The pull effect of entrepreneurship on population growth in small municipalities

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Abstract

Purpose – Rural areas face significant population decline, a trend that threatens their sustainability and requires attention. This study aims to explore the impact of entrepreneurship on population growth in small municipalities, addressing how local conditions, such as adverse geodemography, influence this relationship.
Design/methodology/approach – The model was developed and tested using data from 323,969 new companies created over seven years across all Spanish municipalities. The research employs a time-lagged design using partial least squares structural equation modeling (PLS-SEM) to test the relationships.
Findings – The results indicate a positive relationship between entrepreneurship and population growth. However, the pull effect of new ventures is weaker in large municipalities with alternative attractions and in very small municipalities, consistent with their inherent limitations. The effect is weaker in municipalities with unfavorable demographic conditions and, to a lesser extent, in those facing geographical challenges. Demographic aging reduces entrepreneurship's effectiveness in promoting population growth among young and female residents, but not in attracting immigrants.
Practical implications – Public policies promoting entrepreneurship and business creation should prioritize small-sized municipalities, as their potential impact exceeds that of large urban areas and very small municipalities. They should consider that aging demographics do not reduce entrepreneurship's ability to attract immigrants.
Social implications – By understanding the factors that enhance or hinder the pull effect of entrepreneurship, rural communities can better support sustainable population growth and local development.
Originality/value – This study provides new insights into how entrepreneurship can influence population growth in small municipalities, highlighting the importance of considering local conditions. The findings offer valuable information for policymakers in designing targeted strategies to mitigate population decline.

Keywords Entrepreneurship, Entrepreneurial ecosystem, Local economic development, Population growth, Public policy, Rural depopulation, Startups, Small municipalities

Paper type Research article

Introduction

Spain's rural population decreased from 43% to 18% between 1960 and 2023 (World Bank, 2025), representing a loss of over five million rural inhabitants (from 13,227,520 to 8,191,222). This demographic shift presents a serious concern, driven primarily by younger people migrating to urban areas for better education, cultural experiences, and career opportunities (Llorent-Bedmar *et al.*, 2021). In response to this challenge, entrepreneurship offers a promising approach to revitalize these municipalities (Refai *et al.*, 2024; Smith, 2017), as new businesses can stimulate economic activity, create jobs, and provide essential services that may retain and attract residents (del Olmo-García *et al.*, 2023). Nevertheless, many public

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policies designed to reverse rural depopulation have had limited success (Szymanowski and Latocha, 2021). This was the motivation behind this study, which aims to address a relevant question: How can depopulation be counteracted in small municipalities? Specifically, it examines how new ventures affect population growth while considering aged demographics, challenging geography, and other municipal characteristics.

Migration theories identify economic factors as primary drivers of rural-urban migration (Selod and Shilpi, 2021), resulting in a cyclical decline characterized by aging populations and economic stagnation in rural areas (Johnson and Winkler, 2015). Additionally, agglomeration economies intensify this trend by concentrating businesses in large cities, enhancing economic opportunities and making these areas more attractive (McCann and van Oort, 2019), despite negative externalities like pollution and congestion (Dijkstra *et al.*, 2013). The debate over whether "people follow jobs, or jobs follow people" stems from varying perspectives within rural sociology, geography, and entrepreneurship (Johnson and Rasker, 1995). This study aligns with the demand-driven approach by investigating how new businesses attract population.

Research on the impact of entrepreneurship on growth has focused mainly on urban contexts (Audretsch *et al.*, 2015; Bosma and Sternberg, 2014), revealing gaps in understanding the distinct challenges of rural areas (Refai *et al.*, 2024; Romero-Castro *et al.*, 2023). Moreover, entrepreneurship research often lacks "rural proofing," overlooking dimensions of rurality like remoteness and accessibility (Gashi Nulleshi and Tillmar, 2022). Their review shows that studies neglect critical aspects of rurality that distinguish it from urban environments. This study examines the relationships among entrepreneurship, population growth, and local conditions in small municipalities. Entrepreneurship is expected to positively relate to population growth, aligning with local economic development frameworks (Blakely and Leigh, 2017). However, new ventures in very small municipalities may struggle to attract population due to challenges in building an EE regarding human and financial capital, know-how, and market knowledge (Miles and Morrison, 2020). Furthermore, rural EEs exhibit lower development levels, thus limiting entrepreneurial opportunities compared to urban areas (Kansheba *et al.*, 2024). Additionally, the impact of entrepreneurship on growth might be weaker in large municipalities due to alternative economic drivers (McCann and van Oort, 2019).

The study posits that demographic and geographic conditions influence population growth and moderate the relationship between entrepreneurial activity and population dynamics. This hypothesis draws on human ecology theory (Hawley, 1981) and economic geography (Krugman, 1991). Human ecology theory suggests that environmental factors shape settlement patterns, while economic geography emphasizes the role of location in economic activities and population distribution. Entrepreneurs in rural areas face "liability of rurality" constraints (Clausen, 2020). Rurality defines a specific entrepreneurial environment with unique physical, social, and economic conditions shaping opportunities and challenges (Stathopoulou *et al.*, 2004). Geographic challenges like remoteness increase costs and create logistical barriers (Szymanowski and Latocha, 2021). Municipalities with these constraints experience transportation and connectivity issues, thereby reducing their attractiveness. Demographic factors, including aging populations and youth outmigration, worsen these challenges (Delfmann *et al.*, 2014).

This study extends prior research in three ways. First, it examines small municipalities, focusing on rural entrepreneurship and its effects on population dynamics—an area less widely studied than urban settings. While medium-sized cities serve as economic centers (Rodríguez-Domenech, 2022), small municipalities face depopulation and reduced economic prospects (Dijkstra *et al.*, 2013), making them an important research subject. Second, it uses a complete dataset analyzing all 323,969 firms established in 8,110 Spanish municipalities, representing a methodological distinction from previous studies (del Olmo-García *et al.*, 2023). Third, to address statistical issues in very small Spanish municipalities—where business creation is infrequent and a single entry can significantly distort annual rates—this study employs median rates of business entry over seven years. The analysis uses partial least squares structural equation modeling (PLS-SEM) and multigroup analysis (PLS-MGA).

This study contributes to the entrepreneurship literature by extending EE and agglomeration theories, typically focused on large cities (Roundy, 2019), to smaller municipalities. While large cities benefit from sharing, matching, and learning effects (Duranton and Puga, 2004), new ventures can stimulate similar effects in small municipalities. However, nonlinear relationships emerge in very small municipalities and larger cities, thereby attenuating the link between entrepreneurship and population growth. Demographic and, to a lesser extent, geographic conditions moderate the relationship between entrepreneurship and population growth by affecting EE development. These findings suggest the need for targeted policies to leverage new firm creation in addressing rural depopulation.

Development of hypotheses

Lee (1966) argued that individuals leave rural areas due to limited opportunities (push factors) and are drawn to urban centers by employment prospects (pull factors). Building on this, migration theories highlight economic factors as primary drivers of rural-urban migration (Johnson and Rasker, 1995; Selod and Shilpi, 2021). In response, small municipalities seek to counteract this trend by creating opportunities that attract entrepreneurs (Artz *et al.*, 2016), in line with local economic development (LED) principles (Blakely and Leigh, 2017) and EE theories (Miles and Morrison, 2020). Since rural entrepreneurship is inherently place-based, local characteristics significantly influence entrepreneurial processes (Muñoz and Kimmitt, 2019; Refai *et al.*, 2024), which supports the assertion of contingency theory that contextual factors explain entrepreneurial success (Chege and Wang, 2020; Donaldson, 2001). Consequently, the positive relationship between entrepreneurship and population growth in small municipalities depends on local contextual conditions.

This conceptual framework is illustrated in Figure 1, which integrates LED principles with agglomeration and migration theories to explain how entrepreneurship (ENTREP) influences population growth (ΔPOP), while accounting for adverse geographical conditions (GEO) and aged demographics (DEM) that both directly impact ΔPOP and moderate the ENTREP-ΔPOP relationship.

The relationship between entrepreneurship and population growth

Entrepreneurship can enhance municipal economic development (Baumgartner *et al.*, 2013; Glaeser *et al.*, 2010; Sá *et al.*, 2019). New businesses stimulate local economic activity, encouraging diversification, innovation, and job creation (Fritsch and Mueller, 2004). Local

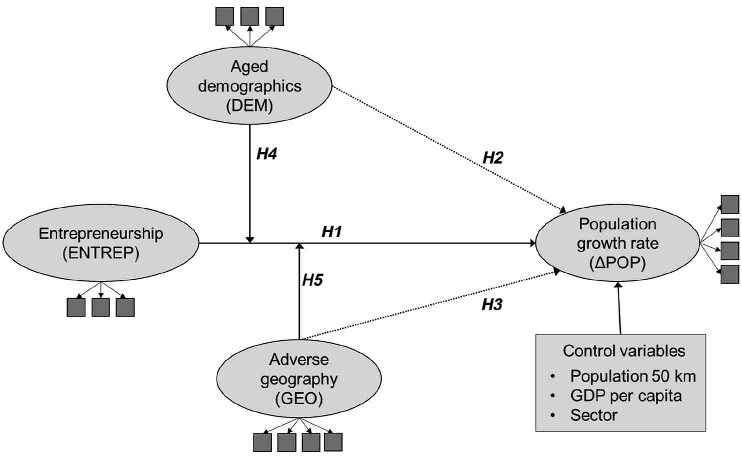

Figure 1. Conceptual model and relationships among variables. **Source:** Authors' own creation/work

administrations often employ LED strategies to stimulate economic activity, involving collaboration among governments, community groups, and the private sector (Blakely and Leigh, 2017). LED draws on agglomeration theories, where spatially concentrated businesses generate economic and social benefits, attracting firms and residents (McCann and van Oort, 2019). Both large and small municipalities can benefit from small-scale agglomeration effects (Roundy, 2017). Empirical evidence links new business creation with economic growth, performance, and stability, even in rural areas (Davidsson *et al.*, 2006; del Olmo-García *et al.*, 2023).

The relationship between entrepreneurship and economic development is well established (Schumpeter, 1934), though its temporal dynamics and influencing factors require additional research (Delfmann and Koster, 2016). Studies have identified a U-shaped relationship between entrepreneurship rates and economic development at the country level (Wennekers *et al.*, 2005). Despite differences in scale between national and local contexts, this finding raises the question of whether nonlinear patterns exist at the municipal level, where the association between entrepreneurship and population growth may differ in very large and very small municipalities.

When a new business emerges in very small municipalities, it often fails to create a functional EE because isolated entrepreneurial initiatives cannot achieve the critical mass of complementary businesses, support services, and knowledge networks needed for ecosystem development (Roundy, 2017). Resource dependence theory (Pfeffer and Salancik, 2003) provides a theoretical framework for understanding this limitation, as it explains how organizations depend on external environments for critical resources. This dependency is particularly pronounced in very small municipalities, which cannot internally generate the infrastructure, networks, and human capital necessary to sustain a robust EE. Although small municipalities may partner with nearby communities, their economic and community dynamics both support and limit entrepreneurial activity (Roundy, 2019). This creates a persistent resource dependency that fundamentally constrains ecosystem development and limits the potential multiplier effects of entrepreneurial activity. Unlike medium-sized municipalities, where sufficient endogenous resources can support the formation of functional entrepreneurial ecosystems, very small localities rely on external resources, which prevents entrepreneurial initiatives from generating significant population growth. Consequently, while EEs create opportunities through growth, jobs, and community development (Davidsson *et al.*, 2006), the difficulty in building robust EEs in the smallest municipalities weakens the relationship between entrepreneurship and population growth.

Cluster theory offers another explanation for the weaker entrepreneurship-population growth link in very small municipalities. Clusters represent geographic concentrations of interconnected firms, suppliers, and institutions in specific fields (Porter, 2000). Although clusters can form in urban and rural areas, municipality size affects their success. For example, dense populations support cluster formation better than isolated areas. As a result, very small municipalities struggle to develop robust clusters due to insufficient critical mass, which limits EE formation and growth potential.

The relationship between entrepreneurship and population growth also weakens in very large municipalities. Migration theories explain population movement drivers, with income expectations being central in both neoclassical theory (Todaro, 1969) and the new economics of labor migration (Stark and Bloom, 1985). While economic factors shape migration (Urbański, 2022), large cities attract residents for reasons beyond job prospects. Specifically, the diverse urban amenities, including specialized healthcare, educational institutions, and cultural offerings, create a complex attraction ecosystem. Some studies suggest that the availability of cultural amenities can increase entrepreneurship and encourage migration to pursue these opportunities (Lee *et al.*, 2004), whereas other research finds no significant relationship between measures of creativity and entrepreneurship (Olim *et al.*, 2014).

Small towns attract people seeking a better quality of life and escaping from urban problems like congestion, pollution, and high costs (Dijkstra *et al.*, 2013). While major capitals offer various motives for relocating, moves to small municipalities tend to rely more heavily on job opportunities. Unlike very small municipalities with limited resources, small towns can generate sufficient internal resources for effective EE formation. As a result, the impact of entrepreneurship on population change is weakest in both very small and very large municipalities.

Thus, the following hypotheses are proposed:

H1a. There is a positive relationship between entrepreneurship and municipal population growth.

H1b. The positive relationship between entrepreneurship and population growth is weaker in both very large and very small municipalities than in medium-sized municipalities.

The effect of local conditions on population growth

Multiple factors shape municipal population dynamics beyond new ventures. Migration theories explain how economic incentives drive population movements (Plane, 1993; Stark and Bloom, 1985; Todaro, 1969), while human ecology theory reveals environmental influences on settlement patterns (Hawley, 1981). Additionally, economic geography demonstrates how location affects economic activity and population distribution (Krugman, 1991). Together, these perspectives show how both internal (economic conditions, demographics) and external (environment, location, global trends) factors shape population changes.

In small municipalities, local demographics significantly impact population growth by determining community attractiveness. Demographic challenges, including population decline, aging, and youth scarcity, create socioeconomic problems. Rural areas experience young residents outmigrating for education and jobs, resulting in lower birth rates and aging populations (Delfmann *et al.*, 2014; Johnson and Winkler, 2015). Certainly, retirees can contribute to local economic development through expertise, wealth, and social capital, supporting new ventures through mentoring, advisory roles, or direct investment. However, this demographic shift creates a self-reinforcing cycle of decline. As Docquier and Rapoport (2012) demonstrated in their analysis of brain drain, the outmigration of skilled young people depletes local human capital, diminishes economic opportunities, and ultimately accelerates demographic decline.

Thus, the following hypothesis is proposed:

H2. There is a negative relationship between aged demographics and municipal population growth.

Geography significantly shapes population settlement, with resource-rich areas attracting migration (Diamond and Ordunio, 1999). High-altitude regions, characterized by extreme climate and limited infrastructure, are less appealing for habitation, thus contributing to population decline (Szymanowski and Latocha, 2021). Similarly, steep topographical slopes impede communication infrastructure, further isolating these areas. Greater physical distance from markets, universities, and hospitals can hinder municipal development by reducing access to administrative, economic, and cultural resources (Krugman, 1991).

In contrast, proximity to urban centers encourages growth by providing access to services, employment, and social opportunities (Rodríguez-Pose and Crescenzi, 2008). Additionally, amenities such as coastal regions are relatively more important in explaining new firm formation in rural places compared to urban places (Naldi *et al.*, 2021). Coastal areas also attract groups who prioritize environmental amenities over economic factors when choosing a location (Benson and O'Reilly, 2009). Although amenities such as climate, landscape, and recreational opportunities may encourage entrepreneurial activity, not all individuals attracted to these areas are motivated by entrepreneurship. Consequently, entrepreneurship becomes one of several significant pull factors rather than the sole determinant.

Thus, the following hypothesis is proposed:

H3. There is a negative relationship between adverse geography and municipal population growth.

Hypothesis 1a posits a positive relationship between entrepreneurship and municipal population growth, though this association may be moderated by demographic factors. In municipalities with aging populations, the effect of entrepreneurship on population growth is expected to be weaker. Specifically, young individuals, who are more prone to migrate (Plane, 1993), are less likely to be attracted to areas with aging populations and limited amenities. Small municipalities, which often have higher proportions of older residents (Ayuda *et al.*, 2010), may be perceived as economically stagnant. Furthermore, aging populations can hinder business success through limited workforce availability (Bloom and Canning, 2004), reduced adaptability to new technologies (Canton *et al.*, 2002), and diminished regional vitality that typically accompanies a youthful population (Glaeser and Shapiro, 2001). Consequently, without an adequate workforce to fill new positions, entrepreneurship alone may not drive population growth (Lee, 1966). Thus, demographic factors moderate the relationship between new firm creation and population change.

Moreover, aged demographics can create a self-reinforcing cycle. As the population ages and declines, the local market for goods and services shrinks, limiting the success and growth of new entrepreneurial ventures. Research shows an inverted U-shaped relationship between age and entrepreneurial initiation, indicating that very young individuals may lack sufficient human capital, while older individuals may lose the advantages of youth (Bönte *et al.*, 2009). As a result, this further reduces the ability of the area to attract new residents, thereby exacerbating negative demographic trends. In contrast, entrepreneurship in areas with a favorable demography may have a multiplier effect, where new ventures not only create direct employment but also enhance the attractiveness of the area to potential immigrants by contributing to a perception of dynamism and opportunity.

Thus, the following hypothesis is proposed:

H4. The positive association between entrepreneurship and population growth is less pronounced in municipalities with aged demographics than in those with a more favorable demography.

Geographic conditions can moderate the relationship between entrepreneurship and population growth. Adverse geography restricts the flow of goods, services, and information, impeding business operations and growth. Similarly, peripherality reduces connectedness and resource access, affecting entrepreneurial development (Rae, 2017). As a result, ventures in unfavorable locations may attract fewer residents than identical businesses in better-situated areas. Additionally, unfavorable geography affects quality of life, diminishing location appeal despite business opportunities (Szymanowski and Latocha, 2021). Conversely, agglomeration economies strengthen when firms, suppliers, and workers concentrate geographically (Duranton and Puga, 2004), creating economic hubs where population growth drives development.

Rural entrepreneurs face a "liability of rurality" affecting venture success (Clausen, 2020). Geographic obstacles include limited accessibility, a harsh climate, and topographical constraints that impede the development of infrastructure. Distance from markets, customers, and urban centers creates barriers for new ventures. These limitations increase costs, complicate logistics, and restrict access to specialized labor (Stathopoulou *et al.*, 2004). Additionally, higher transportation costs in remote areas reduce profitability (Krugman, 1991), discouraging business creation and population growth. Therefore, the geographic context serves as a moderating factor in the relationship between entrepreneurship and population growth. While entrepreneurship generally contributes to population growth, its effectiveness is constrained by the geographic realities of the municipality. Consequently, areas with favorable geography can leverage entrepreneurial activity more effectively to attract and retain population.

Thus, the following hypothesis is proposed:

H5. The positive association between entrepreneurship and population growth is less pronounced in municipalities with adverse geographical conditions than in those with more favorable geography.

Methodology

Sample and data

Spain currently comprises 8,132 municipalities with a total population of 48 million inhabitants. This structure was established for historical reasons, rather than based on population size or geographical area criteria. Spanish municipalities are the basic local administrative units in Spain, comparable to townships or communes in other countries. Populations range from small rural villages with fewer than 100 inhabitants to large cities with over a million residents. Similarly, their territorial size varies significantly—some municipalities cover only a few square kilometers, while others span hundreds. In this study, a large municipality refers to population size rather than geographical area. The sample included 8,110 municipalities, as 22 small municipalities merged during the analyzed period, preventing their individual analysis.

Four municipal subsamples were analyzed based on population size: municipalities with 50,000 or more inhabitants, fewer than 50,000, fewer than 5,000, and fewer than 1,000. This nested approach aligns with Spain's administrative framework, where population thresholds determine municipal responsibilities (e.g. municipalities with more than 5,000 inhabitants must provide local police services). Although no universal rural-urban classification exists (Dijkstra *et al.*, 2019), these thresholds correspond to widely accepted classifications in Europe (Schiavina *et al.*, 2023).

Demographic and geographical data were obtained from the Spanish Institute of Statistics (INE) and the Spanish Geographical Institute (IGN). OpenStreetMap provided data on the distances between municipalities and their proximity to the coast. Company data were sourced from the Iberian Balance Sheet Analysis System (SABI), which aggregates information from the Spanish National Commercial Register (RMC). SABI includes details on each company's headquarters, industry classification (NACE code), and establishment date. The mandatory registration of companies of all sizes in Spain ensures comprehensive coverage.

The study faced a statistical challenge in very small municipalities, where a single new business could distort entry rates. To address this, data were aggregated over seven years (2008–2014) for independent variables and outcome changes were measured in a subsequent period (2015–2022), following standard procedures (Fritsch and Mueller, 2004; Van Stel and Storey, 2004). Van Stel and Storey (2004) assessed employment changes after measuring startup activity to ensure the correct direction of causality, using four-year averages to account for outliers. Fritsch and Mueller (2004) demonstrated that the effects of new business formation on regional development follow distinct temporal patterns with significant lag structures. Therefore, to address these temporal considerations, a time-lagged longitudinal study design was employed instead of a standard panel data methodology. A total of 323,969 new companies were established in Spain, with their headquarters identified by municipality. The year 2022 was selected as the endpoint due to data availability constraints.

Measures

Table 1 displays constructs with their reflective indicators. Population growth rate (ΔPOP) is the dependent construct capturing demographic shifts through four indicators. General population growth rate (Δpop1) measures demographic change, providing the baseline for understanding population dynamics. Population under 16 years growth rate (Δpop2) measures youth demographics in rural Spain. Children's presence is necessary for rural sustainability, because losing a single family can determine whether a rural school remains open, thus affecting long-term viability. Female population growth rate (Δpop3) captures gender differences in rural-urban migration, with higher female outmigration from agricultural areas.

Table 1. Constructs and indicators with their definitions

Indicator	Description
Dependent Variables	
ΔPOP. Population growth rate	
Δpop1	General population growth rate: The median annual population growth rate from 2015 to 2022, calculated as the median percentage change for each year relative to five years earlier. Source: INE.
Δpop2	Youth population growth rate: The median annual growth rate in the population under 16 years of age from 2015 to 2022, calculated as the median change for each year in comparison to the population five years earlier. Source: INE.
Δpop3	Female population growth rate: The median annual growth rate in the number of women from 2015 to 2022, calculated as the median change for each year compared to five years prior. Source: INE.
Δpop4	Net migration growth rate: The median annual growth rate of immigrants to emigrants from 2015 to 2022, representing the balance of population inflows and outflows within the municipality during this period. Source: INE.
Independent Variables	
ENTREP. Entrepreneurship	
Entrep1	New business density: Median of new companies established in the municipality between 2008 and 2014 in comparison to the total population. Sources: SABI database and INE.
Entrep2	New business to total business: Median of new companies established in the municipality between 2008 and 2014 compared to the total number of existing companies. Sources: SABI database and INE.
Entrep3	New business to active business: Median of new companies established in the municipality between 2008 and 2014 in comparison to the total number of active companies in the municipality. Sources: SABI database and INE.
GEO. Adverse geography	
Geo1	Altitude: Elevation of the municipality above sea level. Source: Spanish Geographical Institute
Geo2	Distance to urban center: Closest distance to a municipality with more than 50,000 inhabitants. Source: OpenStreetMap
Geo3	Distance to provincial capital: Straight-line distance to the capital of the province. Source: OpenStreetMap
Geo4	Distance to coast: Straight-line distance to the coast. Source: OpenStreetMap
DEM. Aged demographics	
Dem1	Average age: Mean age of the population in the municipality for the period 2008–2014. Source: INE.
Dem2	Inverse youth population: Inverse of the average percentage of the population under the age of 16 for the period 2008–2014. Source: INE.
Dem3	Elderly population: Average percentage of the population over the age of 65 for the period 2008–2014. Source: INE.
Control Variables	
GDPpc	Gross domestic product per capita of the province in which the company's headquarters are located. Source: INE.
Pop50 km	Number of inhabitants in 50 km around the municipality. Source: Global Human Settlement Layer database (Schiavina *et al.*, 2023)
Sector	Sector intensity: The ratio of sector-specific companies to total companies in each municipality (S1: primary sector, divisions 01–03; S2: secondary sector, divisions 05–43; S3: tertiary sector, divisions 45–99), calculated using NACE Rev. 2 codes (Eurostat, 2008) from SABI database and INE.
Grouping Variable	
Pop	Dummy variables that equal 1 if the population of the municipality is greater than or equal to 50,000 (pop≥50,000), or below a specific threshold (pop<50,000, pop<5,000, pop<1,000)

Source(s): Author's own creation/work

Women maintain social networks and provide care services necessary for community sustainability. Their contributions strengthen rural communities by supporting social and familial structures (Ahl *et al.*, 2024). Finally, net migration growth rate (Δpop4) measures population flows, thereby providing insight into the municipality's relative attractiveness (Johnson and Winkler, 2015).

The entrepreneurship construct (ENTREP) was measured using three reflective indicators related to business entry, all representing median rates over the seven-year period (2008–2014). Entrep1 calculates the number of new firms established in each municipality during this period relative to its population; Entrep2 measures the total number of new companies established relative to all companies in the municipality; while Entrep3 excludes inactive companies. Entrep1 is a business entry measure derived from the labor market approach (Evans and Jovanovic, 1989), focusing on the flow of new firms entering the market. In contrast, Entrep2 and Entrep3 are influenced by organizational ecology theory (Hannan and Freeman, 1977), as they account for the density and competition among firms.

The adverse geography construct (GEO) comprises four reflective indicators: municipality altitude (Geo1), distance to the nearest municipality with more than 50,000 inhabitants (Geo2), distance to the capital city (Geo3), and distance to coast (Geo4). These variables have consistently been identified in previous research as detrimental factors influencing municipal development (Naldi *et al.*, 2021; Szymanowski and Latocha, 2021). When analyzing the subsample of municipalities with populations exceeding 50,000 inhabitants, the construct incorporates only the altitude and distance to coast indicators.

The aged demographics construct (DEM) represents the constraints posed by an aging population on municipal development and includes three reflective indicators, all representing average rates over the seven-year period (2008–2014). Dem1 is the average age in the municipality, Dem2 is the inverse of the average percentage of the population under 16 years, and Dem3 measures the average percentage of the population aged over 65 (Delfmann *et al.*, 2014).

The study incorporates several control variables. Sector intensity (Sector) was measured as the proportion of companies in each economic sector relative to all companies in the municipality. The analysis included primary (S1), secondary (S2), and tertiary (S3) sectors, classified by NACE codes (Eurostat, 2008). To account for economic spillover effects from nearby larger municipalities that may benefit smaller ones, a control variable measured the population within a 50 km radius (Pop50 km) using Global Human Settlement data (Schiavina *et al.*, 2023). Provincial gross domestic product per capita (GDPpc) was included to capture regional economic conditions that influence business creation and population dynamics.

Table 2 presents descriptive statistics for the variables used in the analysis. Spain's territorial heterogeneity follows European patterns but exhibits more extreme polarization (Goerlich and Cantarino, 2013). Municipalities with populations of over 50,000 inhabitants (1.76% of all municipalities, n = 143) comprise 51.5% of the total population (23.8 million). Conversely, municipalities with fewer than 1,000 inhabitants (60.55% of all municipalities, n = 4,911) account for only 3.3% of the population (1.5 million). The mean total population change (Δpop1) of −5.3% indicates an overall population decline, with the youth population (Δpop2) showing a more pronounced decrease (mean = −9.1%).

Figure 2 maps Spain's new company distribution by municipality (2008–2014) relative to population. Data were converted to ranks to enhance pattern visibility. Darker shades, indicating higher entrepreneurial activity, are concentrated in Madrid and coastal regions. Lighter shades, showing lower entrepreneurial dynamism, appear mainly in interior areas, particularly those surrounding the capital.

Figure 3 shows population changes (2015–2022), with data transformed into ranks. The spatial pattern mirrors the entrepreneurial trends in Figure 2. Darker areas show population growth, mainly in Madrid and coastal regions, especially along the Mediterranean. Lighter areas indicate population decline, primarily in interior regions.

Table 2. Exploratory analysis of continuous and dummy indicators for the total sample. Continuous indicators and dummy indicators are presented separately to illustrate their respective statistics

Continuous indicators	Obs	Mean	Std. dev	Min	Q1	Median	Q3	Max
Δpop1	8,110	−0.053	0.079	−0.447	−0.100	−0.052	−0.004	0.75
Δpop2	8,110	−0.091	0.332	−1.0	−0.192	−0.065	0.016	4.0
Δpop3	8,110	−0.045	0.145	−1	−0.122	−0.042	0.033	1.345
Δpop4	8,110	0.981	0.403	0.000	0.800	1	1.202	4.444
Entrep1	8,110	0.004	0.007	0	0	0.003	0.006	0.333
Entrep2	8,110	0.173	0.185	0	0	0.167	0.243	1
Entrep3	8,110	0.012	0.019	0	0	0	0.027	0.167
Geo1	8,110	613.165	344.04	1	333	666	858	1,695
Geo2	8,110	43.248	28.132	0	21.762	37.878	60.198	220.537
Geo3	8,110	43.697	24.239	0	26.108	40.192	58.425	220.537
Geo4	8,110	98.502	81.901	0	28.262	82.923	148.683	319.947
Dem1	8,110	42.821	2.532	34.643	40.876	42.663	44.329	48.794
Dem2	8,110	−9.781	5.591	−28.551	−14.198	−9.820	−5.471	1
Dem3	8,110	28.282	11.847	0.000	18.951	26.872	36.190	76.596
GDPpc	8,110	21,938	4,113	15,915	18,243	21,387	25,489	34,251
Pop50 km	8,110	710,587	107,687	10,800	144,514	314,707	780,374	6,600,000
S1	8,110	0.109	0.203	0	0	0.016	0.125	1
S2	8,110	0.321	0.256	0	0.118	0.317	0.456	1
S3	8,110	0.457	0.297	0	0.250	0.501	0.657	1

Dummy indicators	Obs	%	Inhabitants	% Total
Pop≥50,000	143	1.76%	23,798,644	51.5%
Pop<50,000	7,967	98.24%	22,397,776	48.5%
Pop<5,000	6,810	83.97%	6,024,095	13.0%
Pop<1,000	4,911	60.55%	1,537,266	3.3%

Source(s): Author’s own creation/work

Results

Six model specifications examined relationships between entrepreneurship, geodemographic conditions, and population growth. Initial models tested direct effects, while later ones examined moderating influences. Model 6 incorporated all variables, including control ones. To address endogeneity concerns, the Gaussian copula approach was implemented (Liengaard *et al.*, 2025), which controls for potential endogeneity through nonlinear dependencies among variables. Following the systematic procedure outlined by Hult *et al.* (2018), the Kolmogorov-Smirnov test was conducted on the latent variable scores of ENTREP and DEMO to verify nonnormality. The geographic construct (GEO) was excluded from the analysis, as geographic conditions are inherently exogenous. The results confirmed nonnormal distributions, satisfying the prerequisite for applying the Gaussian copula approach.

The use of PLS-SEM involves two main steps: the measurement model, which establishes the relationships between observed indicators and latent variables, and the structural model, which defines the relationships among latent variables (Hair *et al.*, 2020). The analysis was conducted using SmartPLS software (Ringle *et al.*, 2024). To account for potential group heterogeneity, separate models were estimated based on population size using a nonparametric PLS-MGA procedure (Sarstedt *et al.*, 2011).

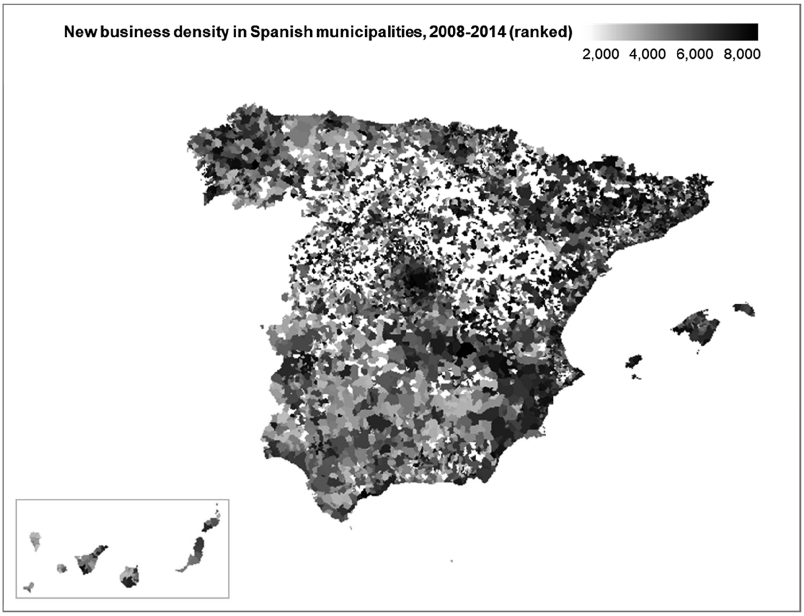

Figure 2. Map of Spain illustrating the density of new companies established in municipalities between 2008 and 2014, relative to the total population. Municipalities are ranked based on their new business density, with darker shades indicating higher density. **Source:** Authors' own creation/work

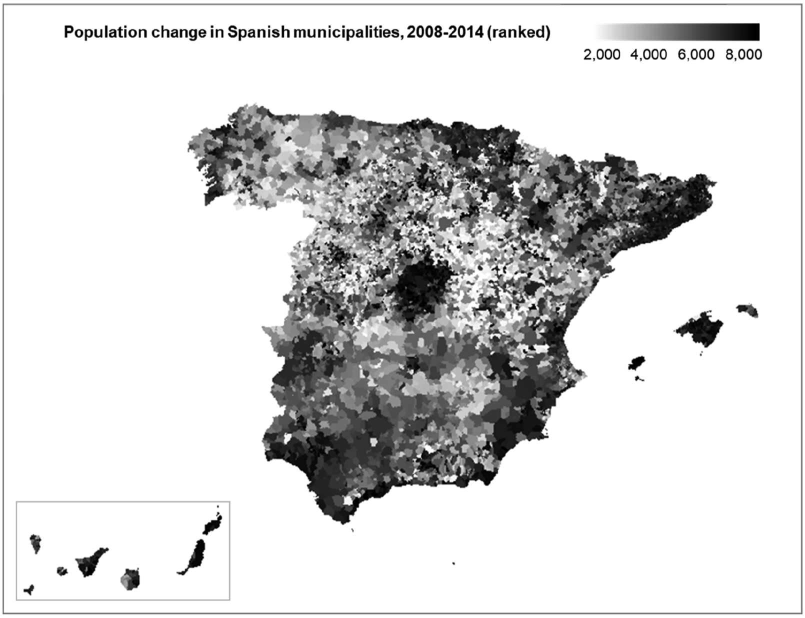

Figure 3. Map of Spain illustrating the population change in municipalities from 2015 to 2022. Municipalities are ranked based on their population change, with darker shades indicating higher positive change. **Source:** Authors' own creation/work

Measurement model

The measurement model evaluation assesses construct validity, reliability, and consistency. Table 3 displays the average variance extracted (AVE), composite reliability (CR), Cronbach's alpha (α), and variance inflation factor (VIF). All outer loadings exceeded the 0.7 threshold (Byrne, 2013), and CR and Cronbach's alpha values surpassed the recommended 0.6 threshold (Hair *et al.*, 2019). AVE values for all four constructs were above 0.50 (Bagozzi and Yi, 1988). VIF assessed multicollinearity, with all values being below 5, indicating no significant issues (Hair *et al.*, 2019).

Table 4 presents the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT) for assessing discriminant validity. The interconstruct correlations remained below the 0.85

Table 3. Convergent validity, composite reliability, and collinearity statistics for the total sample. Includes outer loadings, average variance extracted (AVE), Cronbach's alpha (α), composite reliability (D.G. rho), and variance inflation factor (VIF)

Latent construct	Indicator	Outer loadings	Outer weights	AVE	Cronbach's α	D.G. rho (CR)	VIF
ΔPOP	Δpop1	0.904	0.393	0.656	0.823	0.883	2.590
Population growth	Δpop2	0.769	0.290				1.450
	Δpop3	0.884	0.355				2.546
	Δpop4	0.747	0.266				1.555
ENTREP	Entrep1	0.903	0.428	0.722	0.812	0.886	3.557
Entrepreneurship	Entrep2	0.833	0.280				3.177
	Entrep3	0.810	0.471				1.366
GEO	Geo1	0.763	0.374	0.559	0.734	0.834	1.348
Adverse geography	Geo2	0.853	0.376				2.673
	Geo3	0.681	0.269				2.152
	Geo4	0.680	0.309				1.352
DEM	Dem1	0.783	0.253	0.746	0.826	0.896	1.348
Aged demographics	Dem2	0.940	0.426				3.932
	Dem3	0.941	0.453				3.871

Source(s): Author's own creation/work

Table 4. Discriminant validity for the total sample. Fornell-Larcker criterion: square roots of average variance extracted (AVE) along the diagonal and latent variable correlations off-diagonal. Heterotrait-Monotrait ratio (HTMT): construct correlation ratios

Fornell-larcker criterion

Constructs	ENTREP	GEO	DEM	ΔPOP
ENTREP	*0.849*			
GEO	−0.417	*0.748*		
DEM	−0.548	0.559	*0.864*	
ΔPOP	0.430	−0.514	−0.601	*0.809*

Heterotrait-monotrait ratio (HTMT)

Constructs	ENTREP	GEO	DEM	ΔPOP	DEMxENTREP
ENTREP					
GEO	0.496				
DEM	0.606	0.681			
ΔPOP	0.490	0.643	0.672		
DEMxENTREP	0.263	0.083	0.050	0.103	
GEOxENTREP	0.187	0.249	0.043	0.103	0.507

Source(s): Author's own creation/work

threshold, and the square roots of the AVEs, as shown in the diagonal of the Fornell-Larcker criterion, exceeded the correlations among constructs, confirming their distinctiveness (Henseler *et al.*, 2015). Additionally, discriminant validity was validated using both the Fornell-Larcker criterion and the HTMT ratio method, with all HTMT values well below the suggested thresholds of 0.85 and 0.90. Consequently, the model satisfied all measurement model criteria.

Structural model and hypothesis testing

Table 5 presents the results of the structural model for each of the four subsamples based on municipal population. Beta coefficients (β) represent standardized regression coefficients, assessing their significance using bootstrapping with 5,000 resamples (Hair *et al.*, 2019). The model's explanatory power was indicated by the adjusted R^2. Additionally, the table presents the results of the PLS-MGA analysis, which examines differences in the relationship between entrepreneurship and population growth by comparing each population group against its complementary group (e.g. Population < n versus Population ≥ n).

A significant and positive beta coefficient was observed between entrepreneurship and population growth across the four subsamples (Model 1). An increase in new firms positively correlates with higher population growth. In all four subsamples analyzed, the beta coefficients for entrepreneurship remained statistically significant. The adjusted R^2 is 0.175 when the population is less than 50,000 and decreases for large cities (0.047) and very small municipalities, being 0.110 when the population is less than 5,000 and 0.048 when it is below 1,000. Therefore, the positive relationship between entrepreneurship and population growth is weaker in both very large and very small municipalities. The PLS-MGA test reveals statistically significant differences in path coefficients among the population groups, except for municipalities with fewer than 5,000 inhabitants.

Model 2 shows the relationship between demographics and population growth. The adjusted R^2 is high across all subsamples and greater than in Model 1 (ranging from 0.215 to 0.360). The PLS-MGA test shows significant path coefficient differences only in municipalities with fewer than 1,000 inhabitants. Estimated path coefficients for Model 3, which examines geography, indicate a negative relationship between adverse geography and municipal population growth, except in municipalities with 50,000 or more inhabitants. PLS-MGA reveals significant path coefficient differences among population groups. The adjusted R^2 values are lower than those in Model 2.

Model 4 incorporates the moderating effect of aged demographics on the relationship between entrepreneurship and population growth. The interaction term ENTREPxDEM is negative and significant, indicating that the positive association between entrepreneurship and population growth weakens as the level of demographic aging increases. However, the moderating effect is not observed in municipalities with more than 50,000 inhabitants.

Model 5 incorporates the moderating effect of adverse geography. The path coefficient of ENTREPxGEO is negative and significant, indicating that the positive association between entrepreneurship and population growth is weaker in municipalities with adverse geography. However, this effect is not significant in either larger municipalities (more than 50,000 inhabitants) or very small ones (fewer than 1,000 inhabitants).

The complete Model 6 includes control variables and adjusts for endogeneity. Hypothesis H1a, concerning the relationship between entrepreneurship and population growth, is only partially supported, as it does not hold for municipalities with more than 50,000 inhabitants or those with fewer than 1,000. Hypothesis H1b, which posits an inverted U-shaped relationship, is confirmed. Hypothesis H2, regarding the direct effect of aged demography, is consistently supported across all subsamples. Hypothesis H3, related to adverse geography, is not supported in municipalities with more than 50,000 inhabitants. Hypothesis H4, which posits a moderating role of demography in the relationship between entrepreneurship and population growth, is also not supported in the largest municipalities. Finally, Hypothesis H5, which posits a moderating role of geographical conditions, is not supported in any of the subsamples.

Table 5. PLS-SEM analysis results. T-statistics based on 5,000 repetitions using bias-corrected accelerated bootstrapping method. Path coefficient differences (Diff) compare each population group with its complementary group (e.g. Pop < n versus Pop ≥ n). c_{ENTREP} and c_{DEMO} indicate the copula term in the model. For the sector variables, the reference (excluded) category is S1

		Pop<1,000			Pop<5,000			Pop<50,000			Pop≥50,000		
		β	R^2adj	Diff	β	R^2adj	Diff	β	R^2adj	Diff	β	R^2adj	Diff
M1	ENTREP → ΔPOP	0.220***	0.048	−0.16***	0.333***	0.110	−0.02	0.419***	0.175	−0.19***	0.233***	0.047	0.19***
M2	DEM → ΔPOP	−0.465***	0.215	0.17***	−0.545***	0.297	0.00	−0.600***	0.360	0.07	−0.530***	0.276	−0.07
M3	GEO → ΔPOP	−0.309***	0.096	0.13***	−0.395***	0.156	−0.06**	−0.449***	0.201	0.35***	−0.102	0.003	−0.35***
M4	ENTREP → ΔPOP	0.079***	0.225	0.12***	0.105***	0.311	−0.02***	0.138***	0.377	0.11	0.212**	0.291	−0.11
	DEM → ΔPOP	−0.439***		−0.14***	−0.495***		−0.13	−0.524***		−0.02	−0.514***		0.02
	ENTREPxDEM → ΔPOP	−0.058***		−0.02	−0.076***		−0.14***	−0.082***		0.13	0.050		−0.13
M5	ENTREP → ΔPOP	0.176***	0.125	−0.09***	0.235***	0.208	−0.05**	0.290***	0.274	−0.03***	0.259***	0.055	0.03***
	GEO → ΔPOP	−0.282***		0.08***	−0.323***		−0.06**	−0.335***		0.19	−0.141		−0.19
	ENTREPxGEO → ΔPOP	0.001		−0.03	−0.027**		−0.10***	−0.028***		0.08***	0.049		−0.08***
M6	ENTREP → ΔPOP	0.054	0.265	0.03	0.117***	0.371	0.33	0.114***	0.437	0.41	0.524	0.394	−0.41
	DEM →ΔPOP	−0.296***		0.00	−0.236***		0.27**	−0.314***		−0.25	−0.562*		0.25
	GEO → ΔPOP	−0.115***		0.18***	−0.188***		0.08**	−0.204***		−0.16	−0.361		0.16
	ENTREPxDEM →ΔPOP	−0.055***		−0.06***	−0.062***		−0.14***	−0.068***		0.10	0.035		−0.10
	ENTREPxGEO →ΔPOP	0.022		−0.02	0.001		−0.04	−0.002		−0.04	−0.038		0.04
	c_{ENTREP}	0.002		−0.07	−0.014		−0.32	−0.004		−0.21	−0.214		0.21
	c_{DEMO}	0.001		0.12	−0.055		−0.06	−0.026		0.10	0.074		−0.10
	GDPpc → ΔPOP	0.131***		−0.08***	0.148***		−0.12***	0.144***		0.13	0.277*		−0.13
	Pop50 km → ΔPOP	0.062***		0.01	0.087***		0.13***	0.053***		−0.12	−0.069		0.12
	Sector												
	S2→ ΔPOP	0.042***		−0.02	0.035**		−0.07	0.031**		0.42***	0.447		−0.42***
	S3→ ΔPOP	0.072***		−0.09***	0.072***		−0.17**	0.072***		0.26***	0.335		−0.26***

Note(s): ***Significant at 1% level; **significant at 5% level; *significant at 10% level

Source(s): Author's own creation/work

Overall, the model demonstrates stronger explanatory power for population dynamics in medium-sized municipalities, while exhibiting reduced predictive consistency in both the smallest and largest ones.

Endogeneity analysis indicates that neither the entrepreneurship copula term (c_{ENTREP}) nor the demographic copula term (c_{DEMO}) was statistically significant across any of the population subsamples. These findings suggest that the structural relationships identified in the models are generally robust to endogeneity concerns.

To enhance robustness, a multilevel mixed-effects model was performed to capture variability across 8,110 municipalities nested within 52 provinces and 19 regions in Spain. Table 6 presents five models: the first uses the latent variable (ΔPOP) as the dependent variable, while others employ individual population change indicators (Δpop1–Δpop4). This approach enables a detailed evaluation of explanatory factors affecting various aspects of population dynamics, highlighting nuances that may be missed in aggregate analysis. Entrepreneurship (ENTREP) shows a positive and significant effect across all models. Geographic (GEO) and demographic (DEM) factors consistently show negative associations with population growth. ENTREPxDEM exhibits a significant negative effect in four models, with Δpop4 being an exception. This suggests that an aged demographic structure reduces the effectiveness of entrepreneurship in promoting local population growth among existing young and female populations, while its effect on attracting immigrants remains unchanged. However, the ENTREPxGEO interaction is not significant, indicating that the relationship between entrepreneurship and population growth does not systematically vary with geographical conditions. Therefore, Hypothesis H5 is not supported. Variance components indicate significant regional and provincial-regional effects, with intraclass correlation coefficients (ICCs) ranging from 0.000 to 0.033 at the regional level and from 0.016 to 0.085 at the provincial-regional level. Model validity is confirmed by significant Wald ($p < 0.01$) and likelihood ratio (LR) tests ($p < 0.01$), supporting the multilevel approach over standard regression.

Figure 4 shows the predicted margins of population growth as a function of entrepreneurship, comparing three types of municipality based on aging levels: less aged (DEM $= -1$), average aged (DEM $= 0$), and more aged (DEM $= 1$). Because the DEM variable is standardized, these values correspond to the mean minus one standard deviation, the mean, and the mean plus one standard deviation, respectively. The top left panel presents results for the total population, the top right for young people, the bottom left for women, and the bottom right for immigrants. Entrepreneurship is positively associated with population growth in municipalities with lower and median aging levels, but not in the most aged municipalities. This pattern is observed for young people and women. However, for immigrants, the association between entrepreneurship and population growth remains positive across all aging levels. These results indicate that population aging moderates the impact of entrepreneurship on demographic growth, except for immigrants, who may be more receptive to economic opportunities in rural areas or face fewer barriers related to the local age structure.

Discussion

Schumpeter (1934) established the entrepreneur as the primary driver of economic development, prompting extensive research on this relationship. Studies have yielded mixed results regarding the effectiveness of new firm formation policies, especially in regions with low entrepreneurial activity (Fritsch and Mueller, 2004; Van Stel and Storey, 2004). This study reveals a complex, nonlinear relationship between entrepreneurship and population growth that varies by municipality size and aligns with current economic development theories. It adapts the framework of Wennekers *et al.* (2005) and Carree *et al.* (2002) to the municipal level, acknowledging that their focus is on national economies. The findings show a positive link between entrepreneurship and population growth (H1a), though this association

Table 6. Multilevel mixed-effects regression analysis of population growth rate. Column 1 presents results with the latent construct ΔPOP as the dependent variable, while columns 2–5 present results for each indicator (Δpop1, Δpop2, Δpop3, and Δpop4) as dependent variables. For the sector variables, the reference (excluded) category is S1

	ΔPOP		Δpop1		Δpop2		Δpop3		Δpop4	
	Coef	z	Coef	z	Coef	z	Coef	z	Coef	z
ENTREP	0.080	7.54***	0.080	7.52***	0.095	7.16***	0.056	4.94***	0.042	3.32***
GEO	−0.193	−13.64***	−0.175	−12.52***	−0.192	−11.74***	−0.141	−9.49***	−0.143	−8.54***
DEM	−0.419	−27.18***	−0.496	−32.45***	−0.045	−2.56**	−0.446	−27.48***	−0.226	−12.35***
ENTREPxDEM	−0.078	−6.86***	−0.099	−8.82***	−0.093	−6.64***	−0.068	−5.7***	0.016	1.21
ENTREPxGEO	0.016	1.48	0.000	0.04	0.013	1.00	0.018	1.6	0.021	1.64
GDPpc	0.134	4.33***	0.082	2.71***	0.130	6.48***	0.147	4.95***	0.078	1.78*
Pop50 km	0.012	0.77	0.032	2.16**	0.006	0.37	−0.002	−0.11	−0.007	−0.4
Sector										
S2	0.029	3.19***	−0.019	−2.07**	0.034	2.94***	0.009	0.93	0.097	9.00***
S3	0.057	5.51***	0.011	1.11	0.056	4.46***	0.029	2.73***	0.117	10.02***
cte	−0.037	−1.03	−0.063	−1.65	−0.043	−2.01**	−0.043	−1.27	0.041	0.76
Level Region (num)	19		19		19		19		19	
Level Province (num)	52		52		52		52		52	
Level Municipalities (num)	8,110		8,110		8,110		8,110		8,110	
Variance Components										
ICC Region	0.013***		0.024***		0.000***		0.007***		0.033***	
ICC Province-Region	0.062***		0.054***		0.016***		0.054***		0.085***	
Model Summary										
Wald test	2,694.05***		3,143.22***		685.38***		2,052.43***		931.98***	
−2 Log Likelihood	18,007.56		17,873.28		21,721.88		18,967.38		20,620.96	
LR test (χ^2)	268.17***		333.12***		55.51***		222.66***		311.95***	

Note(s): ***Significant at 1% level; **significant at 5% level; *significant at 10% level

Source(s): Author's own creation/work

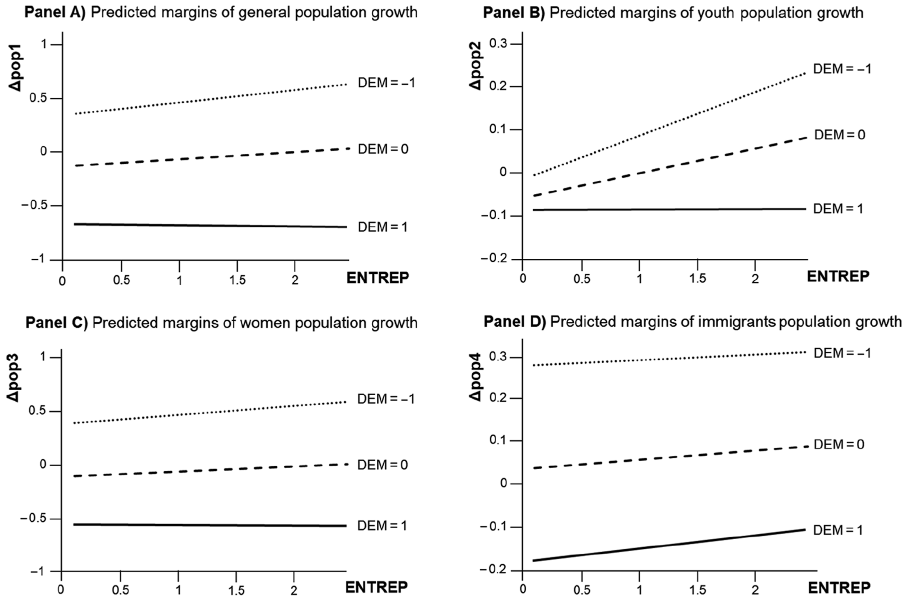

Figure 4. Predicted margins of population growth as a function of entrepreneurship, comparing three types of municipality based on aging levels: less aged (DEM = −1), average aged (DEM = 0), and more aged (DEM = 1). These values correspond to the mean minus one standard deviation (μ–σ), the mean (μ), and the mean plus one standard deviation (μ + σ), respectively. Panel A shows results for the total population, Panel B for the youth population, Panel C for women, and Panel D for immigrants. **Source:** Authors' own creation/work

is not statistically significant in municipalities with fewer than 1,000 or more than 50,000 inhabitants. The relationship follows an inverted U-shaped pattern (H1b).

Large cities show weaker entrepreneurship-population growth relationships (H1b). A possible explanation for this, although not directly examined here, could be the presence of inherent attractions—advanced healthcare, prestigious educational institutions, cultural activities, and professional networks (McCann and van Oort, 2019). While large urban areas benefit from traditional agglomeration effects through sharing, matching, and learning mechanisms (Duranton and Puga, 2004), small municipalities can develop comparable advantages through new business clusters, attracting population without urban drawbacks like congestion, pollution, and high living costs (Dijkstra *et al.*, 2013).

The relationship between entrepreneurship and population growth also appears to be less pronounced in very small municipalities (H1b). Specific characteristics may influence how new business creation affects population growth in these areas. While this study does not directly assess these factors, evidence suggests that very small municipalities face limitations in developing effective EEs (Miles and Morrison, 2020). They also have fewer resources, including healthcare facilities, educational centers, and transportation networks, with limited access to services (Clausen, 2020). Constraints like that may limit the attractiveness of new businesses, reducing their ability to stimulate municipal population growth.

The data support H2, showing negative associations between population growth and aged demographics. The data partially support H3, showing negative associations between population growth and geographical constraints, although this relationship does not hold in large municipalities. Demographic variables demonstrate stronger explanatory power than geographical factors, as evidenced by higher R^2 values. These findings align with research on brain drain (Docquier and Rapoport, 2012), where the outmigration of young residents creates a self-reinforcing cycle of demographic decline. While causal pathways remain beyond the scope of this analysis, this pattern suggests that, although geographical limitations affect infrastructure development, demographic characteristics may have a stronger influence on long-term population trends in municipalities.

Previous research examining demographics and geography in the relationship between entrepreneurship and population growth shows mixed results (Delfmann *et al.*, 2014; Johnson and Rasker, 1995; Szymanowski and Latocha, 2021). The analysis of H4 supports a moderating role of demographic variables in Spanish municipalities. However, it does not support H5 regarding the moderating role of geographical factors, as confirmed by PLS-SEM and multilevel regression. This limited impact of geographical factors might be attributed to Spain's developed transportation networks, which reduce barriers and have contributed to decreasing regional inequalities (Cabrer-Borrás and Serrano-Domingo, 2007). Following Spain's accession to the EU, a significant proportion of European cohesion funds was directed toward the development of infrastructure. The findings suggest that infrastructure investments might mitigate adverse geographical effects on the relationship between entrepreneurship and population growth, though this mechanism was not directly tested.

Conclusions

This study examined the effect of entrepreneurship on population growth in small municipalities, taking into consideration local geography and demographics. By identifying a positive association between entrepreneurship and population growth, the study supports the application of the LED framework in small municipalities, typically associated with large ones (Blakely and Leigh, 2017; McCann and van Oort, 2019). The relationship follows an inverted U-shaped pattern, with the association being less evident in very small and large municipalities. The constraints of very small municipalities reduced the positive relationship between new ventures and population growth. While entrepreneurship can stimulate very small municipalities by attracting businesses and promoting local economic opportunities (Artz *et al.*, 2016; del Olmo-García *et al.*, 2023), challenging demographics and geography limit its effectiveness in driving population growth. This relationship was also less evident in large municipalities, which could be explained by offering attractions beyond employment opportunities. The findings align with contingency theory (Donaldson, 2001), human ecology theory (Hawley, 1981), and economic geography (Krugman, 1991), which emphasize the importance of contextual factors.

Policy and practice implications

The findings of this study offer valuable insights for policymakers and practitioners tackling rural development and depopulation challenges, contributing to the ongoing debate on the effectiveness of entrepreneurship policies across varied geodemographic contexts (Szymanowski and Latocha, 2021). Although entrepreneurship can stimulate population growth (Artz *et al.*, 2016; Blakely and Leigh, 2017), its impact varies depending on the context. Public efforts to promote entrepreneurship should therefore focus on small municipalities, where the potential benefits are greatest, suggesting that policies should prioritize these areas over a one-size-fits-all approach. This prioritization should not imply neglecting slightly larger rural areas. It is necessary to consider alternative ways of supporting these rural settlements, recognizing that entrepreneurship may play a different, but still important, role in their development.

Very small municipalities often face deficiencies in basic services, limiting the ability of new businesses to attract workers. Baumgartner *et al.* (2013) cautioned that policymakers should temper expectations regarding the short-term impact of entrepreneurship on rural economies. Thus, before promoting new firm creation, policymakers should implement strategies tailored to local conditions that enhance foundational services. This requires comprehensive interventions beyond traditional economic incentives, including regulatory reforms to reduce administrative burdens for rural entrepreneurs. Therefore, in these municipalities, policies should first address the "liability of rurality" (Clausen, 2020) by improving digital infrastructure, developing coworking spaces, and fostering connections with educational institutions. Korsgaard *et al*. (2015) distinguished between "entrepreneurship in the rural" and "rural entrepreneurship," with the latter emphasizing local resource utilization and stronger territorial ties. This distinction highlights the importance of entrepreneurs in small municipalities building networks and partnerships to overcome resource constraints. Consistent with this, our results indicate that population in the surrounding area (Pop50 km) is associated with population growth in smaller municipalities. Moreover, support should extend beyond the startup phase to ensure long-term sustainability and bolster local development. The significant moderating effect of demographic factors suggests that policies addressing aging populations should precede entrepreneurship initiatives, incorporating structural measures such as housing incentives for young families and improvements to public services.

The negative ENTREPxDEM interaction significantly affects general, youth, and female population growth, but not net migration. Consequently, public policies in Spain could take advantage of the fact that aged demographic conditions do not appear to diminish the potential of entrepreneurship to attract immigrants. Policy interventions could include simplifying bureaucratic processes for immigrant entrepreneurs, facilitating access to financing through targeted programs, promoting rural business opportunities internationally to attract skilled individuals, and providing specialized support to rural startups that focus on immigrant labor.

Limitations and future research

The sample in this study is large, encompassing all companies created over a seven-year period across all Spanish municipalities. However, the generalizability of the findings may be limited by the specific contexts and characteristics of the municipalities examined. It would be valuable to examine these relationships in other countries with different institutional frameworks and economic conditions, and incorporate additional variables that influence new firm formation and local growth, such as access to resources and infrastructure. Future research could examine rural contexts to clarify mixed findings on the relationship between cultural amenities and entrepreneurship (Lee *et al.*, 2004; Olim *et al.*, 2014).

The study focused on initial business creation. However, analyzing subsequent business development would also be relevant, as it could provide insights into the mechanisms influencing population dynamics in rural areas. Business growth—measured through firm expansion, employment creation beyond the startup phase, and the evolution from necessity-based to opportunity-driven entrepreneurship—may affect population growth differently than business creation alone. This analysis is suggested for future research.

This study used broad business categories based on the NACE classification (Eurostat, 2008), enhancing the reproducibility of the results. Research indicates that knowledge-intensive industries are associated with specialized employment opportunities and knowledge transfer across firms (Glaeser *et al.*, 2010). Although small municipalities often have limited connections to knowledge networks found in urban areas, studying the potential of knowledge-intensive industries in rural settings remains valuable. Future research could also explore the effect of entrepreneurship in small municipalities on other activities, such as traditional manufacturing, retail services, personal services, circular economy initiatives, silver economy initiatives for aging populations, and emerging sectors in rural settings.

References

Ahl, H., Berglund, K., Pettersson, K. and Tillmar, M. (2024), "Women's contributions to rural development: implications for entrepreneurship policy", *International Journal of Entrepreneurial Behavior and Research*, Vol. 30 No. 7, pp. 1652-1677, doi: 10.1108/IJEBR-11-2022-0973.

Artz, G.M., Kim, Y. and Orazem, P.F. (2016), "Does agglomeration matter everywhere? New firm location decisions in rural and urban markets", *Journal of Regional Science*, Vol. 56 No. 1, pp. 72-95, doi: 10.1111/jors.12202.

Audretsch, D.B., Belitski, M. and Desai, S. (2015), "Entrepreneurship and economic development in cities", *The Annals of Regional Science*, Vol. 55 No. 1, pp. 33-60, doi: 10.1007/s00168-015-0685-x.

Ayuda, M.I., Collantes, F. and Pinilla, V. (2010), "From locational fundamentals to increasing returns: the spatial concentration of population in Spain, 1787-2000", *Journal of Geographical Systems*, Vol. 12 No. 1, pp. 25-50, doi: 10.1007/s10109-009-0092-x.

Bagozzi, R.P. and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 16 No. 1, pp. 74-94, doi: 10.1007/BF02723327.

Baumgartner, D., Schulz, T. and Seidl, I. (2013), "Quantifying entrepreneurship and its impact on local economic performance: a spatial assessment in rural Switzerland", *Entrepreneurship and Regional Development*, Vol. 25 Nos 3-4, pp. 222-250, doi: 10.1080/08985626.2012.710266.

Benson, M. and O'Reilly, K. (2009), "Migration and the search for a better way of life: a critical exploration of lifestyle migration", *The Sociological Review*, Vol. 57 No. 4, pp. 608-625, doi: 10.1111/j.1467-954X.2009.01864.x.

Blakely, E.J. and Leigh, N.G. (2017), *Planning Local Economic Development*, Sage, Thousand Oaks, CA.

Bloom, D.E. and Canning, D. (2004), "Global demographic change: dimensions and economic significance", working paper 10817, National Bureau of Economic Research, Cambridge, MA doi: 10.3386/w10817.

Bönte, W., Falck, O. and Heblich, S. (2009), "The impact of regional age structure on entrepreneurship", *Economic Geography*, Vol. 85 No. 3, pp. 269-287, doi: 10.1111/j.1944-8287.2009.01033.x.

Bosma, N. and Sternberg, R. (2014), "Entrepreneurship as an urban event? Empirical evidence from European cities", *Regional Studies*, Vol. 48 No. 6, pp. 1016-1033, doi: 10.1080/00343404.2014.904041.

Byrne, B.M. (2013), *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*, Routledge, London.

Cabrer-Borras, B. and Serrano-Domingo, G. (2007), "Innovation and R&D spillover effects in Spanish regions: a spatial approach", *Research Policy*, Vol. 36 No. 9, pp. 1357-1371, doi: 10.1016/j.respol.2007.04.012.

Canton, E.J., de Groot, H.L. and Nahuis, R. (2002), "Vested interests, population ageing and technology adoption", *European Journal of Political Economy*, Vol. 18 No. 4, pp. 631-652, doi: 10.1016/S0176-2680(02)00112-X.

Carree, M., Van Stel, A., Thurik, R. and Wennekers, S. (2002), "Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976-1996", *Small Business Economics*, Vol. 19 No. 3, pp. 271-290, doi: 10.1023/A:1019604426387.

Chege, S.M. and Wang, D. (2020), "The impact of entrepreneurs' environmental analysis strategy on organizational performance", *Journal of Rural Studies*, Vol. 77, pp. 113-125, doi: 10.1016/j.jrurstud.2020.04.008.

Clausen, T.H. (2020), "The liability of rurality and new venture viability", *Journal of Rural Studies*, Vol. 73, pp. 114-121, doi: 10.1016/j.jrurstud.2019.12.005.

Davidsson, P., Delmar, F. and Wiklund, J. (2006), *Entrepreneurship and the Growth of Firms*, Edward Elgar Publishing, Cheltenham.

del Olmo-García, F., Domínguez-Fabián, I., Crecente-Romero, F.J. and del Val-Núñez, M.T. (2023), "Determinant factors for the development of rural entrepreneurship", *Technological Forecasting and Social Change*, Vol. 191, 122487, doi: 10.1016/j.techfore.2023.122487.

Delfmann, H. and Koster, S. (2016), "The effect of new business creation on employment growth in regions facing population decline", *The Annals of Regional Science*, Vol. 56 No. 1, pp. 33-54, doi: 10.1007/s00168-015-0738-1.

Delfmann, H., Koster, S., McCann, P. and Van Dijk, J. (2014), "Population change and new firm formation in urban and rural regions", *Regional Studies*, Vol. 48 No. 6, pp. 1034-1050, doi: 10.1080/00343404.2013.867430.

Diamond, J.M. and Ordunio, D. (1999), *Guns, Germs, and Steel*, Books on Tape, New York, NY.

Dijkstra, L., Garcilazo, E. and McCann, P. (2013), "The economic performance of European cities and city regions: myths and realities", *European Planning Studies*, Vol. 21 No. 3, pp. 334-354, doi: 10.1080/09654313.2012.716245.

Dijkstra, L., Poelman, H. and Veneri, P. (2019), "The EU-OECD definition of a functional urban area", OECD Regional Development Working Papers, No. 2019/11, OECD Publishing doi: 10.1787/d58cb34d-en.

Docquier, F. and Rapoport, H. (2012), "Globalization, brain drain, and development", *Journal of Economic Literature*, Vol. 50 No. 3, pp. 681-730, doi: 10.1257/jel.50.3.681.

Donaldson, L. (2001), *The Contingency Theory of Organizations*, Sage, Thousand Oaks, CA.

Duranton, G. and Puga, D. (2004), "Micro-foundations of urban agglomeration economies", in Henderson, J.V. and Thisse, J.-F. (Eds), *Handbook of Urban and Regional Economics*, North-Holland, Amsterdam, Vol. 4, pp. 2063-2117.

Eurostat (2008), "NACE rev. 2: statistical classification of economic activities in the european community", Office for Official Publications of the European Communities, Luxembourg.

Evans, D.S. and Jovanovic, B. (1989), "An estimated model of entrepreneurial choice under liquidity constraints", *Journal of Political Economy*, Vol. 97 No. 4, pp. 808-827, doi: 10.1086/261629.

Fritsch, M. and Mueller, P. (2004), "Effects of new business formation on regional development over time", *Regional Studies*, Vol. 38 No. 8, pp. 961-975, doi: 10.1080/0034340042000280965.

Gashi Nulleshi, S. and Tillmar, M. (2022), "Rural proofing entrepreneurship in two fields of research", *International Journal of Entrepreneurial Behavior and Research*, Vol. 28 No. 9, pp. 332-356, doi: 10.1108/IJEBR-05-2021-0323.

Glaeser, E.L. and Shapiro, J. (2001), "Is there a new urbanism? The growth of US cities in the 1990s", working paper 8357, National Bureau of Economic Research, Cambridge, MA doi: 10.3386/w8357.

Glaeser, E.L., Rosenthal, S.S. and Strange, W.C. (2010), "Urban economics and entrepreneurship", *Journal of Urban Economics*, Vol. 67 No. 1, pp. 1-14, doi: 10.1016/j.jue.2009.10.005.

Goerlich, F.J. and Cantarino, I. (2013), "A population density grid for Spain", *International Journal of Geographical Information Science*, Vol. 27 No. 12, pp. 2247-2263, doi: 10.1080/13658816.2013.799283.

Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2019), "When to use and how to report the results of PLS-SEM", *European Business Review*, Vol. 31 No. 1, pp. 2-24, doi: 10.1108/EBR-11-2018-0203.

Hair, J.F., Howard, M.C. and Nitzl, C. (2020), "Assessing measurement model quality in PLS-SEM using confirmatory composite analysis", *Journal of Business Research*, Vol. 109, pp. 101-110, doi: 10.1016/j.jbusres.2019.11.069.

Hannan, M.T. and Freeman, J. (1977), "The population ecology of organizations", *American Journal of Sociology*, Vol. 82 No. 5, pp. 929-964, doi: 10.1086/226424.

Hawley, A.H. (1981), "Human ecology: persistence and change", *American Behavioral Scientist*, Vol. 24 No. 3, pp. 423-444, doi: 10.1177/000276428102400307.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135, doi: 10.1007/s11747-014-0403-8.

Hult, G.T.M., Hair, J.F., Jr, Proksch, D., Sarstedt, M., Pinkwart, A. and Ringle, C.M. (2018), "Addressing endogeneity in international marketing applications of partial least squares structural equation modeling", *Journal of International Marketing*, Vol. 26 No. 3, pp. 1-21, doi: 10.1509/jim.17.0151.

Johnson, J.D. and Rasker, R. (1995), "The role of economic and quality of life values in rural business location", *Journal of Rural Studies*, Vol. 11 No. 4, pp. 405-416, doi: 10.1016/0743-0167(95)00029-1.

Johnson, K.M. and Winkler, R.L. (2015), "Migration signatures across the decades: net migration by age in US counties, 1950-2010", *Demographic Research*, Vol. 32, pp. 1065-1080, doi: 10.4054/DemRes.2015.32.38.

Kansheba, J.M., Fubah, C.N. and Marobhe, M.I. (2024), "Unravelling the entrepreneurial ecosystem conditions spurring the global value chains: a configurational approach", *International Journal of Entrepreneurial Behavior and Research*, Vol. 30 No. 6, pp. 1400-1424, doi: 10.1108/IJEBR-07-2023-0738.

Korsgaard, S., Müller, S. and Tanvig, H.W. (2015), "Rural entrepreneurship or entrepreneurship in the Rural—between place and space", *International Journal of Entrepreneurial Behavior and Research*, Vol. 21 No. 1, pp. 5-26, doi: 10.1108/IJEBR-11-2013-0205.

Krugman, P. (1991), "Increasing returns and economic geography", *Journal of Political Economy*, Vol. 99 No. 3, pp. 483-499, doi: 10.1086/261763.

Lee, E.S. (1966), "A theory of migration", *Demography*, Vol. 3 No. 1, pp. 47-57, doi: 10.2307/2060063.

Lee, S.Y., Florida, R. and Acs, Z.J. (2004), "Creativity and entrepreneurship: a regional analysis of new firm formation", *Regional Studies*, Vol. 38 No. 8, pp. 879-891, doi: 10.1080/0034340042000280910.

Liengaard, B.D., Becker, J.-M., Bennedsen, M., Heiler, P., Taylor, L.N. and Ringle, C.M. (2025), "Dealing with regression models' endogeneity by means of an adjusted estimator for the gaussian copula approach", *Journal of the Academy of Marketing Science*, Vol. 53 No. 1, pp. 279-299, doi: 10.1007/s11747-024-01055-4.

Llorent-Bedmar, V., Palma, V.C.C.D. and Navarro-Granados, M. (2021), "The rural exodus of young people from empty Spain. Socio-educational aspects", *Journal of Rural Studies*, Vol. 82, pp. 303-314, doi: 10.1016/j.jrurstud.2021.01.014.

McCann, P. and Van Oort, F. (2019), "Theories of agglomeration and regional economic growth: a historical review", in Capello, R. and Nijkamp, P. (Eds), *Handbook of Regional Growth and Development Theories*, Edward Elgar Publishing, Cheltenham, pp. 6-23, doi: 10.4337/9781788970020.00007.

Miles, M.P. and Morrison, M. (2020), "An effectual leadership perspective for developing rural entrepreneurial ecosystems", *Small Business Economics*, Vol. 54 No. 4, pp. 933-949, doi: 10.1007/s11187-018-0128-z.

Muñoz, P. and Kimmitt, J. (2019), "Rural entrepreneurship in place: an integrated framework", *Entrepreneurship and Regional Development*, Vol. 31 Nos 9-10, pp. 842-873, doi: 10.1080/08985626.2019.1609593.

Naldi, L., Nilsson, P., Westlund, H. and Wixe, S. (2021), "Amenities and new firm formation in rural areas", *Journal of Rural Studies*, Vol. 85, pp. 32-42, doi: 10.1016/j.jrurstud.2021.05.023.

Olim, A., Mota, I. and Silva, S.T. (2014), "The influence of creativity on entrepreneurship: the Portuguese case", in Baptista, R. and Leitão, J. (Eds), *Entrepreneurship, Human Capital, and Regional Development. International Studies in Entrepreneurship*, Springer, Cham, Vol. 31, pp. 205-235, doi: 10.1007/978-3-319-12871-9_11.

Pfeffer, J. and Salancik, G.R. (2003), *The External Control of Organizations: a Resource Dependence Perspective*, Stanford University Press, Stanford, CA.

Plane, D.A. (1993), "Demographic influences on migration", *Regional Studies*, Vol. 27 No. 4, pp. 375-383, doi: 10.1080/00343409312331347635.

Porter, M.E. (2000), "Location, competition, and economic development: local clusters in a global economy", *Economic Development Quarterly*, Vol. 14 No. 1, pp. 15-34, doi: 10.1177/089124240001400105.

Rae, D. (2017), "Entrepreneurial learning: peripherality and connectedness", *International Journal of Entrepreneurial Behavior and Research*, Vol. 23 No. 3, pp. 486-503, doi: 10.1108/IJEBR-05-2016-0132.

Refai, D., Elkafrawi, N. and Gittins, P. (2024), "Creating a sustainable ripple in rural entrepreneurship–the case of deserttulip in resource-constrained rural Jordan", *International Journal of*

Entrepreneurial Behavior and Research, Vol. 30 No. 1, pp. 180-199, doi: 10.1108/IJEBR-02-2023-0168.

Ringle, C.M., Wende, S. and Becker, J.-M. (2024), "SmartPLS 4", available at: https://www.smartpls.com (accessed 20 December 2024).

Rodríguez-Domenech, M.Á. (2022), "Medium-sized cities facing the demographic challenge in Spain's low-density regions through citizen participation projects", *International Journal of Environmental Research and Public Health*, Vol. 19 No. 9, p. 5303, doi: 10.3390/ijerph19095303.

Rodríguez-Pose, A. and Crescenzi, R. (2008), "Research and development, spillovers, innovation systems, and the genesis of regional growth in Europe", *Regional Studies*, Vol. 42 No. 1, pp. 51-67, doi: 10.1080/00343400701654186.

Romero-Castro, N., López-Cabarcos, M.A. and Piñeiro-Chousa, J. (2023), "Finance, technology, and values: a configurational approach to the analysis of rural entrepreneurship", *Technological Forecasting and Social Change*, Vol. 190, 122444, doi: 10.1016/j.techfore.2023.122444.

Roundy, P.T. (2017), "Small town' entrepreneurial ecosystems: implications for developed and emerging economies", *Journal of Entrepreneurship in Emerging Economies*, Vol. 9 No. 3, pp. 238-262, doi: 10.1108/JEEE-09-2016-0040.

Roundy, P.T. (2019), "It takes a village' to support entrepreneurship: intersecting economic and community dynamics in small town entrepreneurial ecosystems", *The International Entrepreneurship and Management Journal*, Vol. 15 No. 4, pp. 1443-1475, doi: 10.1007/s11365-018-0537-0.

Sá, E., Casais, B. and Silva, J. (2019), "Local development through rural entrepreneurship, from the triple helix perspective: the case of a peripheral region in northern Portugal", *International Journal of Entrepreneurial Behavior and Research*, Vol. 25 No. 4, pp. 698-716, doi: 10.1108/IJEBR-03-2018-0172.

Sarstedt, M., Henseler, J. and Ringle, C.M. (2011), "Multigroup analysis in partial least squares (PLS) path modeling: alternative methods and empirical results", in Sarstedt, M., Schwaiger, M. and Taylor, C.R. (Eds), *Measurement and Research Methods in International Marketing*, Emerald Group Publishing, Bingley, pp. 195-218, doi: 10.1108/S1474-7979(2011)0000022012.

Schiavina, M., Freire, S., Carioli, A. and MacManus, K. (2023), "GHS-POP R2023A – GHS population grid multitemporal (1975-2030)", European Commission, Joint Research Centre (JRC), doi: 10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332CFE.

Schumpeter, J.A. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge.

Selod, H. and Shilpi, F. (2021), "Rural-urban migration in developing countries: lessons from the literature", *Regional Science and Urban Economics*, Vol. 91, 103713, doi: 10.1016/j.regsciurbeco.2021.103713.

Smith, R. (2017), "Examining the characteristics, philosophies, operating practices and growth strategies of village entrepreneurs", *International Journal of Entrepreneurial Behavior and Research*, Vol. 23 No. 4, pp. 708-725, doi: 10.1108/IJEBR-10-2016-0350.

Stark, O. and Bloom, D.E. (1985), "The new economics of labor migration", *The American Economic Review*, Vol. 75 No. 2, pp. 173-178.

Stathopoulou, S., Psaltopoulos, D. and Skuras, D. (2004), "Rural entrepreneurship in Europe: a research framework and agenda", *International Journal of Entrepreneurial Behavior and Research*, Vol. 10 No. 6, pp. 404-425, doi: 10.1108/13552550410564725.

Szymanowski, M. and Latocha, A. (2021), "Does the environment matter? Depopulation in the sudetes (case study of the kłodzko region, SW Poland)", *Applied Geography*, Vol. 135, 102535, doi: 10.1016/j.apgeog.2021.102535.

Todaro, M.P. (1969), "A model of labor migration and urban unemployment in less developed countries", *The American Economic Review*, Vol. 59 No. 1, pp. 138-148.

Urbański, M. (2022), "Comparing push and pull factors affecting migration", *Economies*, Vol. 10 No. 1, p. 21, doi: 10.3390/economies10010021.

Van Stel, A. and Storey, D. (2004), "The link between firm births and job creation: is there a upas tree effect?", *Regional Studies*, Vol. 38 No. 8, pp. 893-909, doi: 10.1080/0034340042000280929.

Wennekers, S., Van Wennekers, A., Thurik, R. and Reynolds, P. (2005), "Nascent entrepreneurship and the level of economic development", *Small Business Economics*, Vol. 24 No. 3, pp. 293-309, doi: 10.1007/s11187-005-1994-8.

World Bank (2025), "Rural population in Spain (% of total population)", available at: https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?end=2024&locations=ES&start=1960&view=chart

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