishments in Madrid, according to the number of user reviews



Source: Own elaboration based on ESRI maps and municipal boundaries of Madrid (IDEM Comunidad de Madrid)

Figure 6 shows a notable difference between the supply of luggage-storage services and their actual use. The establishments with the highest use, according to the number of reviews recorded, are those located in the historic center and, more generally, within Madrid's urban core (the almendra central), which constitutes the city's economic and functional core. Outside this inner core, only a few establishments have any reviews, most of which are either located on the boundary of the almendra central or along Metro lines 5 and 8, which, as mentioned above, run towards the airport.

The points with the highest intensity of use are located in the historic center and are closely linked to major mobility hubs. Notable examples include the high-speed train station of Atocha and Puerta del Sol, which, in addition to being a major tourist attraction, functions as a key transportation hub in Madrid's network, with both a metro station and a commuter-rail station. Other mobility hubs with establishments showing a high number of reviews are Chamartín station, the intermodal area of Cuatro Caminos, and

Barajas Airport. Outside the center and within the almendra central, high-intensity points can also be found near Retiro Park and the Santiago Bernabéu Stadium.

Notwithstanding, the results reveal important differences between the companies analyzed. The establishments with the highest number of reviews are locker-type facilities, as this information was collected directly from Google Maps. The number of reviews associated with Bounce establishments also stands out.

6 Discussion

The proliferation of luggage-storage businesses in the city of Madrid is a significant phenomenon that may have been encouraged by the increase in Short-Term Rentals (STRs), which, unlike other traditional accommodation types, do not offer this service. Overall, demand is concentrated in the historic center of the city and, to a lesser extent, around Retiro Park and the Santiago Bernabéu Stadium, as well as near key mobility nodes, such as the airport, Atocha and Chamartín train stations, and the Cuatro Caminos junction.

Luggage-storage can be often considered a “silent” commercial activity. While lockers and traditional baggage-storage facilities are visible to passersby and have already drawn the attention of certain residents, who observe how traditional businesses in the city center have been replaced by these types of services, the businesses that offer luggage storage as a complement to their main activity (hair salons, shops, restaurants, bars, etc.) are practically invisible to residents. However, these are precisely the businesses providing the largest number of storage points. Thus, we can refer to a growing process of urban touristification that does not directly manifest itself in the urban landscape. Instead, it involves incorporating new functions into existing assets, whether these are homes or commercial premises.

While previous studies like Kordel et al. (2024) highlighted the visible urban transformation caused by automated lockers in historic centers, our findings expand this perspective by revealing a 'silent' layer of touristification driven by digital intermediaries that remains physically imperceptible to residents. In this transformation, digital intermediary platforms play a key role and therefore require careful analysis.

The supply of luggage-storage companies in Madrid is dominated by locker companies, concentrated in the historic city center and showing the highest demand according to the review count. This spatial convergence suggests that luggage storage acts as a catalyst for further touristification in areas already saturated with tourism activity. Alongside them, six digital platforms were identified offering luggage-storage services through local commercial establishments, mainly within the urban core (Almendra central) and around the airport. As previously noted, these operators are multinational digital intermediaries (such as Bounce, Stasher, or Radical Storage) that apply standardized global strategies to the local urban landscape. Crucially, as shown in the detailed mapping of different operators, the empirical

evidence reveals a lack of overlap in supply. Unlike other platform economy sectors where a single local business might simultaneously use multiple intermediaries (e.g., a restaurant using both UberEats and JustEat), local shops in Madrid tend to affiliate with only one luggage platform. This suggests that these global networks are aggressively competing to 'capture' and monopolize local commercial assets, effectively fragmenting the urban space into their own exclusive, corporate micro-territories.

Part of the establishments offered by these intermediary platforms are located in municipalities within the metropolitan area of Madrid, primarily in the southern areas of the region. Nevertheless, on their websites, these services are marketed as being part of Madrid. As with STRs offered through global digital platforms like Airbnb, these services, marketed by global digital intermediaries, contribute to diluting the spatial footprint of tourism and its impacts across the city, expanding into peripheral areas where tourism has traditionally been minimal (Cerdá-Mansilla et al., 2021; Gil & Sequera, 2018).

Related to this, a relatively clear relationship seems to exist between the distribution of STRs in Madrid and the supply of luggage-storage services, confirming the association between the two types of activities linked to platform capitalism. Nevertheless, a clear concentration of luggage-storage facilities is also observed around the main transportation infrastructures, especially the airport and the high-speed train stations, as well as near the city's major tourist attractions, particularly around the Santiago Bernabéu Stadium and Las Ventas bullring. In fact, when analyzing demand, it is mainly concentrated at these points. In this sense, a spatial pattern similar to that of tourist accommodation emerges: a wide spatial distribution of supply throughout the city, and a strong concentration of demand and usage intensity in the city center, associated with accessibility to major tourist attractions. This spatial behavior supports the arguments of Guttentag (2019) and Celata et al. (2020) showing that even the tourist activity can spread throughout the city it remains mostly concentrated in specific urban areas where most tourist flows and activities converge.

Two corridors stand out where a significant number of luggage-storage points are located despite the absence of major tourist attractions. One runs between Nuevos Ministerios and Chamartín stations, and the other corresponds to metro Line 5, which passes through the tourist center and approaches the airport without reaching it. These patterns reinforce the close link between transportation infrastructure and luggage-storage services as facilitators of tourist mobility.

7 Study limitations and directions for future research

This study presents several limitations, pointing toward avenues for future research. First, reviews are not a fully reliable variable for measuring the use of a storage facility, as some businesses may not participate in online review systems or may promote them less actively. In fact, several companies analysed did not provide any information on user reviews. Additionally, the volume of reviews can be influenced by the

nature of the user experience; for instance, poor service quality may incentivize users to leave feedback more frequently than satisfactory experiences. Second, although there appears to be no overlap between establishments offered by the different companies, and supply seems complementary, a precise analysis has not yet been conducted to confirm this. Future research should assess possible overlap and duplication between services.

In addition, further investigation is required to understand certain spatial patterns for which no clear or single explanation has been identified, at least from the perspective of tourism demand. For instance, the concentration of locations with a significant number of reviews along metro Line 5, which runs near but not directly to the airport (and is approximately a half-hour walk away), is noteworthy. This raises questions, considering that tourists typically store their luggage near their accommodation or close to the departure point for their return journey. To address these gaps, a second phase of this research is planned to incorporate primary fieldwork. This will involve localized field campaigns, surveys, and interviews to perform ground-truthing verification, allowing us to better understand users' selection and usage patterns based on location.

On the other hand, while this study provides a robust foundational mapping of the territorial impact of luggage platforms, we acknowledge that the current analysis is primarily descriptive. Future research should build upon these initial findings by incorporating advanced spatial statistical methods to further validate the patterns identified through visual inspection in this exploratory phase.

Finally, future research should also examine the economic relevance of this activity for local businesses offering luggage storage as a secondary service. In specific, it should be explored whether a phenomenon like STRs, which has displaced traditional businesses from certain urban areas, may simultaneously be supporting their survival by creating new complementary business opportunities.

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