

Article

No People, No News: News Deserts and Areas at Risk in Spain

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Abstract

In recent decades Spain has suffered a gradual process of depopulation and exodus from rural areas to large capitals. The *España Vacía* political and social movement denounces the country's territorial inequality, while the government is working on a strategic plan to address the demographic challenge. At the media level, there is concern about citizens' access to a local and quality journalistic service, key to the strengthening of communities and their democratic functioning. The main objective of this research is to explore the phenomenon of news deserts in Spain, identifying the areas that can be considered news deserts and those that are at risk of becoming so, based on the mapping of digital media in the country. The characteristics of the digital media of the autonomous communities with the highest presence of news deserts are studied to ascertain whether the risk factors of population or richness index are connected to their appearance. The results reveal that 6,304 (77.53%) Spanish municipalities can be considered news deserts, inhabited by 11.6 million people, 24.51% of the country's total population. In addition, another 523 municipalities are at risk of becoming news deserts. In the regions with the largest number of news deserts, there is a clear concentration of media in the main capitals and a weak ecosystem of local and hyperlocal media. Depopulation is the main risk factor in the loss of media and news coverage in local communities.

Keywords

critical information needs; depopulation; digital media; local journalism; news deserts; Spain

Issue

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1. Introduction

The crisis suffered in recent decades by the local press and legacy media (Wadbring & Bergström, 2017) has been fuelled by the consequences of the lack of information services in local communities. The disappearance of daily local press titles endangers the satisfaction of critical information needs (Ferrier et al., 2016; Friedland et al., 2012) and has motivated research into the emergence of so-called news deserts and their effects. This phenomenon has been studied in different countries and contexts in recent years, helping to highlight the issues suffered especially by rural, depopulated, and less economically developed areas.

Since the 1950s and 1960s, Spain has undergone a gradual process of depopulation and exodus from rural

areas to large capitals—which is currently also affecting the urban context of small and medium-sized cities (Galletero-Campos & Saiz Echezarreta, 2022). In recent years, the political and social movement of *España Vacía* (Emptied Spain) has emerged, which seeks to make depopulated regions visible, denounce inequality in the provision of services, and demand a better quality of life in rural areas as well as measures against ageing and low birth rates, which are a consequence of centralist policies and which cause economic and social problems beyond depopulation (Rodríguez-Rejas & Díez-Gutiérrez, 2021). The movement has been organized into various political parties, which in 2022 formed the Federation of Parties of Emptied Spain to stand in future elections. In the 2019 general elections, Teruel Existe achieved representation in the Congress of Deputies and the Senate.

Since 2017, the demographic issue has been on the political and media agenda (Sáez Pérez, 2021). The Spanish government recognises the problem and warns that 63% of municipalities lost population between 2001–2018, a figure that rises to 80.2% if we look at the period of 2011–2018—90% of them being territories with less than 1,000 inhabitants (Ministerio de Política Territorial y Función Pública, 2019). In response, in 2019 the government approved a package of 130 measures in the national strategy for the demographic challenge.

When the demographic issue is transferred to the communication and media sphere, access to a local and quality journalistic service is a clear concern (Jenkins & Kleis Nielsen, 2020). Municipalities without news media can see their community awareness deteriorate, as “they are neither protagonists of local news nor do they receive information that directly affects their environment” (Galletero-Campos & Saiz Echezarreta, 2022, p. 49). Some previous works have addressed this issue, studying the loss of the provincial press in Castilla La Mancha (Galletero-Campos, 2021), the crisis of the traditional media in Castilla y León (Sanz Hernando, 2017), the informative treatment of depopulation (de Sola Pueyo, 2021), the emergence of new local digital native media in Aragón (Segura Anaya et al., 2020), and the application of artificial intelligence for news coverage in municipalities in empty Spain (Aramburú Moncada et al., 2023).

Given the demographic problems and the evident territorial inequality that Spain suffers, it is necessary to address whether this social reality is reflected in its media ecosystem and in the provision of information services to citizens, which is key to the proper functioning of democracy. The general objective of this research is to explore the phenomenon of news deserts in Spain, an issue that has not been addressed previously in the academic field. Specifically, the following objectives are pursued:

O1: To explore the media map in Spain and to identify the geographical areas that can be considered or are at risk of becoming news deserts.

O2: To find out what the digital media is like in the autonomous communities where the incidence of news deserts is greatest, observing the characteristics of their journalistic media—digital native or legacy nature, local scope.

O3: To determine whether certain contextual factors can be related to the existence of news deserts, such as population or the economic level of these areas.

2. Theoretical Background

2.1. Spanish Media and Social Context

Understanding the distribution and geographical scope of the news media in Spain requires contextualisation.

The current territorial and administrative organisation of the state was shaped after the democratic transition that began in 1975, the point from which the current media ecosystem was also developed.

Spain is a nation-state with central organs of power, which is in turn divided into 17 autonomous communities and two autonomous cities—Ceuta and Melilla—located in North Africa. These are territorial spaces equivalent to regions, with their own autonomous governments and distinct cultural identities. In fact, six of them have co-official languages other than Spanish. The autonomous communities are divided into provinces—a total of 50 in the country, plus the two autonomous cities—which have their governing bodies, the provincial councils. The provinces are divided into municipalities, a total of 8,131 in Spain, which also have their own local governments. Smaller than the province and without an administrative body of their own are the comarcas, which are groupings of municipalities formed on the basis of historical alliances of a geographical and human nature. In social terms, Spain has a total population of 47.38 million inhabitants. Although the population has been growing over the last few decades, there are significant internal problems of depopulation, an inequality that is also reflected in the economic sphere.

In the current Spanish media ecosystem, there are public broadcasting media—at the national level, in some autonomous communities, and municipalities—as well as private media provided by large media groups and small companies, and also alternative, community, or citizen media. The system has undergone major transformations in recent decades, going from a scenario dominated by large publishing and media groups in the 1980s and 1990s to the crisis of the traditional model, the adaptation to the digital scenario, and the consequences of the economic crisis of 2008. The first national map of local media was made by Macià Mercadé (1993) in 1990, identifying 95 newspapers, 410 radio stations, and 113 local television channels. The first digital media database in 2005 identified a total of 1,075 outlets, of which 22.3% were digital natives (Salaverría Aliaga, 2005). In 2018, the updated map located up to 3,065 active digital media—50.9% of them digital natives (Salaverría Aliaga et al., 2018). The latest revision of the map, which is used as the basis for this research, identified in April 2021 a total of 2,874 active digital media, of which 1,361 are digital natives (Negredo Bruna & Martínez-Costa, 2021). In recent years, mappings have shown a media concentration associated with population and economic factors (Negreira-Rey, 2021), a significant growth of digital natives (Negredo Bruna et al., 2020), and of local and hyper-local media (Negreira-Rey et al., 2020).

2.2. Previous Research on News Deserts

In recent years, various projects and research have identified the emergence and characteristics of news deserts in different contexts. So far, media mapping and location of

news deserts have both been carried out at the national level in the US (Abernathy, 2020; Bucay et al., 2017; Ferrier et al., 2016), the UK (Gulyas, 2020), Brazil (Lins da Silva & Pimenta, 2020), and Portugal (Jerónimo et al., 2022). These studies delimit geographical areas of different dimensions for the identification of news deserts: postal codes, counties, or states in the US; postcode district areas in the UK; or municipalities in Brazil and Portugal. Researchers have measured the number of daily and weekly newspapers, the existence of digital media, hyperlocal media, radio and television, ethnic media outlets, and public media. They have analysed their circulation and digital audience, as well as their ownership, and have related the datasets to population and wealth indicators, or the presence of local organs of power.

Generally speaking, there has been a significant disappearance of traditional daily press titles. Added to this is the emergence of “ghost newspapers,” those that are taken over by larger companies and do not regularly cover information from the local community (Abernathy, 2020). Corporate concentration is increasing and is subsequently reducing the diversity and quality of news services, as well as the proximity of news coverage (Abernathy, 2020; Miller, 2018).

While local media have disappeared, up to half of local journalists have also been lost in some contexts (Abernathy, 2020) and digital media and their audiences have increased (Gulyas, 2020). Although it is noted that hyperlocal digital media tend to be in territories with fewer local newspapers (Gulyas, 2020), these new media outlets do not always grow to occupy underserved areas. In fact, digital media and print newspapers tend to be equally numerous in the same regions (Gulyas, 2020), as they also need a market with an audience, subscribers, advertisers, or other financial support (Abernathy, 2020).

Several studies show that the loss of newspapers tends to occur more frequently in rural communities, as their news ecosystems are weaker, have higher rates of poverty, have a richer racial and ethnic diversity, are isolated from other population centres, or have difficulties in accessing a good Internet connection (Abernathy, 2020; Damanhoury et al., 2022; Mathews & Ali, 2022).

Citizens living in news deserts perceive a lack of information about local events and their sense of community and visibility of their locality is threatened, as they only make headlines in mainstream media for negative events (Mathews, 2022). In these areas, it is more difficult to obtain information about the community and maintain social bonds (Mathews & Ali, 2022), power may feel less policed (Matherly & Greenwood, 2021), and citizens resort to relying on platforms such as Facebook or Twitter to keep them informed, although such news may be unreliable and subject to fragmentation (Smethers et al., 2021).

2.3. News Deserts Conceptualisation

The conceptualisation of news deserts has sought to reflect the reality of territories that have suffered the

closure of media outlets, the reduction of available local information or the lack of news coverage of their communities. In these contexts, citizens do not see their critical information needs covered because they cannot access quality news about what is happening in their local territory (Smethers et al., 2021), which is vital for making decisions that affect their quality of life (Abernathy, 2020).

When defining news deserts, researchers agree that they refer to the lack of media and news in a small territory where a local community resides. One of the reference definitions is that proposed by Abernathy (2018, p. 16), who characterises news deserts as a “community without a local newspaper,” whose inhabitants “have very limited access to the sort of credible and comprehensive news and information that feed democracy at a grassroots level” (Abernathy, 2020, p. 18). Other authors such as Miller (2018, p. 60) also describe news deserts as “communities with no outlet for locally reported news.”

However, the main problem is not the absence of media in local territories, but the existence of communities that are without news to meet their specific information needs (Napoli et al., 2018). Ferrier et al. (2016, p. 221) define media deserts as “a geographic locale that lacks access to fresh, local news and information,” while Diah Astuti and Irwansyah (2022, p. 382) describe news deserts as a “community or area that is not covered by newspapers due to the declining population of local newspapers in various regions.”

Jerónimo et al. (2022, p. 8) also address the lack of media and local news coverage, defining news deserts as “municipalities where there are no local media or where there are no media covering local news on a regular basis.” The authors distinguish between news deserts (municipalities with no local news), semi-deserts (with less frequent or unsatisfactory news coverage), municipalities at risk (with one media outlet creating local news), and out-of-the-desert (with two or more media outlets creating local news).

In this research, developed in the Spanish context, we apply the concept of news deserts based on the absence of local information coverage in a community. Relying on the above definitions, we consider news deserts to be those small and delimited communities or geographical areas that are not covered by any media so that their citizens cannot satisfy their critical information needs in the local environment. We understand that access to local news content is therefore key. We consider that there are contextual risk factors that may favour a geographical area becoming a news desert, such as population, wealth, rural or urban environment, economic development of the area, news media density, or access to technologies.

The geographical unit used to identify news deserts is the municipality. In Spain, there are a total of 8,131 municipalities, all with defined geographical boundaries and their own local government, although they can be very different in terms of size or population. The municipality

is the smallest local territorial area with an administrative and governmental structure, and it is also the reference space for defining journalism and local media in Spain (Negreira-Rey et al., 2020).

In the results of this research, we classify as news deserts those municipalities where there is no informative coverage. As in previous research (Jerónimo et al., 2022), we also identified the areas at risk of becoming news deserts, classifying as such those municipalities in which only one media outlet—legacy or digital native—provides news coverage.

3. Methodology

This study initiates research into the phenomenon of news deserts in Spain, which implies an exploratory and descriptive nature of the research and its objectives.

To answer O1, we take as a starting point the map of digital media in Spain, updated in April 2021 (Negredo Bruna & Martínez-Costa, 2021). The directory lists a total of 2,874 active digital outlets. It includes native and legacy media, which have published content in the three months prior to the review, with a journalistic character, and which are based in Spain or have a specific edition for the country. From this database, we reviewed the location—taking as a reference the registered office—and the areas of coverage—based on the description of the project and the informative sections of its websites—of each media outlet, identifying the municipalities covered by each of them. In this way, we obtained their geographic distribution and the number of news media with coverage in each municipality of the state, locating those we consider to be news deserts or at risk of becoming so. To relate the news deserts to the population density of the municipalities, we used the official data of municipality size (km²) from the Registry of Local Entities and the municipal population data for 2021, available from the National Institute of Statistics.

Using descriptive statistical treatment of the data, we detected the autonomous communities with the highest presence of news deserts. We used them as cases of interest for the study of their digital media, exploring the characteristics of their news outlets to identify possible common trends or risk factors (O2). We analyse the native or legacy characteristics of the outlets, based on data from the previously referenced map (Negredo Bruna & Martínez-Costa, 2021). To delve deeper into the local dimension of the news media, we used data from the map of digital media of proximity in Spain (Negreira-Rey, 2020), in which the local scope was defined in greater detail—regional, provincial, intercomarcal (several comarcas), comarcal (one comarca), inter-municipal (several municipalities), municipal (one municipality), and hyperlocal (smaller areas than the municipality, such as the neighbourhood, the district, or the parish)—which is necessary to assess more precisely the degree of proximity of the news offer.

Finally, we consider whether some contextual factors can be related to the emergence of news deserts (O3), taking into account the population and the average income per person as an indicator of wealth. For this purpose, we use population data for each municipality for the years 2001 and 2021 and income per person and municipality for 2019, obtained from the National Institute of Statistics. Using SPSS statistical software, we applied inferential statistics to study the relationship between the number of news media outlets per municipality and the contextual variables described, specifically with the bivariate correlation analysis. With Pearson's coefficient (*r*) we measured the strength with which two variables are associated, although it should be remembered that correlation does not imply causality. In the variables with significant correlation, we went deeper into the descriptive statistical analysis by segmenting the cases according to the evolution of the population in the last two decades and the classification of the informative deserts.

The methodological design of the research assumes several limitations. Although the digital media map from which we started is the most complete and up-to-date database of active news media in Spain, we assume that it does not include all the outlets in the country—it leaves out press, radio, and television media without digital editions—and that it may lose validity over time. We also recognize that the map of digital news media presents limitations when it comes to exhaustively identifying the total universe of active digital media in Spain—it is difficult to track down all initiatives when exploring the local and hyperlocal media ecosystem at the municipal level for the whole country, especially when there are no official registers and many projects have a short life span. Due to the great diversity of media outlets included in the map, there are cases in which neither the location nor the area of coverage can be clearly identified, so a certain margin of error is assumed in the identification of news deserts. The research does not include digital audience data for each media outlet, which would help to obtain a more accurate picture of the severity of the risk in areas that are not yet news deserts. Population and level of wealth are studied as risk factors in the development of news deserts, although it would also be of interest to measure the impact of other factors, such as technology access and internet connection, which can be addressed in future research.

4. Results

4.1. Identification of News Deserts in Spain

After reviewing the location and coverage areas of the digital media indexed on the map, we were able to discover the number of media outlets that offer news coverage in each municipality in Spain. Of the 8,131 Spanish municipalities, 6,304 (77.53%) have no media located in their territory, nor do they receive regular news service

from any media. They can therefore be considered news deserts, and are inhabited by a total of 11,611,825 citizens, 24.51% of the country's population. We found 523 (6.43%) municipalities that are only covered by one media outlet and could be considered areas at risk of becoming news deserts. They are home to 9.47% of the Spanish population.

If we look at the distribution of the number of media outlets offering news coverage per municipality, we can see that—with the exception of news deserts—the most common situation is that there are between 1–5 news media outlets with regular news coverage per municipality (Table 1). It is uncommon to find municipalities covered by 6–10 news media outlets, and those with more than 10 outlets are exceptional.

If we visualise these data on the map of Spain (Figure 1), we see clear differences in the presence of news deserts in the different regions of the country. We find very pronounced concentrations in the number of mapped media and significant demographic inequalities per autonomous community (Table 2). The municipalities that are covered by more than 10 media outlets are, in general, cities that correspond to the capital cities of provinces. The dispersion of the pop-

ulation and the demographic density of the municipalities is also a factor that can be related to the news deserts. It is observed that, while the average population density for all municipalities in Spain is 178.55 inhabitants/km², in municipalities that are news deserts this falls to 83.36 inhabitants/km² and rises to 506.99 inhabitants/km² in municipalities that are not news deserts. The communities of Madrid, whose capital is also the capital of the state, and Cataluña, where the city of Barcelona is located, are atypical cases. Both cities stand out for their demographic density, economic activity, and media concentration, as they are home to most of the national media organisations. The municipality of Madrid has 524 media outlets, and the city of Barcelona has 184.

Data on the presence of news deserts per autonomous community allow us to identify those areas where this phenomenon is most pronounced (Table 2). There are five regions in which more than 90% of their municipalities can be considered news deserts: Castilla y León (96.89%), La Rioja (95.98%), Comunidad Foral de Navarra (93.38%), Castilla La Mancha (90.86%), and Cantabria (90.19%). Taking into account the population of these municipalities, we observe population percentages of

Table 1. Distribution of the number of news media outlets with coverage per municipality.

| News media outlets | Municipalities | Population |
|--------------------|----------------|---------------------|
| 0 | 6,304 (77.53%) | 11,611,825 (24.51%) |
| 1–5 | 1,569 (19.30%) | 13,971,749 (29.49%) |
| 6–10 | 207 (2.55%) | 7,381,928 (15.58%) |
| >10 | 51 (0.63%) | 14,419,605 (30.43%) |

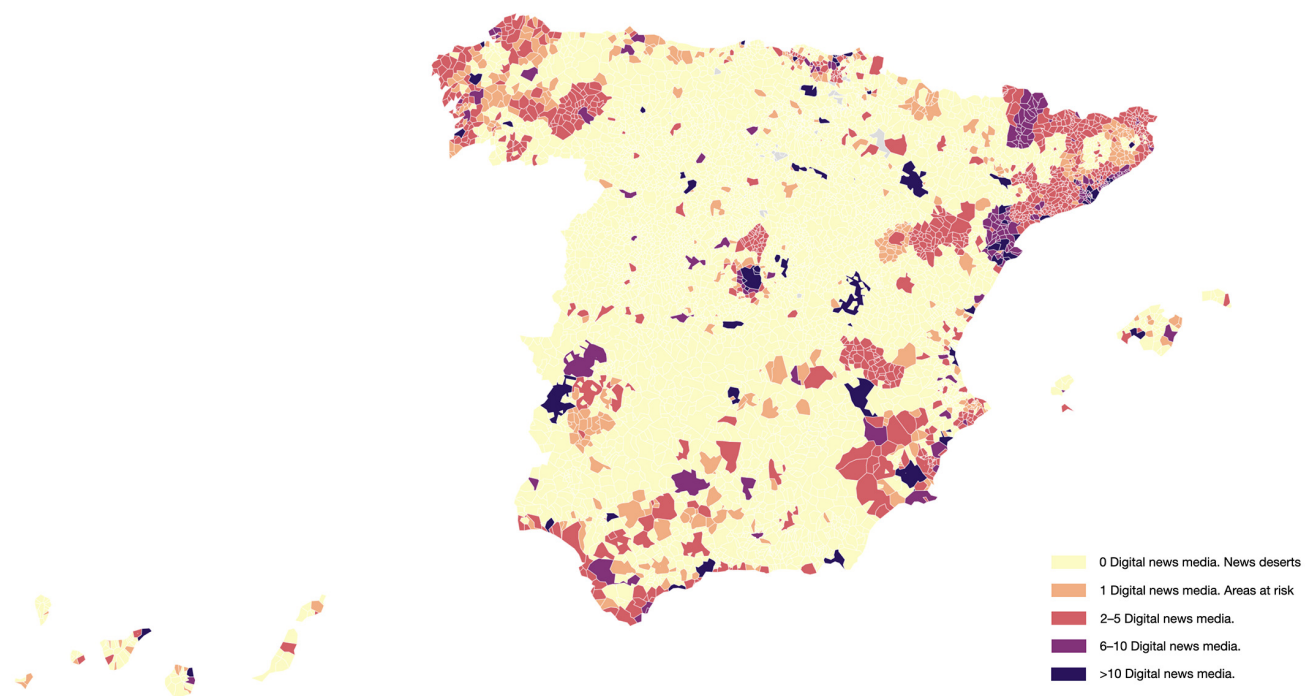


Figure 1. Distribution of media with news coverage by municipality in Spain.

Table 2. Distribution of digital news media, population, presence of news deserts, and population affected by news deserts per autonomous community.

| Autonomous community | Digital news media (% total Spain) | Population (% total Spain) | Municipalities news deserts (%) | Population in municipalities news deserts (%) | Average population density in news deserts (habitants/km ²)* |
|----------------------------|------------------------------------|----------------------------|---------------------------------|---|--|
| Andalucía | 295 (10.48%) | 8,472,407 (17.88%) | 679 (86.50%) | 3,085,483 (36.42%) | 150.08 |
| Aragón | 73 (2.59%) | 1,326,261 (2.80%) | 585 (80.03%) | 391,494 (29.52%) | 23.75 |
| Canarias | 80 (2.84%) | 2,172,944 (4.59%) | 67 (76.14%) | 879,944 (40.64%) | 286.41 |
| Cantabria | 40 (1.42%) | 584,507 (10.67%) | 92 (90.19%) | 249,692 (42.72%) | 149.41 |
| Castilla y León | 135 (4.79%) | 2,383,139 (5.03%) | 2,178 (96.89%) | 1,030,824 (43.09%) | 14.76 |
| Castilla La Mancha | 124 (4.31%) | 2,049,562 (4.33%) | 835 (90.86%) | 1,122,512 (54.69%) | 26.72 |
| Cataluña | 576 (20.45%) | 7,763,362 (16.38%) | 197 (20.80%) | 221,695 (2.86%) | 77.13 |
| Comunidad de Madrid | 706 (25.07%) | 6,751,251 (14.25%) | 95 (53.07%) | 643,632 (9.55%) | 211.06 |
| Comunidad Foral de Navarra | 55 (1.95%) | 661,537 (1.40%) | 254 (93.38%) | 280,207 (42.36%) | 123.07 |
| Comunitat Valenciana | 200 (7.10%) | 5,058,138 (10.67%) | 423 (78.04%) | 1,579,511 (31.23%) | 462.00 |
| Extremadura | 57 (2.02%) | 1,059,501 (2.24%) | 343 (88.40%) | 473,257 (44.79%) | 23.69 |
| Galicia | 146 (5.18%) | 2,695,645 (5.69%) | 114 (36.42%) | 335,573 (12.46%) | 56.04 |
| Illes Balears | 67 (2.38%) | 1,173,008 (2.48%) | 52 (77.61%) | 419,688 (35.78%) | 131.36 |
| La Rioja | 27 (0.96%) | 319,796 (0.67%) | 167 (95.98%) | 105,050 (32.85%) | 27.96 |
| País Vasco | 131 (4.65%) | 2,213,993 (4.67%) | 148 (58.96%) | 298,374 (13.48%) | 160.60 |
| Principado de Asturias | 42 (1.49%) | 1,011,792 (2.14%) | 57 (73.08%) | 312,878 (30.92%) | 73.93 |
| Región de Murcia | 56 (1.99%) | 1,518,486 (3.20%) | 18 (40.00%) | 182,011 (11.90%) | 354.20 |
| Ceuta | 10 (0.36%) | 83,517 (0.18%) | 0 (0.00%) | 0 (0.00%) | 0 |
| Melilla | 3 (0.11%) | 86,261 (0.18%) | 0 (0.00%) | 0 (0.00%) | 0 |
| Total Spain | 2,816** | 47,385,107 | 6,304 | 11,611,825 | 178.55 |

Notes: * Population density at the municipality level; ** 58 news media outlets with no autonomous community identified.

between 30% and 50% of inhabitants who may not have their critical information needs covered.

In the opposite position are five autonomous communities with a percentage of municipalities considered news deserts of less than 60% and with less than 20% of their population in these territories. These are Cataluña, Galicia, Región de Murcia, Comunidad de Madrid, and País Vasco. As noted above, Comunidad de Madrid and Cataluña are regions with a high media and population density. Furthermore, previous studies have shown that Cataluña, Galicia, and País Vasco stand out for their local media ecosystems and also for being autonomous communities with their own co-official languages, in addition to Spanish (Negreira-Rey et al., 2020).

4.2. Regions With Higher News Desertification

This section studies the digital media of the regions with the highest percentage of municipalities considered

news deserts. Two main characteristics of their media are studied: their digital native nature, related to the age of the projects and their entrepreneurial spirit or degree of innovation; and their local scope, important for understanding the concentration of the media in each region and the presence of local and hyperlocal media in small territories.

In the autonomous communities with the highest news desertification, some common trends can be observed (Table 3). There is a balance between digital native and legacy media. Digital native media represent almost 50% of the total in these regions, which shows renewed media ecosystems. In general, digital natives have experienced a boom in the country during the last two decades, following the crisis of the traditional media model and the economic recession.

Regarding the local scope of the media outlets, almost half of them are regional or provincial in scope, except in Comunidad Foral de Navarra. They cover large

Table 3. Characteristics of the news media outlets in the autonomous communities with the highest presence of news deserts.

| Type of media | | Castilla y León | La Rioja | Comunidad Foral de Navarra | Castilla La Mancha | Cantabria |
|-----------------------|-----------------------------|-----------------|----------|----------------------------|--------------------|-----------|
| Digital news media | | 137 | 27 | 55 | 124 | 40 |
| Digital native origin | Legacy | 51.09% | 59.26% | 50.91% | 45.97% | 52.50% |
| | Native | 48.91% | 40.74% | 47.27% | 54.03% | 47.50% |
| | N/A | 0.00% | 0.00% | 1.82% | 0.00% | 0.00% |
| Local scope | Regional | 7.03% | 55.00% | 38.46% | 23.76% | 44.74% |
| | Provincial | 50.00% | | | 37.62% | |
| | Inter-comarcal or comarcal | 17.19% | 0.00% | 17.95% | 10.89% | 2.63% |
| | Intermunicipal or municipal | 24.22% | 45.00% | 33.33% | 25.74% | 44.74% |
| | Hyperlocal | 0.00% | 0.00% | 7.69% | 0.00% | 0.00% |
| | N/A | 0.78% | 0.78% | 2.56% | 1.98% | 7.89% |

Note: La Rioja, Comunidad Foral de Navarra, and Cantabria are single-province, so the regional and provincial scope is equivalent in these territories.

territories within the region, with an informative vocation that exceeds the local level. The location of their company headquarters shows that these media tend to be concentrated in the main capitals of the region, which are also the most populated, with the greatest economic activity and where the government institutions are located. In Castilla y León, 60.58% of the media are located in the capital municipalities of the provinces, while in La Rioja they account for 48.14%, in the Comunidad Foral de Navarra 45.45%, in Castilla La Mancha 50%, and in Cantabria 40%. It should be noted that La Rioja, Comunidad Foral de Navarra, and Castilla La Mancha have only one capital each.

The distribution of media in each territory is clearly unequal, with little weight of local media covering municipalities or comarcas beyond the main cities. No region has more than 50% of comarcal or municipal media, and only the Comunidad Foral de Navarra has some hyperlocal media. This is evidence of the lack of news media in rural and less populated areas that regularly cover the local news of the territory and its people.

4.3. News Deserts and Risk Factors

In this section, we determine whether the contextual factors of population and wealth correlate with the appearance of news deserts. Taking into account the growing depopulation of small municipalities, these factors could help to detect or prevent the risk of these areas becoming news deserts.

The correlation, through Pearson's coefficient, between the variables of media per municipality and population in 2021 is positive and statistically significant ($r = 0.906$, $p < 0.001$). It shows a very strong correlation between the number of news media and the number of

inhabitants, in such a way that in the more populated municipalities, there is a greater number of outlets and vice versa. The correlation is also positive and statistically significant between the number of news media per municipality and the average income per person ($r = 0.103$, $p < 0.001$), although at much lower levels. The average income in the ten most populated municipalities in Spain, where the large cities are located, is €13,923 per person. In municipalities with more than 50,000 inhabitants, a total of 149 nationwide, the average income is €12,711 per person, and in municipalities with less than 50,000, it is €11,648 per person. As we can see, the difference is more than €2,200 between the most and least populated areas.

It is possible, therefore, to confirm that the smaller the population of a municipality, the more likely it is to be a news desert, although the correlation does not imply causality and the population factor does not explain its appearance, or it is not the only reason. This also happens with the personal wealth index, although the relationship is not as strong.

We then observed the correlation between the number of news media per municipality and the variation in population in those losing inhabitants during the period 2001–2021, resulting in a positive and statistically significant correlation ($r = 0.163$, $p < 0.001$), although also at low levels. This relationship indicates that municipalities that lost the most population in these 20 years are more likely to be news deserts. Beyond this correlation, the variation in population and the number of media per municipality reveal other data of interest.

Of the municipalities that in the period 2001–2021 lost more than 1% of their population, a total of 4,929, have an average of 0.35 news media outlets per municipality. Of these, 88% (4,338 municipalities) are news

deserts, 4% (197 municipalities) are areas at risk of becoming news deserts, and 591 municipalities have more than one media outlet. The loss of population over the last 20 years has been significant in these territories, with an average 25% decrease in the number of inhabitants. In 2001, these municipalities had an average population of 1,791 inhabitants and represented 21.71% (8,829,938 inhabitants) of the national population. In 2021, their average population was 1,563 inhabitants, but their weight in the state decreased to 16.26% (7,702,725 inhabitants). The average income, as a factor that correlates positively with the appearance of news deserts, is €11,264 per person in these areas.

In the opposite situation are the municipalities that gained population. Of the ten most populated municipalities in Spain, eight have experienced population growth and in four of them, the population has grown by more than 1% in the period indicated. A total of 2,916 municipalities gained more than 1% of population between 2001–2021 and have 1.71 news media per municipality on average. Sixty point two percent (1,754 municipalities) are news deserts, 10.5% (305 municipalities) are areas at risk of being news deserts, and 1,162 municipalities have more than one media outlet. In these 20 years, these municipalities have experienced significant population growth, with an average increase of 45%. In 2001 they had 10,475 inhabitants on average and represented 75.12% (30,543,710 inhabitants) of the total national population. In 2021 they had 12,995 inhabitants on average and their weight in the country's population had risen to 79.97% (37,893,260 inhabitants). The average income, as a factor that correlates positively with the appearance of news deserts, is €12,278 per person.

As singular cases, we saw what happened in municipalities that lost at least 50% of their population in the 20 years studied. The territories that suffered this critical level of depopulation number 253, with 97.6% being news deserts and with an average of 0.04 news media per municipality. On the other hand, we see that of the municipalities with more than 50,000 inhabitants, a total of 149 in the country, 130 grew in population and 98 did so by more than 1% over the 2001–2021 period. Of them, only 6.0% (nine municipalities) are news deserts, with an average of 12.85 media outlets per municipality.

5. Conclusions

More than 11.6 million inhabitants in Spain live in municipalities without any media that provides them with local information about the area in which they live. They represent 24.51% of the Spanish population and reside in the 6,304 municipalities we identified as news deserts. The figure is alarming, considering that these communities may not have their critical information needs covered. The situation is aggravated considering that another 9.47% of the population lives in one of the 523 municipalities at risk of becoming news deserts, i.e., which are only covered by one media outlet.

Although previous studies of the phenomenon of news deserts have addressed different international contexts using different methodologies (Gulyas, 2021), they have reached common conclusions about their adverse effects, which we can also apply to the Spanish case. Residents of news deserts do not receive current professional information or information published in traditional media—although they might receive information through other channels, such as Facebook (Collier & Graham, 2022)—about what is happening in their community on a daily basis, and this damages their democratic functioning, social cohesion, or sense of community (Mathews, 2022). Neighbours and local organisations are not represented in the media, do not obtain real visibility for their communities (Mathews & Ali, 2022), and lack a fundamental public service for making decisions that affect their quality of life (Abernathy, 2020).

In the case of Spain, territorial inequality in access to local information goes hand in hand with population inequality. We have found that the municipalities with the fewest inhabitants and those that have suffered depopulation processes in recent years are those that have the fewest media and are most frequently news deserts. Although the high number of municipalities in Spain (8,131) and their small size may affect these data, it is clear that depopulation is a determining risk factor in the appearance of news deserts, as is the wealth index, although to a lower degree. Of the 4,929 municipalities that lost more than 1% of their population in the period 2001–2021, 88% are news deserts, which should raise concerns about the protection of the media ecosystem and access to local information in depopulated territories.

Global numbers for the news media in Spain show a rich and growing ecosystem, with 2,874 active digital media in 2021 and an important weight of digital natives and local and hyperlocal media (Negredo Bruna & Martínez-Costa, 2021; Negreira-Rey et al., 2020). So, why are there so many areas in a news desert in Spain? If we look at the characteristics of digital media in autonomous communities with the highest percentage of news deserts, we see that they tend to be concentrated in the most populated cities and capitals of the provinces. Furthermore, most of them have a regional or provincial scope, with a lower weight of local media covering smaller and more remote municipal or county areas, and with an exceptional presence of hyperlocal media. We can say that they have a poorer network of local and hyperlocal digital media than other territories.

If we contrast this image with that of the communities with a lower percentage of news deserts, we observe regions with a high population and digital media density—such as Madrid and Cataluña—and with a strong ecosystem of local and hyperlocal media, together with cultural singularities such as the existence of their own co-official languages—such as Galicia, País Vasco, and Cataluña. We, therefore, conclude that local and

hyperlocal digital media do not necessarily appear in territories with few media organisations or that are at risk of becoming news deserts, as has already been observed in other countries (Gulyas, 2020), but they tend to be more numerous in territories where there is a media, population and economic density that makes it easier for them to maintain their activity.

The phenomenon of news deserts needs to be addressed in Spain. There is a large territory, and more than 11 million inhabitants that do not have their local media to tell their reality and satisfy the citizens' right to information, as recognized by the Spanish Constitution. The political and social movement of España Vacía can contribute to making this problem visible, demanding equality in the provision of services for the poorest and most depopulated rural areas. Access to local information and the protection of local media should be contemplated as part of the government's strategy against the so-called demographic challenge, as other researchers have previously pointed out (Galletero-Campos & Saiz Echezarreta, 2022). Knowing the risk factors for the development of news deserts—such as population or wealth index—and their evolution in the territories, as well as the state of the media ecosystem, can fuel work to reverse the situation of citizens living in news deserts or areas at risk.

This research is a first approach to the phenomenon of news deserts in Spain. It attempts to offer a national picture of the problem while recognizing important limitations. In future works it will be necessary to study what happens in specific areas and communities, to understand in greater depth their news media, the quality and frequency of the news, the information sources used by citizens, as well as the possible risk factors and their evolution.

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Conflict of Interests

The authors declare no conflict of interests.

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