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ARTICLE

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The Digitalization of the Housing Market in Spain: A Case Study of the Use of Online Platforms and Spatial Inequalities

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Abstract

Online platforms are the main form of mediation in the housing market. While their importance has grown significantly in recent decades, that growth has been uneven throughout various territories and social groups. The role of online platforms goes beyond intermediation; the ease of access they provide stimulates market activity, while the concentration of listings on the same web portals homogenizes and raises prices. This article uses a unique database on housing supply for rentals and sales by census tract from Spain's primary online housing portal between 2012 and 2021. Using data from this portal as a case study, we analyse how the gradual growth of the digital housing supply (in both space and time) is connected to changes in the distribution and characteristics of the housing units. Rental and sales markets show spatial differences, with opposing dynamics in rural and urban areas, highlighting a digital divide. Middle-class urban areas, which also attract tourists, are the most active markets, while rural areas remain less dynamic. Housing in more active markets, in turn, appreciates, increasing territorial inequality. Rising prices benefit existing owners but are a disadvantage to potential buyers, especially lower-income households. In that respect, our case study points to the conclusion that the digital divide in the use of online intermediation tools amplifies territorial and social inequalities.

Keywords

digital divide; housing; proptech; purchase; rental

1. Introduction

Building on advances in information and communication technologies, contemporary societies are replacing established procedures, work practices, and systems of exchange with new digital tools. Digitalization, however, is not an entirely new phenomenon, but rather the intensification of a broader, long-standing process. As early as the 1930s, Toynbee (1987) identified this trend, which he termed “etherealization,” in which materials are progressively reduced, lightened, and ultimately dematerialized. This trajectory has transformed not only physical objects, such as telephones and computers, but also social processes, fundamentally reshaping how problems are addressed and solutions enacted.

For its part, housing exemplifies materiality in its most tangible form. As a solid construction anchored to the land, it resists portability and allows only limited, often complex modifications, so much so that many prefer relocation to renovation. Given its high cost and centrality to everyday life, housing constitutes one of the most significant markets in social and economic terms (Zhao & Liu, 2023). The difficulty of navigating this market, which has been shown to be greater for lower-income families and young people, has elevated the role of intermediaries, particularly online real estate platforms. These companies are commonly included as part of so-called property technologies—often shortened to “proptech” (Asensio-Soto & Navarro-Astor, 2022)—a broader term referring to the incorporation of different advances in IT into the real estate business. Such actors have been crucial to the shaping of the capitalist city (Yates, 2021). Indeed, the housing market has undergone a profound transformation in recent decades due to digitalization (Asensio-Soto & Navarro-Astor, 2022), although its implementation has been slower than in other sectors. Advertisements once displayed on office bulletin boards or affixed to the balconies or windows of properties are now predominantly hosted on digital platforms, especially regarding the rental market (Fernández Gallardo & Millán Vázquez de la Torre, 2021).

Digitalization is not only reshaping behaviours and businesses, but is also altering the social structure. Unequal access to—and uneven proficiency with—new technologies and devices has created a digital divide between different social groups, broadening and deepening social inequalities (Barbeta-Viñas & Sánchez-Gelabert, 2023), with digitalization at times playing a crucial role in social life, such as during the Covid-19 pandemic (González Vidal & Gewerc Barujel, 2021). This raises questions about whether digitalization, in the form of the rise and consolidation of these platforms, also impacts the existing inequality in already unequal societies.

Our article addresses this gap by focusing on the growth of real estate portals, as an example of the housing market digitalization that has happened around the world in recent decades, and by questioning how this evolution affects socio-spatial inequality at different scales. To that end, we used data on the number of advertisements and prices in Idealista, the largest online real estate platform in Spain and one of the pioneers in the field, making it an ideal case study for developments in the field overall. Data from this source has already proven to be a valid indicator for studying the market in previous studies (Rey-Blanco, González, et al., 2024). The main objectives in this article are to (a) analyse the evolution of the use of this online housing platform in space and time, (b) identify areas where the use of the real estate portal has increased the most in both the rental and sales markets, and (c) analyse the association between these areas and price dynamics at the local level. Our findings contribute to the literature in three key ways. First, they demonstrate the potential of data derived from private platforms like Idealista for social, urban, and political research. Second, the results reveal substantial differences between urban and non-urban areas, both across metropolitan regions and between neighbourhoods, indicating that housing markets are unevenly represented and shaped by online platforms. Third, these spatially uneven patterns of digitalization have direct implications for urban policy, as they can reinforce existing territorial inequalities, affect the availability and visibility of housing information, and determine the capacity of local governments to target and evaluate housing policies.

2. Conceptual Background

2.1. Digitalization and the Digital Divide

Although "digitization" and "digitalization" are both terms that have been widely used in the literature in recent decades—sometimes interchangeably—there is a school of thought, as presented by Brennen and Kreiss (2016), that justifies distinguishing between them. While digitization is "the technical process of converting streams of analogue information into digital bits of 1s and 0s with discrete and discontinuous value" (p. 1), digitalization is "the structuring of many and diverse domains of social life around digital communication and media infrastructures" (p. 5). However, the relationship between the two phenomena is undeniable, and applied to the subject of this study, it becomes clear that the digitization of the housing supply in Spain is a proxy for the digitalization process that is still developing in the country.

While digitalization is often presented as a matter of technical innovation, it is a phenomenon whose scope extends far beyond the technological dimension, since it reshapes markets, systems of governance, and even practices in everyday life. The extent of these changes has led to the emergence of a new social paradigm, primarily based on digitalization, as in Lupton's (2015) digital society, and on information as the fundamental raw material of the system, or Castells's (1997) information society, and specifically on data, the basis of so-called platform capitalism (Srnicek, 2018).

However, this process is not uniform across time and space. New inequalities, related to integration into the digital society, are arising in the form of the so-called digital divide. This term has also undergone its own evolution, from mainly referring to differences in access to the Internet, to control of the network, through to differences in use (Pizzi et al., 2023). These distinctions, which have been shown to be multidimensional in the literature (Pérez-Amaral et al., 2021), are therefore particularly complex to study and understand, sometimes obscuring the true causes of such gaps (Papí-Gálvez & La Parra-Casado, 2023).

Given that digitalization is a relatively recent and rapidly evolving phenomenon, the first gaps that come to mind are those related to age. Differences in digital performance according to age have been shown in recent studies, such as Papí-Gálvez and La Parra-Casado (2023), who report poorer digital socialization among people older than 75. Furthermore, even within the same age groups, it has been shown that differences in access to new technologies, and especially in the quality of that access and in the uses made of those new technologies, are also significant and are related to the socioeconomic conditions of the population, as shown in Calderón Gómez (2019) in the case of young people aged 16 to 34.

Similarly, studies on the digital divide have found evidence of a gender divide, according to which women are at a disadvantage in the digitalization race. Although this gap is narrowing in some areas, as shown in the study by Castaño et al. (2011), and in some cases is not significant (Papí-Gálvez and La Parra-Casado, 2023), it is still notable in other areas, such as STEM studies and the labour market in Spain (González Vidal & Gewerc Barujel, 2021). However, other macro-structural factors may explain the differences between genders, such as socioeconomic or educational conditions (Calderón Gómez, 2019).

Just as age and gender appear to be mediated by factors such as education or socioeconomic status in the digital divide, another variable closely related to social class—place of residence—can also serve as a focus for studying differences in digitalization, in this case from a spatial perspective. This is particularly evident in studies on online consumption, which Barbeta-Viñas and Sánchez-Gelabert (2023, p. 42) consider a "new factor of inequality" in the digital society.

These inequalities can also occur between countries. In the case of Spain, evidence has been found of lower development in the use of ICTs when compared to the European average, as well as more pronounced gender differences than in neighbouring countries (Caridad Sebastian & Ayuso García, 2011; Castaño et al., 2011). The same phenomenon has also been identified within the same country. However, Wu and Liu (2025) have shown that although there are differences between rural and urban areas in terms of access, use and the impact of digitalization, in some respects the cross-cutting nature of digital space means that some distinctions that are apparent in the physical world are not as apparent in the digital world, although they can be identified in differences in digital culture.

Although digital space is often presented as globally accessible and has been included in studies on public space as another of its dimensions (Smith & Low, 2013), the geographies of digital consumption remain uneven, and the study of the phenomenon is an ongoing process. Nevertheless, these studies point to a spatial inequality that replicates the disparities of the physical world in both the digital realm (Liu, 2023) and the housing market.

2.2. Digitalization and the Housing Market

Digitalization in the housing market can be broadly defined as the transition from traditional, physical channels of property exchange to virtual platforms. This shift entails the migration of property advertising and brokerage from offline methods, such as newspaper listings and local estate agencies, to online portals and digital intermediaries (Boeing, 2020). The Internet has become a primary medium for property listings, fundamentally reshaping the way information is accessed and disseminated in real estate markets.

Within this context, property technology—or proptech—has emerged as a term that encapsulates the technological transformation of real estate. Proptech refers to the incorporation of digital tools, data analytics, and platform-based models in real estate intermediation (Asensio-Soto & Navarro-Astor, 2022). Online housing platforms have introduced alternative business models that challenge traditional brokerage structures. Instead of relying on physical offices and commission-based fees, online platforms often operate with reduced or fixed fees, using the digital platforms to directly connect sellers and buyers (Gedikli et al., 2025). Evidence suggests that online platforms accelerate sales processes and achieve a closer alignment between listed and realized prices compared to traditional agencies (Gedikli et al., 2025).

The impact of these platforms extends beyond their own transactions. Their growth has also influenced the behaviour of traditional brokers, forcing them to adapt by lowering fees and incorporating digital strategies to remain competitive (Asensio-Soto & Navarro-Astor, 2022). Furthermore, online platforms have expanded the visibility of properties, increasing liquidity and reducing information asymmetries in housing markets (Jiang et al., 2023; Zhang et al., 2023). As such, the rise of online agencies is reshaping not only the online market but also the dynamics of the housing market as a whole.

The increasing centrality of digital platforms raises questions about how closely online listings reflect real housing supply. Research shows that online housing markets do not fully capture the diversity of available properties. Instead, listings are unevenly distributed across urban areas, often overrepresenting affluent or central neighbourhoods while underrepresenting disadvantaged ones (Abella et al., 2025; Boeing, 2020). This creates a digital bias, where certain communities and housing segments become less visible to potential buyers and tenants.

At the same time, online listings provide a valuable proxy for understanding real housing markets. Studies using online data have been able to identify spatial segmentations and patterns of availability that would otherwise be difficult to observe (Abella et al., 2025; Boeing & Waddell, 2016). One key issue in digital housing markets is the relationship between asking prices online and actual transaction prices offline. Research suggests that online platforms tend to present inflated or strategically set prices, which may deviate from the final sale or rental price. For example, in Madrid, online rental prices are consistently higher than official market benchmarks (Rey-Blanco, Arbues, et al., 2024). This discrepancy reflects strategic pricing behaviour by landlords. At the same time, online data has been shown to provide useful predictive power for housing market dynamics. Search activity and online engagement have been linked to subsequent price changes, as increased digital activity often precedes shifts in real demand and prices (Bennöhr & Oestmann, 2014; Beracha & Wintoki, 2013; van Dijk & Francke, 2018).

Moreover, the design and information flows of online platforms affect pricing outcomes. Digital platforms can reduce mismatches between listing and final prices by improving transparency and market efficiency (Jiang et al., 2023). They also enhance valuation processes through the integration of market activity into digital metrics, such as bidding and engagement data (Saputra & Putri, 2024). These mechanisms demonstrate the dual role of online platforms in both shaping and reflecting pricing dynamics.

Despite the promises of digitalization, online housing markets are characterized by spatial inequalities. Studies conducted in the United States have demonstrated that online listings disproportionately represent wealthier, whiter, and more educated neighbourhoods, while underrepresenting disadvantaged communities (Boeing, 2020). This unevenness reflects both supply-side dynamics—landlords in affluent areas are more likely to advertise online—and demand-side factors, such as differences in Internet access and digital literacy across populations.

Spatial segmentation in digital housing markets has been documented in several contexts. Abella et al. (2025) show how online listings reveal clear divisions between neighbourhoods, reinforcing existing urban inequalities. In this respect, digital housing markets reproduce offline spatial disparities, limiting the extent to which digitalization democratizes access to housing information. The consequences of these inequalities are significant. Overrepresentation of affluent areas increases their visibility and attractiveness, potentially accelerating processes like gentrification. Conversely, the underrepresentation of disadvantaged neighbourhoods restricts their residents' access to broader housing opportunities, perpetuating cycles of spatial exclusion (Boeing, 2020). These findings underscore that while digital platforms expand housing visibility, they do so unevenly, reinforcing pre-existing inequalities.

3. Data and Methods

This study uses housing stock and price data (for both sales and rental markets) obtained from the Idealista online real estate platform. The dataset reflects asking prices, not final prices. There is no adjusted formula to approximate actual prices, as there are no sources available with a similar degree of granulation and completion to use to make comparisons. However, for reference, actual purchase prices are generally lower than asking prices (instead of instigating bidding wars, owners usually set high asking prices and negotiate). Final rental prices, on the other hand, will be very close to the asking price. This is because the critical situation in the current housing rental market deprives renters of negotiating power, requiring them to make a significant economic effort to pay the rent (Khametshin et al., 2024). While other studies, such as Rey-Blanco, Arbues, et al. (2024), have accessed this information on prices using data scraping, our study obtained the information directly from the Idealista company, which provided us with a serialized dataset containing quarterly information for every spatial unit for a ten-year period. The dataset contains information at the census tract level for the entire country from 2012 to 2021, a period that spans from the housing market crisis to its subsequent recovery, the Covid-19 shock, and the rapid digitalization of housing market transactions. The available variables are the number of "for sale" and "for rent" advertisements per census tract, excluding duplicates (the "sale and rental stock") and the average price per square meter.

Regarding possible data limitations, no comparative study was made of different real estate portals. Instead, one specific portal was chosen based on both its importance in the sector and the fact that, as one of the oldest portals, it is able to provide a good example of the progressive development in the digital sector. A more in-depth study comparing different sources would yield more robust results. However, the lack of previous systematic studies (with either private or public data) makes Idealista a useful reference point for future, more exhaustive research.

The analytical strategy of this study follows a multiscale approach, examining the evolution of housing stock from the national scale (Spain as a whole) down to individual cities and, finally, studying differences at the census tract level for the case studies.

To address the first objective—analysing the evolution of the use of online housing platforms in space and time—we conducted a descriptive analysis of the temporal evolution of housing stock offered across Spain and within different types of municipalities. These municipalities were classified in two ways: (a) by their inclusion in metropolitan areas, according to Feria and Martínez-Bernabé (2016); and (b) by population size. To control for distortions related to municipal size, we calculated housing stock per capita, an approach that makes it possible to describe the general process of digitalization and its variation across the different levels of Spain's urban hierarchy.

For the second objective—identifying the areas where the use of the Idealista platform has increased the most—we mapped the spatial distribution of the housing stock change between 2012 and 2021 by municipality. By using per capita housing stock rather than raw stock, we were able to control for population size effects. We mapped the results for the whole country along with a detail of two metropolitan areas (Madrid and Barcelona) using the QGIS geographic information software.

Finally, to address the third objective—analysing the relationship between these areas and price dynamics—the municipalities were ranked on two top-20 lists, according to their total housing stock for sale and for rent at the end of the study period. For each list, we present the total stock in 2021, absolute growth, and relative growth (percentage change). From these rankings, three case studies were selected: Barcelona (a big city at the top of the urban hierarchy), Granada (a medium-sized city with a high increase in digitalization), and Torrevieja (a town in Alicante, with a high degree of digitalization in the sales market, but not in the rental market). For each case, we analysed the relationship between digitalization (housing stock evolution) and price dynamics, using correlation analyses. Regarding data diagnostics, no representative outliers were identified in the cases analysed. Correlation analysis was conducted using Pearson's r, which was selected given the linear nature of the relationships under study and the results of the pre-tests. Normality and linearity assumptions were assessed and met for the variables included in the analysis. The individual results for each city are displayed in scatterplots with fitted regression lines for each year (2012–2021), using census tracts within each municipality as the unit of analysis (see Supplementary File).

4. Results

4.1. General Evolution of the Use of Real Estate Portals in Spain

The analysis of the largest real estate portal suggests that the 2012–2021 period undoubtedly witnessed an intense digitalization of the real estate market in Spain, as shown in Figure 1. However, this phenomenon occurred principally in terms of sales and not rentals, which were dwarfed in comparison.

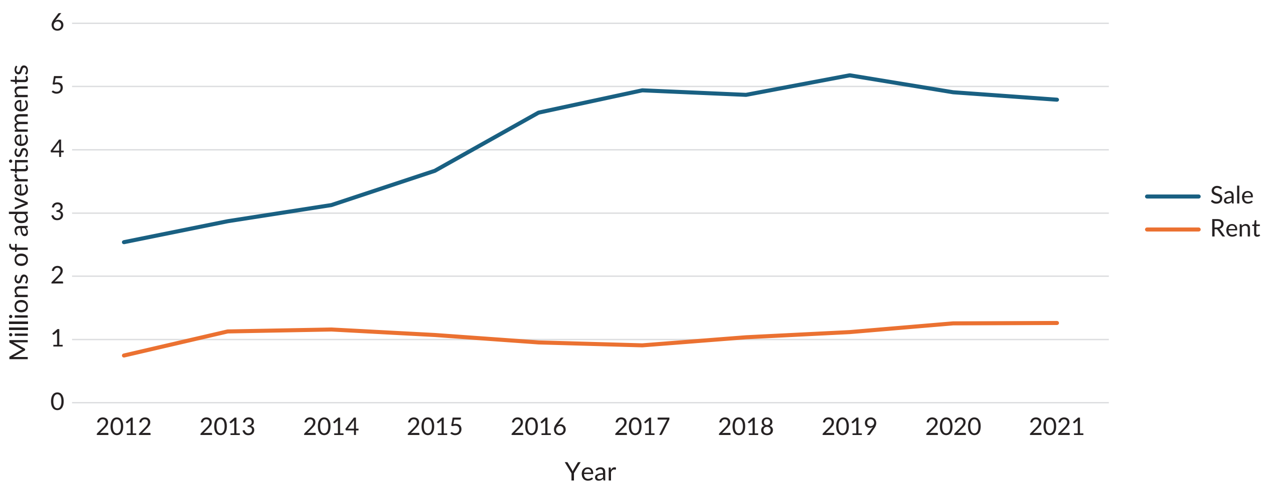

Figure 1. Evolution of overall sales and rental housing stock advertised in Spain (2012–2021), in millions. Source: Based on data from Idealista.

The number of advertisements for houses for sale on Idealista doubled in five years. But the pace of said digitalization was uneven. Three clear periods can be distinguished in the evolution of the sales stock:

1. 2012–2016 was a boom period, with an average yearly increase above 15%; the digital real estate market (and this platform in particular) was thriving, reflecting how online platforms might have become crucial in shaping contemporary urban markets (Yates, 2021).
2. The 2016–2019 period, when growth slowed to an average 5%, reaching a stagnation phase.
3. The post-Covid-19 pandemic period (2019–2021), when there was a decrease in the sales stock but a clear increase in the rental stock. While market uncertainty and an unexpected economic crisis acted as disincentives to buying a house, at the same time they reinforced the decision to rent, with its lower risks.

The size gap between the sales and rental markets makes it impossible to adequately analyse the rental stock with the first graph. Therefore, we separated the two stocks in Figure 2 and added another variable: the geographic location of the advertisements, separating those for metropolitan areas (which comprise the vast majority of urban Spain) from those for non-metropolitan spaces (rural areas and small cities). We also represented sales advertisements with a blue line and rental advertisements with orange columns (each with a different scale) to facilitate comparison.

This data segregation reveals some interesting differences. Regarding housing for sale on Idealista, the metropolitan supply was more consolidated at the beginning of the period and clearly stagnated in 2016, while the non-metropolitan supply was lower in 2012, but maintained steady growth until 2019. This difference reflects the earlier digitalization of urban spaces, confirming the existence of a digital divide on this real estate portal. Rural areas and smaller cities generally have an older, less educated population, and

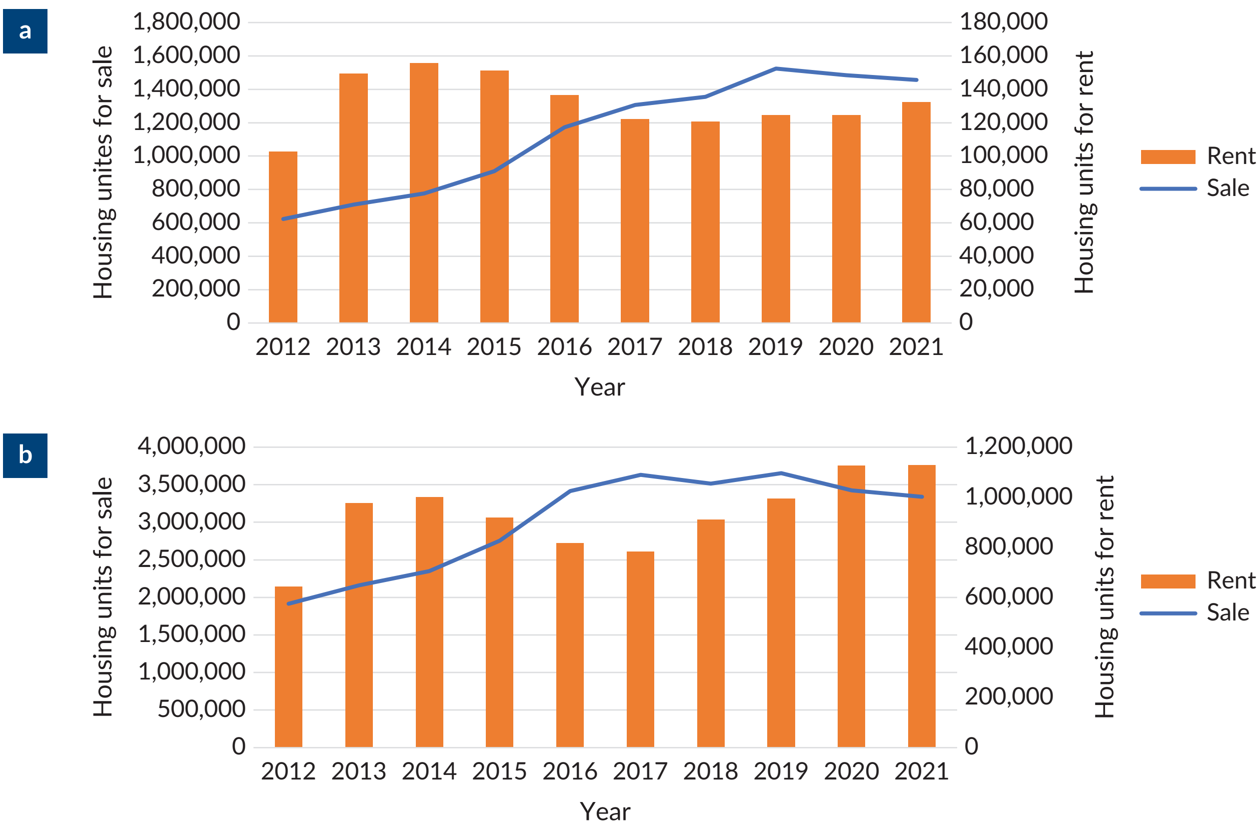

Figure 2. Evolution of housing stock for sale and rent in Spanish (a) non-metropolitan and (b) metropolitan municipalities (2012–2021). Source: Based on data from Idealista.

both characteristics could be connected to a lower degree of digital literacy. As noted by Papí-Gálvez and La Parra-Casado (2023) and Calderón Gómez (2019), digital performance is strongly mediated by education and socioeconomic status. The digital divide amplifies pre-existing inequalities, as these spaces also have a lower per capita income and fewer public and private services, which can be seen as a new factor of inequality in the digital society (Barbeta-Viñas & Sánchez-Gelabert, 2023). This institutional neglect, coupled with depopulation, has led these rural parts of Spain to be referred to as "empty Spain," later renamed "emptied Spain." This subtle difference emphasizes the active role of public and private actors in the depopulation process, through inaction or even direct actions that foster the abandonment of rural spaces (Andrés Cabello, 2024).

The rental stock on the Idealista portal had a similar evolution during most of the period in both metropolitan and non-metropolitan spaces, with initial growth up to 2014 and a phase of decline, followed by the appearance of differences: While there was a timid recovery in the rural areas, the increase in the more urbanized areas was faster. The differences between the metropolitan and non-metropolitan areas were even greater than the initial impression. A comparison of the scales on the left and right sides of the graphs shows that there are ten times more houses for sale than for rent in non-metropolitan locations. In metropolitan areas, the scales are closer, with units for sale roughly tripling rental units. This information indicates the need for further exploration of the digital divide and the uneven territorial distribution of housing. Rental is a minority option in Spain, with public rental opportunities being virtually non-existent. Generally speaking, renting is a secondary option for individuals who cannot afford home ownership or for highly mobile groups who prefer to have more flexibility, with both subsets of renters concentrated in the large metropolitan areas and within them, in the central municipalities. Areas in high demand, then, also reflect the structural difficulties faced by both regular and potential urban inhabitants, for example, young people entering the housing market (Echaves García, 2017).

Figure 3 focuses on the gap between the number of advertisements for houses for sale and for rent. This figure includes a new variable, the population of the municipality, in order to study the stock. As the overall stock of a municipality is linked to its population, we calculated a new measurement: stock per 1,000 inhabitants in the municipality. The examination of Idealista suggests that the digitalization of the real estate market may

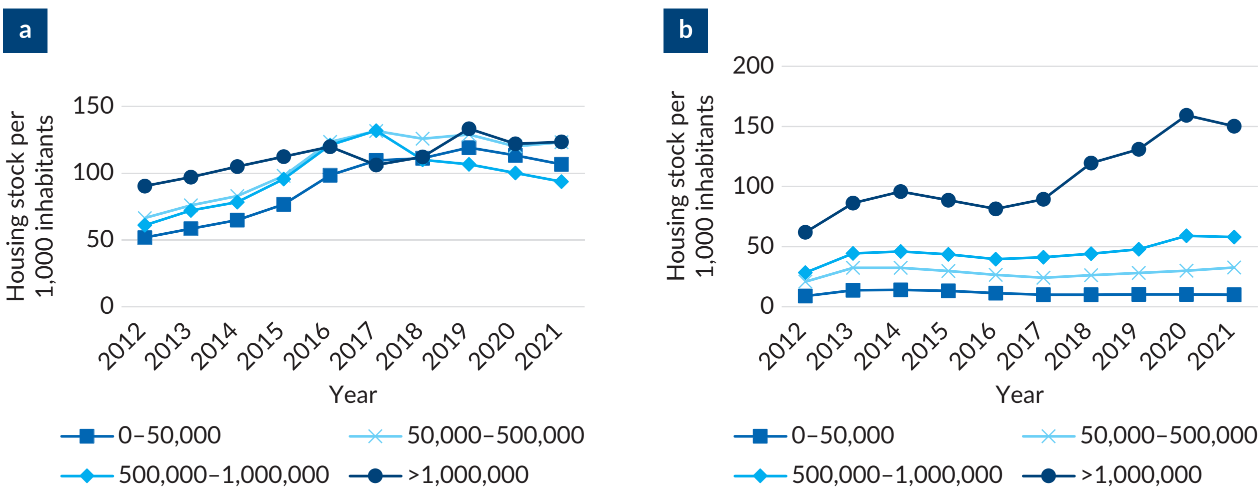

Figure 3. Evolution of (a) sales and (b) rental housing stock per capita (‰) in Spanish municipalities by population (2012–2021). Source: Based on data from Idealista and Spain's National Statistics Institute.

have been much more advanced in the bigger cities until 2016, when the mid-sized cities between 100,000 and 1,000,000 inhabitants took the lead. The size of the municipality is clearly associated with digitalization, as the lines in the graph are almost parallel and ordered by municipality size (with the noteworthy exception of the two most populated cities, which have a decline in advertisements per capita, probably related to the appearance of new competitors, which decreased Idealista's share of the market in some locations; in 2017, some new fully digital real estate companies began to operate in Spain, as reported in *Expansión*, a newspaper that specializes in financial news: see Fernández, 2019). Since the new agencies first arrived in the bigger cities, the smaller ones were not initially affected.

The rent graph is more clear-cut: Rental advertisements in Idealista were always concentrated in bigger cities, and the smaller the municipality, the less stock per thousand inhabitants (the variable is perfectly linear, without exceptions). While the arrival of new real estate agencies may have decreased the share of sales advertisements posted in Idealista, their position in the rental market was not affected, with very prominent growth in the bigger cities in Spain. The Idealista business model, which allows both individuals and conventional real estate agencies to advertise properties, seems very well suited to the rental housing market. Advertisements for sales, on the other hand, have been affected by the new conditions offered by digital real estate agencies. Often, these companies do not manage viewings, which allows them to save on personnel costs. These savings, in turn, enable them to offer more affordable brokerage services to clients: Instead of charging a percentage of the sale price, they charge a flat fee for their services (which can mean savings of thousands of euros in the case of high-value properties).

4.2. Mapping Real Estate Digitalization in Spain From 2012–2021

Our second goal was to identify the municipalities and urban areas where the use of the digital real estate portal Idealista has increased the most. We explored the distribution of advertisements in broad terms, grouping the evolution of metropolitan/non-metropolitan areas and cities by their population size. However, thanks to the granularity of the information in our database, we were able to study the territorial distribution of the properties advertised online with much more spatial detail, in line with our interest in analysing digitalization at the municipal level for the country as a whole. This representation makes it possible to study territorial inequalities between regions, between coastal and inland areas, and between metropolitan centres and their surrounding municipalities within metropolitan areas.

The first map in Figure 4 shows the changes in the number of sales advertisements per 1,000 inhabitants at the municipality level for the whole of Spain. The boundaries of the metropolitan areas are drawn to identify the rural spaces and major urban agglomerations. The predominance of green and blue indicates the overall advances in digitalization (based on the analysis of the Idealista portal) in most of the country, with some exceptions. In addition to the small municipalities across the country, four major metropolitan areas have a predominance of red: the three provincial capitals in the Basque Country (Bilbao, San Sebastian, Vitoria) and the biggest city in the country, Madrid. The decrease in the number of advertisements per inhabitant during the period is linked to their large share of the real estate market at the beginning. Due to the starting point of 2012, the evolution over the decade studied largely reflects the effect of new competitors entering Idealista's business in these cities. These four cities also show an overspill effect on their surroundings, creating a blue ring encircling the red in the centre. The rest of the metropolitan areas clearly increased their supply, as expected.

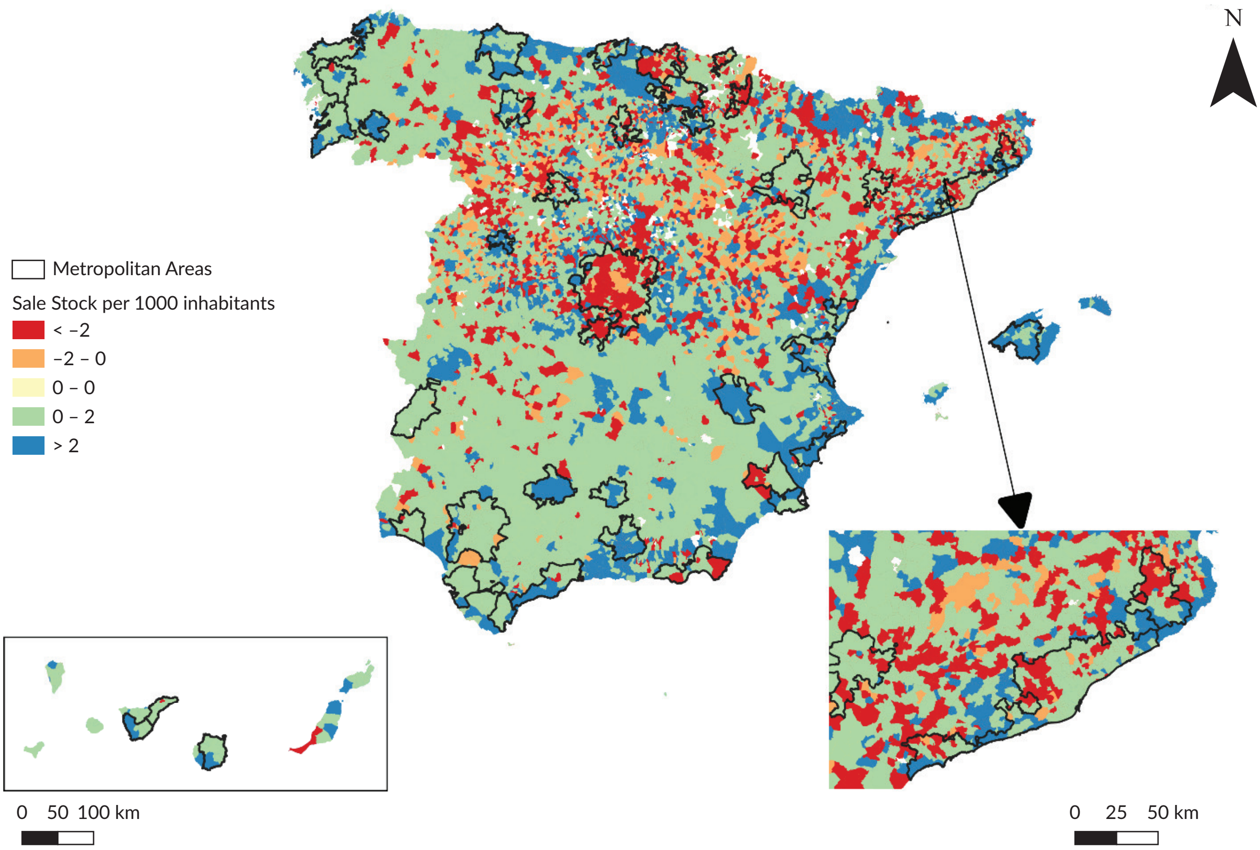

Figure 4. Evolution of housing stock for sale in Spanish municipalities for the peninsula, Balearic Islands, and Canary Islands (bottom left) and detailed map for the metropolitan area of Barcelona (bottom right), from 2012 to 2021 (change in ‰). Source: Based on data from Idealista and Spain's National Geographic Institute.

In spatial terms, two distinct features are clear. One is the coast-inland divide. Coastal areas are predominantly in the higher category that represents increases, due both to the appeal of these municipalities and to the higher property values in these areas, which leads to a more active market. The island of Mallorca is a perfect example, where only the municipalities in the centre of the island have a moderate increase in the number of advertisements. Mountainous areas also show a similar behaviour. These municipalities can be very attractive due to their landscape or the presence of specific amenities like ski resorts, another reflection of the spatial segmentation of digital housing markets, where affluent or desirable areas are overrepresented, as observed by Abella et al. (2025). A comparison of the real estate digitalization map with the elevation map clearly shows the blue areas in the major mountain ranges in Spain: the Pyrenees, the Cantabrian Mountains, the Central System, and Sierra Nevada.

An enlarged map of Barcelona provides an example of the evolution of Idealista stock in a specific city. Although most of the area is green, the largest increases are in the municipalities furthest from the capital, which are also coastal. Only a few inland municipalities show decreases in the supply of homes for sale.

The second map in Figure 5 looks very different from the previous one. In terms of surface area, at the territorial level, the prevailing dynamic is a decrease in the number of advertisements per person, producing a predominance of orange and red. However, the map may overestimate large, sparsely populated municipalities in rural areas due to their large surface area, while municipalities that are not as big, but are densely populated, appear much smaller. A perfect example in this respect is Madrid, which is enlarged in the figure. Although the metropolitan area appears almost entirely red, there is a large blue spot in the middle: the municipality of Madrid, meaning that it is the capital that accounts for the major increase in rental supply. In other words, what is on view is not so much a decline in rental supply as its concentration in large cities. The same pattern can be seen in Barcelona, Seville, Zaragoza, and Valencia.

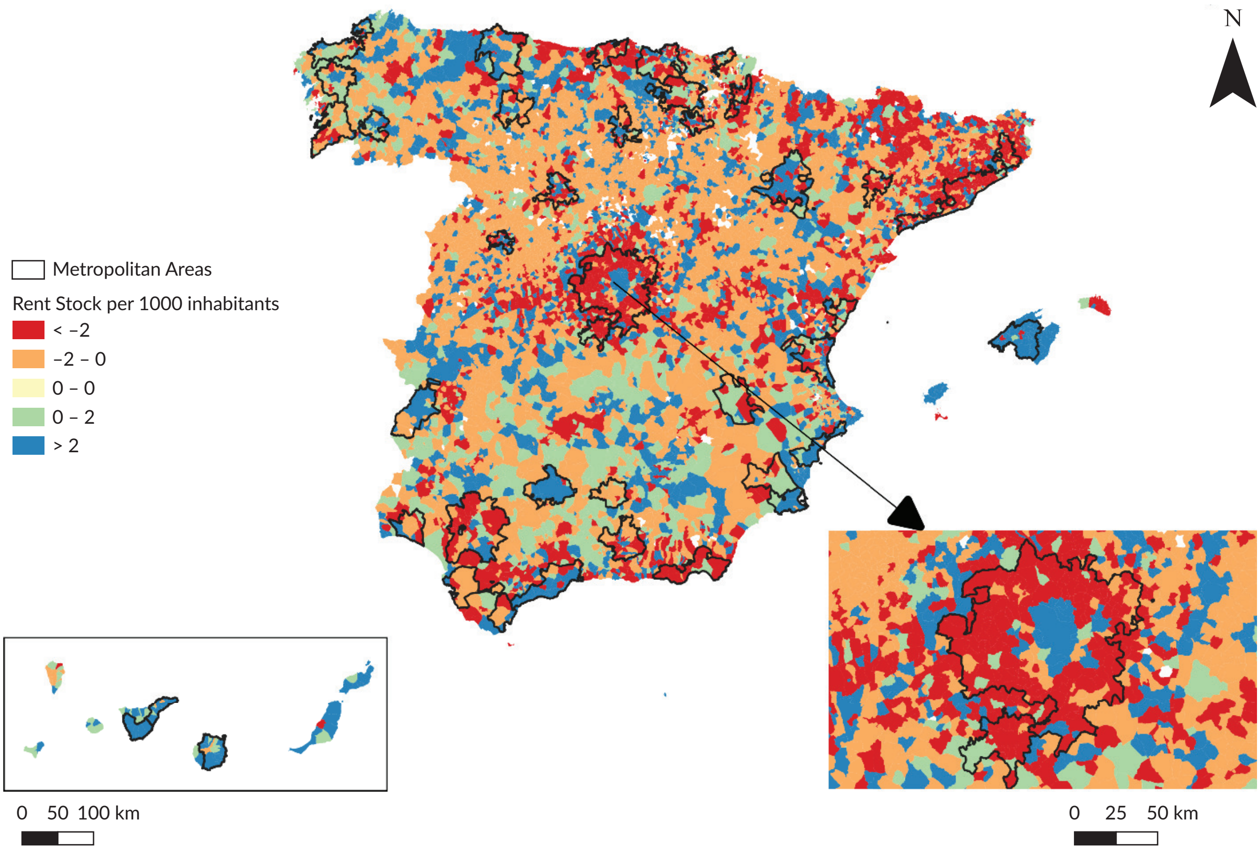

Figure 5. Evolution of housing stock for rent in Spanish municipalities for the peninsula, Balearic Islands, and Canary Islands (bottom left) and detailed map for the metropolitan area of Madrid (bottom right), from 2012 to 2021 (change in ‰). Source: Based on data from Idealista and Spain's National Geographic Institute.

Another significant pattern is seen in the proliferation of advertisements for island rentals. The Canary Islands, Mallorca, and Ibiza are all almost uniformly blue. Different studies have analysed the specific problems linked to specialization and tourist overexploitation in the residential markets of the Canary Islands (García-Hernández et al., 2018) and the Balearic Islands (Martinez-Garcia et al., 2025). Other prime coastal locations, such as the Costa del Sol in Malaga and the coastal municipalities in Cadiz, Murcia, Valencia, and Alicante, also have important increases in the rental supply per inhabitant. The dynamics suggest that the platform is being used to search for holiday houses in valuable locations, as well as long-term rentals in central cities. The two different uses share a common characteristic: high prices. The more expensive the area, the more the incentive to rent; therefore, these areas attract investors who will buy to rent the property out, and their actions reinforce the price escalation.

4.3. The Relationship Between Digitalization and Housing Price Dynamics

Exploring the link between Idealista posts and price escalation required expanding the level of detail in the analysis, moving down from the municipal level to the census tract. Zooming in on this level reveals new patterns previously hidden within the municipalities. Although it would be ideal to systematically include the entire territory, the scope of this article is limited to the sub-municipal level. Results are presented for three case studies, selected based on their characteristics. The following two tables present a ranking of the cities where the digitalization process is most advanced (for housing sales and rentals, respectively). This is augmented by the evolution of the housing supply during the period under study, in both absolute and percentage terms.

In Table 1, the total sales stock shows how, although the largest cities lead the ranking, some mid-sized cities appear ahead of others with much larger populations. Particularly noteworthy are the positions in the ranking of Torrevieja (a city that is not part of any metropolitan area, but has a large tourist presence) and Granada (a mid-sized city that appears in fifth place and has the largest increase in listings in relative terms).

Table 1. Top 20 Spanish municipalities according to the digitalization of the sales market.

Municipality	Metropolitan area	Sale stock 2021	Increase 2012–2021	Increase (%)
Madrid	Madrid	195,742	253	0%
Barcelona	Barcelona-Sabadell	140,991	88,304	168%
Marbella	Málaga-Marbella	87,428	67,869	347%
Valencia	Valencia	86,213	25,999	43%
Granada	Granada	71,282	60,690	573%
Alicante	Elche-Alicante	69,507	39,645	133%
Torrevieja	Non-metropolitan	55,893	38,005	212%
Palma	Palma de Mallorca	52,744	27,483	109%
Estepona	Málaga-Marbella	52,484	41,071	360%
Málaga	Málaga-Marbella	50,611	18,428	57%
Córdoba	Córdoba	49,983	30,478	156%
Murcia	Murcia	44,114	18,460	72%
Mijas	Málaga-Marbella	43,139	32,627	310%
Seville	Seville	41,570	5,662	16%
Benalmádena	Málaga-Marbella	35,664	23,315	189%
Orihuela	Non-metropolitan	35,412	25,117	244%
Elche	Elche-Alicante	35,319	24,679	232%
Zaragoza	Zaragoza	33,602	5,974	22%
Oviedo	Avilés-Gijón-Oviedo	32,482	19,259	146%
Salamanca	Salamanca	28,330	17,690	166%

Source: Based on data from Idealista.

While the ranking of the rental stock in Table 2 reflects the population size of cities more clearly, once again, Granada ranks fifth, despite its population being less than a quarter of a million. It is also the city with the highest increase in supply, along with Salamanca. Both cities share some characteristics: They are mid-sized cities with large universities, which attract a type of population that overwhelmingly chooses rent as a form of tenure.

Taking both rankings into account, we decided to use the cities of Barcelona, Granada and Torrevieja as case studies: Barcelona as a large city with strong rental and purchase markets (and less affected by its initial situation than Madrid); Granada as a mid-sized city, but with significant rental and purchase markets; and Torrevieja as a non-metropolitan city with a dynamic linked to tourism and with a strong imbalance between a large purchase stock but low rental stock.

Table 2. Top 20 Spanish municipalities according to the digitalization of the rental market.

Municipality	Metropolitan area	Rental stock 2021	Increase 2012–2021	Increase (%)
Madrid	Madrid	262,735	147,327	56%
Barcelona	Barcelona-Sabadell	146,705	92,020	63%
Valencia	Valencia	49,532	20,342	41%
Seville	Seville	37,277	16,222	44%
Granada	Granada	35,574	26,089	73%
Málaga	Málaga-Marbella	31,653	18,057	57%
Palma	Palma de Mallorca	25,607	17,233	67%
Alicante	Elche-Alicante	21,439	11,526	54%
Marbella	Málaga-Marbella	18,798	13,271	71%
Salamanca	Salamanca	17,435	12,978	74%
Palmas de GC	Palmas de GC	14,781	9,601	65%
Oviedo	Avilés-Gijón-Oviedo	14,488	8,707	60%
Zaragoza	Zaragoza	13,066	4,369	33%
Córdoba	Córdoba	11,531	5,439	47%
Murcia	Murcia	11,425	982	9%
Bilbao	Bilbao	11,004	4,136	38%
Benalmádena	Málaga-Marbella	9,673	6,209	64%
Vigo	Pontevedra-Vigo	9,314	−2,212	−24%
Gijón	Avilés-Gijón-Oviedo	8,297	4,087	49%
A Coruña	A Coruña	8,251	2,369	29%

Source: Based on data from Idealista.

Once the cases were selected, a key question became clear: Is the Idealista stock associated with an improvement in competitiveness in the sector (and therefore a decrease in prices) or, on the contrary, does it contribute to price increases? The literature contains studies that largely support the latter supposition (Boeing, 2020; Rey-Blanco, González, et al., 2024). During the period studied here for Spain, there was a general increase in prices while the use of online real estate portals was becoming widespread, meaning that a certain common trend is to be expected. However, how is this relationship spatially correlated at the micro level, and from year to year? In other words, is the proliferation of advertisements in a neighbourhood associated with a variation in prices?

The results in Table 3 show that the association between the Idealista stock and housing prices is clearly positive: The proliferation of advertisements in a census tract is usually accompanied by a clear increase in prices. The correlation is not very strong in the case of sales, but it is very consistent, with no exceptions in the direction of the association. In the Idealista rental market, the correlation is much stronger, with coefficients between 0.5 and 0.6 in Barcelona and Granada (Torrevieja's rental data are not relevant here, as its rental market is almost non-existent).

Table 3. Correlations between housing prices and stock in Barcelona, Granada, and Torrevieja.

	Barcelona		Granada		Torrevieja	
	Sale	Rent	Sale	Rent	Sale	Rent
2012	0.37	0.56	0.17	0.61	0.35	0.23
2013	0.47	0.56	0.18	0.61	0.25	0.10
2014	0.49	0.60	0.19	0.58	0.17	−0.09
2015	0.50	0.60	0.30	0.57	0.20	−0.10
2016	0.44	0.53	0.40	0.56	0.29	0.22
2017	0.37	0.54	0.50	0.56	0.42	−0.05
2018	0.38	0.59	0.30	0.61	0.40	0.22
2019	0.39	0.56	0.28	0.51	0.54	0.16
2020	0.39	0.55	0.32	0.59	0.58	0.02
2021	0.35	0.55	0.33	0.58	0.60	0.10

Note: Correlation levels between ±0.3 and ±0.5 are considered moderate, while those above ±0.5 are considered strong. Source: Based on data from Idealista.

These results provide an insight into how the comparison features of digital portals are used: Rather than seeking competitiveness by offering prices lower than the market rate, sellers tend to match rising prices (i.e., comparisons are used to maximize the profit on the property, not to stand out from other competitors). The analysis of our platform suggests that the sales market seems to be slightly more diverse, indicating that the need for short-term cash can drive sellers to offer properties at lower prices. In the rental market, on the contrary, the trend seems to be very clear and sustained: Information on prices in the neighbourhood is used as a guide to set minimum rental rates, which contributes to the rising cost of housing. As explained in the newspaper *20 minutos* (Rodero, 2025), landlords who offer rentals below market price face enormous pressure: They receive persistent calls from estate agents to raise their prices, even though they are not looking to earn more. In other words, these agencies have a clear interest in avoiding downward competition or the existence of alternatives at below-market prices.

For the interpretation of the data at the census tract level, the Supplementary File contain a series of scatter plots representing supply and price by tract and year, for both rentals and sales, and for each of the three case studies selected. One of the first things that stands out in all the graphs is how digitalization (based on our case study) might be accompanied by increasing diversification. In the early years of the study, the points appear much more concentrated in all the graphs, but their dispersion increases enormously in the later years. This dispersion might point to two phenomena. The first is the concentration of real estate activity in certain sectors, which have a much higher number of listings than the rest of the city. This may be due to natural factors, such as the urbanization of new spaces, but also to processes of transformation linked to gentrification and touristification. Secondly, in terms of prices, the cities studied are becoming increasingly unequal. Certain areas are reaching ever-higher prices, especially in the rental market. This rise in prices almost immediately leads to a process of displacement of residents, since Spain has no social rental alternatives to mitigate this effect in the private market. The use of digital portals as a tool to increase prices becomes particularly serious in the most expensive areas, as there is greater potential profit for landlords, making it more likely to result in the displacement of residents.

5. Conclusion

Digitalization is a process that seems unstoppable at present. New areas of social life are replacing analogue spaces and functions with a growing dependence on digital technology. Although this change offers enormous opportunities for economic gain, these advantages and opportunities have a less positive side that this article has explored. This work represents a novelty in the field, as it provides empirical evidence of growth in the use of property portals at different territorial levels, linking this evolution with that of prices (both rental and purchase). To date, no other studies in Europe have carried out an analysis of this type. While this article presents evidence based on a case study to portray the progress of digitalization in the Spanish property market and its effects on social inclusion, the conclusions reached apply to other countries that have followed a similar path.

Our main findings show how the digitalization of the property market in Spain between 2012 and 2021 was a rapid but uneven process. In large cities, the online posting of properties was active since the beginning of the period, while in smaller towns, the increase in the number of online advertisements has been slower and more recent. The effect of these differing trajectories is that technology further stimulates the most dynamic markets, widening the territorial divide (Arundel et al., 2024). Regarding tenancy, the use and consequences of posting housing units are quite different. Advertisements for sales are distributed nationwide and the increase in stock does not correlate strongly with local price increases. Online renting is concentrated on the islands and in large cities, and stock increases strongly correlate with rising prices. The incorporation of technology into ways of searching for housing in highly competitive and spatially concentrated rental markets does not improve market efficiency, but rather eliminates downward competition, as it is used by individuals and companies to set high, uniform prices by area. The lack of public housing—which could provide homes for people priced out of the market—ends up producing a situation where landlords have little incentive to offer housing at low prices. Moreover, in the rare case that they do so, they come under pressure to correct them (Rodero, 2025). Individual actions by conscientious landlords can scarcely change a much broader dynamic.

Housing is the cornerstone of social inclusion, forming the basis from which other public services can be accessed and fostering support and social networks, which are essential and spatially located resources. A large part of the population faces problems when trying to gain access to decent housing in current housing market conditions in Spain. To this day, digitalization has not helped to correct deficiencies in the system. If technological development does not alleviate these problems, then solutions need to begin with public intervention in housing that is both politically determined and covered by the budget. Given current trends, and taking into consideration our findings, the alternatives that are truly capable of curbing the rise in rental prices are, in the short term, much stronger price controls in areas under high pressure, and in the long term, the creation of a public housing stock capable of providing an alternative for people who cannot afford private market prices and a counterbalance to stabilize excessive price increases in areas under pressure from market dynamics.

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Conflict of Interests

The authors declare no conflict of interest.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

References

Abella, D., Martínez, J. H., Mazzoli, M., Migozzi, J., Le Corre, T., Alonso-Paulí, E., Crespí-Cladera, R., Louail, T., & Ramasco, J. J. (2025). Exploring the spatial segmentation of housing markets from online listings. *EPJ Data Science*, *14*, Article 34. https://doi.org/10.1140/epjds/s13688-025-00551-z

Andrés Cabello, S. (2024). España vacía, España vaciada: Las dimensiones de identidad y simbólicas de las regiones periféricas. Un marco territorial. *Papeles del CEIC*, *2024*(1), 1–7. http://doi.org/10.1387/pceic.25988

Arundel, R., Torrado, J. M., & Duque-Calvache, R. (2024). The spatial polarization of housing wealth accumulation across Spain. *Environment and Planning A: Economy and Space*, *56*(6), 1686–1709. https://doi.org/10.1177/0308518X241247738

Asensio-Soto, J. C., & Navarro-Astor, E. (2022). Proptech: A qualitative analysis of online real estate brokerage agencies in Spain. *Intangible Capital*, *18*(3), 489–505. https://doi.org/10.3926/ic.2090

Barbeta-Viñas, M., & Sánchez-Gelabert, A. (2023). Online consumption and inequality in Spain: Are new forms of fragmentation emerging? *Revista Española de Investigaciones Sociológicas*, *2023*(184), 23–45. https://doi.org/10.5477/cis/reis.184.23

Bennöhr, L., & Oestmann, M. (2014). *Determinants of house price dynamics. What can we learn from search engine data?* (Discussion Paper No. 153). Fächergruppe VWL. https://hdl.handle.net/10419/103151

Beracha, E., & Wintoki, M. B. (2013). Forecasting residential real estate price changes from online search activity. *Journal of Real Estate Research*, *35*(3), 283–312. https://doi.org/10.1080/10835547.2013.12091364

Boeing, G. (2020). Online rental housing market representation and the digital reproduction of urban inequality. *Environment and Planning A: Economy and Space*, *52*(2), 449–468. https://doi.org/10.1177/0308518X19869678

Boeing, G., & Waddell, P. (2016). New insights into rental housing markets across the United States: Web scraping and analyzing Craigslist rental listings. *Journal of Planning Education and Research*, *37*(4), 457–476. https://doi.org/10.1177/0739456X16664789

Brennen, J. S., & Kreiss, D. (2016). Digitalization. En K. B. Jensen, E. W. Rothenbuhler, J. D. Pooley, & R. T. Craig (Eds.), *The international encyclopedia of communication theory and philosophy* (1st ed., pp. 1–11). Wiley. https://doi.org/10.1002/9781118766804.wbiect111

Calderón Gómez, D. (2019). Una aproximación a la evolución de la brecha digital entre la población joven en España (2006-2015). *Revista Española de Sociología*, *28*(1), 27–44. https://doi.org/10.22325/fes/res.2018.16

Caridad Sebastian, M., & Ayuso García, M. D. (2011). Situación de la brecha digital de género y medidas de inclusión en España. *Investigación bibliotecológica*, *25*(55), 227–252.

Castaño, C., Fernández, J. Á. M., & Cantos, J. L. M. (2011). La brecha digital de género en España y Europa: Medición con indicadores compuestos. *Revista Española de Investigaciones Sociológicas*, *2011*(136), 127–140. https://doi.org/10.5477/cis/reis.136.127

Castells, M. (1997). *La sociedad red*. Alianza.

Echaves García, A. (2017). El difícil acceso de los jóvenes al mercado de vivienda en España: Precios, regímenes de tenencia y esfuerzos. *Cuadernos de Relaciones Laborales*, *35*(1), 127–149. https://doi.org/10.5209/CRLA.54986

Feria, J. M., & Martínez-Bernabé, L. (2016). La definición y delimitación del sistema metropolitano español. Permanencias y cambios entre 2001 y 2011. *Ciudad y Territorio. Estudios Territoriales*, *48*(187), 9–24. https://recyt.fecyt.es/index.php/CyTET/article/view/76461

Fernández, J. G. (2019, January 30). De Housfy a Housell, así son las nuevas inmobiliarias digitales. *Expansión*. https://www.expansion.com/economia-digital/companias/2019/01/30/5c488515468aeb0f778b4593.html

Fernández Gallardo, J. A., & Millán Vázquez de la Torre, M. G. (2021). The transformation of the Spanish real estate market after the Financial crisis. *Journal of Tourism and Heritage Research: JTHR*, *4*(1), 323–342. https://www.jthr.es/index.php/journal/article/view/259

García-Hernández, J. S., del Carmen Díaz-Rodríguez, M., & García-Herrera, L. M. (2018). Real estate boom and crisis in the Canary Islands: Property dispossession and the resurgence of real estate. *Investigaciones Geográficas*, *2018*(69), 23–39. https://doi.org/10.14198/INGEO2018.69.02

Gedikli, C., Hill, R., Talavera, O., & Yilmaz, O. (2025). *Online real estate agencies and their impact on the housing market* (Discussion Paper 25–01). Department of Economics, University of Birmingham. https://ideas.repec.org//p/bir/birmec/25-01.html

González Vidal, I. M., & Gewerc Barujel, A. (2021). Socioeducational gaps derived from the impact of digitization in Spain 2020. *Revista de Educación a Distancia (RED)*, *21*(68). https://doi.org/10.6018/red.465571

Jiang, Z., Rai, A., Sun, H., Nie, C., & Hu, Y. (2023). How does online information influence offline transactions? Insights from digital real estate platforms. *Information Systems Research*, *35*(3), 1324–1343. https://doi.org/10.1287/isre.2020.0658

Khametshin, D., López-Rodríguez, D., & Pérez García, L. (2024). *El mercado del alquiler de vivienda residencial en España: Evolución reciente, determinantes e indicadores de esfuerzo* (Report No. 2432). Banco de España https://www.bde.es/f/webbe/SES/Secciones/Publicaciones/PublicacionesSeriadas/DocumentosOcasionales/24/Fich/do2432.pdf

Liu, C. (2023). The digitalisation of consumption and its geographies. *Geography Compass*, *17*(7), Article 12716. https://doi.org/10.1111/gec3.12716

Lupton, D. (2015). *Digital sociology*. Routledge.

Martinez-Garcia, A., Horrach-Rosselló, P., & Mulet-Forteza, C. (2025). Forgotten effects of sharing accommodation impacts in the Balearic Islands. *Current Issues in Tourism*, *28*(17), 2764–2786. https://doi.org/10.1080/13683500.2024.2381242

Papí-Galvez, N., & La Parra-Casado, D. (2023). Age-based digital divide: Uses of the internet in people over 54 years old. *Media and Communication*, *11*(3), 77–87. https://doi.org/10.17645/mac.v11i3.6744

Pérez-Amaral, T., Valarezo, A., López, R., & Garín-Muñoz, T. (2021). Digital divides across consumers of internet services in Spain using panel data 2007–2019. Narrowing or not? *Telecommunications Policy*, *45*(2), Article 102093. https://doi.org/10.1016/j.telpol.2020.102093

Pizzi, A., Pecourt, J., & Rius-Ulldemolins, J. (2023). De la "brecha digital" al control de internet. Usos, actitudes y participación digital en España. *Revista Española de Sociología*, *32*(3). Article 178. https://doi.org/10.22325/fes/res.2023.178

Rey-Blanco, D., Arbues, P., Lopez, F., & Paez, A. (2024). A geo-referenced micro-data set of real estate listings for Spain's three largest cities. *Environment and Planning B: Urban Analytics and City Science*, *51*(6), 1369–1379. https://doi.org/10.1177/23998083241242844

Rey-Blanco, D., González, J., & Sánchez, D. (2024). Relación entre precios de alquiler en portales inmobiliarios y precios de mercado. Evidencias para la Comunidad de Madrid. *EURE*, *50*(150). https://doi.org/10.7764/EURE.50.150.10

Rodero, P. (2025, July 21). Los caseros que ponen su piso por debajo del precio de mercado: "La inmobiliaria me llama todos los años para que suba el alquiler." *20 minutos*. https://www.20minutos.es/noticia/5730556/0/caseros-ponen-piso-por-debajo-precio-mercado-alquiler-inmobiliaria-me-llama-todos-los-anos-para-que-suba-alquiler-vivienda

Saputra, J. P. B., & Putri, N. A. (2024). The impact of market activity on property valuations in digital real estate through a quantitative analysis of bidding and sales dynamics. *International Journal Research on Metaverse*, *1*(2), 142–156. https://doi.org/10.47738/ijrm.v1i2.11

Smith, N., & Low, S. (2013). Introduction: The imperative of public space. In S. Low & N. Smith (Eds.), *The politics of public space* (pp. 1–16). Taylor & Francis. https://doi.org/10.4324/9780203390306

Srnicek, N. (2018). *Capitalismo de plataformas*. Caja Negra. https://cajanegraeditora.com.ar/libros/capitalismo-de-plataformas-nick-srnicek

Toynbee, A. J. (1987). *A study of history. Volume I: Abridgement of volumes I-VI*. Oxford University Press.

van Dijk, D., & Francke, M. (2018). Internet search behavior, liquidity and prices in the housing market. *Real Estate Economics*, *46*(2), 368–403. https://doi.org/10.1111/1540-6229.12187

Wu, X., & Liu, C. (2025). Digitalising rural lifestyles: Online platforms and everyday life in Chinese villages. *Geoforum*, *159*, Article 104206. https://doi.org/10.1016/j.geoforum.2025.104206

Yates, A. (2021). *Real estate and global urban history*. Cambridge University Press. https://doi.org/10.1017/9781108850551

Zhang, X., Zhang, Y., & Lin, Z. (2023). Online advertising and real estate sales: Evidence from the housing market. *Electronic Commerce Research*, *23*(1), 605–622. https://doi.org/10.1007/s10660-022-09584-2

Zhao, C., & Liu, F. (2023). Impact of housing policies on the real estate market—Systematic literature review. *Heliyon*, *9*(10). Article 20704. https://doi.org/10.1016/j.heliyon.2023.e20704

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