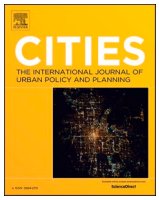
Cities 172 (2026) 106829

Contents lists available at ScienceDirect

Cities

journal homepage: www.elsevier.com/locate/cities



The Smart City illusion: Why cooperation is the missing ingredient in rural development☆

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ARTICLE INFO

Keywords:
Smart cities
Territorial marketing
Intermunicipal cooperation
Sustainable development
Innovation

ABSTRACT

This study analyzes the application of the Smart City concept to small towns. Current research on Smart Cities primarily focuses on metropolitan areas, creating a significant gap in our understanding of how these concepts can be effectively implemented in less urbanized regions. This work addresses this gap by linking territorial marketing and Smart City paradigms with a focus on cooperation. Based on a qualitative analysis, the study identifies the most relevant areas of intervention of three Portuguese inland municipalities classified as Smart Cities. The findings reveal the potential of territorial marketing and Smart City initiatives to revitalize inland regions and promote sustainable development. However, the absence of direct cooperative projects indicates a missed opportunity to establish a cohesive territorial identity. The analysis highlights shared challenges, such as addressing mobility disparities and enhancing digital inclusion, which demand a cooperative approach. The findings underscore the pressing need for municipalities to shift away from individualistic development approaches to foster inter-municipal synergies.

1. Introduction

The growing massification of urban areas has led to the abandonment of small towns and rural areas, already weakened by the decline in infrastructures and the lack of digital skills, jeopardizing the sustainable development of territories. To tackle these constraints, many municipalities in the country's interior have implemented development strategies anchored in territorial marketing tools to increase their attractiveness. One of the strategies was to "smartify" the territory, particularly the cities.

The smart city concept has recently gained particular interest and popularity (Aldegheishem, 2019; Bibri & Krogstie, 2017; Gracias et al., 2023). Academics, government officials, and economic agents have devoted a great deal of attention to the subject, finding in "smartness" a way to achieve the sustainable development goals (SDGs) defined by the United Nations in 2015 as part of its 2030 agenda for sustainable development (Jones et al., 2017; Kasinathan et al., 2022; United Nations, 2015).

The commitment to smart initiatives and strategies has positioned some municipalities as "smart," associating them with innovation, technology, and sustainability attributes. However, the concept of the smart city, linked to cities' ability to increase efficiency, economic development, sustainability, and citizens' quality of life through ICTs, has been confined to urban areas, lacking a broader territorial vision. Although "smartification" is a model more likely to suit large cities, assessing its applicability to small and medium-sized cities is important due to the development opportunities it offers. When the goal is sustainable development, digitalization, climate change, and migration must be considered in both metropolitan areas and the countryside (Fernández & Peek, 2023). Population imbalances, intensifying climate impacts, and growing competition pose exceptional challenges for rural and inland areas. Local authorities must address the scarcity and limitations of infrastructures as well as the lack of digital skills to increase their attractiveness. These issues are at the root of the complex challenges cities face and have stimulated the adoption of a marketing orientation, incorporating actions and projects within the smart city framework to strengthen competitiveness and sustainability (Boisen, 2007; Boisen et al., 2011, 2018). Given their small size, cities in rural and inland areas must engage in inter-municipal cooperation with neighboring cities as a way of addressing these challenges and achieving

☆ This article is part of a Special issue entitled: 'Evolution of urban spatial structure' published in Cities.

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https://doi.org/10.1016/j.cities.2026.106829
Received 23 April 2025; Received in revised form 9 December 2025; Accepted 30 January 2026
Available online 12 February 2026

development and sustainability goals (Bel & Warner, 2015; Dušek, 2017; Hulst & Van Montfort, 2007; Teles, 2016).

Alongside the challenges posed by globalization, strong competition between countries, regions, and cities, and the COVID-19 pandemic, the need to accelerate digitalization has become even more urgent. In this context, regional development must be based on the dynamics of creative and intelligent territories, where different partners work collaboratively to create conditions to improve the quality of life, economy, mobility, employment, and regional competitiveness. This understanding led to the adoption of marketing strategies and tools to attract investment in technology, tourism, and human resources to build and expand the territory's attractiveness (Kotler et al., 1993). Usually, these strategies are identified as territorial marketing (Bartkowiak & Krzakiewicz, 2018) and include marketing tools that support policy improvements that benefit residents, the business ecosystem, and visitors.

Despite the importance of the topic, the relationship between these subjects remains inadequately explored in the literature. A basic search using the search equation: "Smart Cit*" and "Territorial Marketing" generated only 22 results in the Web of Science (WoS) database and 9 in Scopus, showing that few studies still consider the concept of "smart" as an opportunity to rethink contemporary city planning models in a comprehensive and more strategic territorial vision that extends beyond a city's political and administrative boundaries.

While urban smart city models have been extensively researched, the territorial logic from an aggregating and integrating perspective is completely absent (Greco & Cresta, 2017). The projects and models proposed are aimed at one-off investments, disconnected from an organic vision of innovation and urban and regional development. Nevertheless, rural territories must work together in a network to promote political and social efficiency, leveraging the entire region's social, cultural, and urban development (Carvalho, 2018).

This study uniquely addresses the gap in the application of smart city models by examining the adaptability and implications for rural territories, thereby advancing knowledge in a critical yet underexplored domain. Therefore, the main purpose of the current study is to explore the existing literature and identify the most relevant areas of intervention of three inland municipalities classified as smart cities in the Smart Cities 2023 Yearbook and to discuss forms of inter-municipal cooperation to provide a framework to guide and stimulate further investigation in cooperation strategies in regional development that can foster a common positioning for the inland territories.

2. Theoretical background

2.1. Territorial marketing

Territories have long felt the need to stand out by emphasizing their distinctive and differentiating characteristics to achieve economic, social, and political objectives and satisfy the needs of their stakeholders (Ashworth & Voogd, 1990; Kotler et al., 1993, 2002). Some authors argue that the future of territories depends on the ability of public action to implement strategies suited to the new social realities, strongly influenced by the need to become attractive for economic activities through the implementation of territorial marketing approaches focused on the development of distinctive, appropriate, and relevant positioning (Hassib & Ibtissem, 2018).

The discussion around the use of marketing in territorial development strategies has led to the emergence of concepts such as "territorial marketing", "place marketing", "place branding", and "place image" (Askerova et al., 2019). Understanding the potential of marketing tools has led to an expansion of the scope of application, and these concepts are now used at town, region, and country levels. Braun (2008) defines place marketing as: "*the coordinated use of marketing tools supported by a shared customer-oriented philosophy, for creating, communicating, delivering, and exchanging urban offerings that have value for the city's customers and the city's community at large*" (Braun, 2008, p. 43). As for cities, the basic assumption is that promotion, marketing, and branding can underpin urban policies that improve places for the benefit of residents, businesses, and visitors. These diverse perspectives are related to the complex challenges that cities have faced, which have stimulated the adoption of these policies to strengthen their competitiveness (Boisen, 2007; Boisen et al., 2011, 2018). In fact, there is a conscious attempt by governments to mold the territory, promoting it to different markets, both internal and external (Kavaratzis & Ashworth, 2008), by adapting the main aspects of classic marketing to the peculiarities of a territory (Tovma et al., 2020).

2.2. Smart cities

Various approaches have been developed to define and evaluate smart cities. While showing some variations, academics, professional organizations and government agencies have agreed on associating the concept with six main dimensions: (1) economy (characteristics related to economic competitiveness including entrepreneurship, innovation, flexibility, labor market productivity and participation in the global market), (2) people (level of qualification or education of citizens and social interactions and perceptions of public life), (3) governance (political involvement, citizen services and administration functions), (4) mobility (logistics and infrastructure - local and global accessibility with the presence of ICT and relevant and sustainable transport systems), (5) environment (attractive natural conditions, including green spaces, less extreme weather, pollution reduction, resource management and environmental protection), and (6) life (characteristics of the quality of life including health, housing, culture, tourism and safety) (Anthopoulos et al., 2016; Lai et al., 2020; Nevado Gil et al., 2020).

Considering these six dimensions as targets, transforming a city into a "smart city" requires a substantial effort from its political representatives, administrators, inhabitants, entrepreneurs, and the community (Borsekova et al., 2018). The move represents an ambitious and crucial transformation for cities worldwide, but the lack of proper conceptualization has led many cities to proclaim themselves "smart" without properly validating the claim (Caragliu et al., 2011; Hollands, 2008).

Although being understood that the smart city model may be more likely to suit large cities, it is not clear from a theoretical or practical point of view what impact the size of the city has on the transformation. Borsekova et al. (2018) showed that cities of different sizes face unequal challenges, concluding that medium-sized cities are more innovative and open-minded than large cities, suggesting that the population's most creative and innovative segments may prefer living in these cities. However, today, living in a big city is no longer an essential prerequisite for success. Medium-sized cities with adequate infrastructure can be fully competitive in attracting innovative and creative talent. Conversely, without these conditions, small and medium-sized cities may lose importance and attention to large urban areas, becoming unable to compete for the necessary funds for the smart city mission (Fernández & Peek, 2023).

Although intelligence is a promising key to realizing the UN's sustainable development goals, it is necessary to look far beyond the use of ICTs, since commitments to economic growth, the lack of mobile network coverage in rural areas, and the lack of efficient governance are elements that can impair the achievement of these goals (Jones et al., 2017). In any case, the right combination of technological and non-technological solutions in a smart city model can generate interesting results for the more efficient use of financial and material resources to better meet the population's needs (Borsekova et al., 2018).

2.3. Cooperation and smart territories

The "smart territory" concept is grounded in the idea of applying ICTs to a wide variety of broader geographical contexts, such as the countryside, in a similar way to what has been done in urban areas, which is consistent with the purpose of promoting sustainability and

efficiency (Navío-Marco et al., 2020). This is a concept of particular interest in the context of territorial cohesion policies targeted at defining long-term development strategies to combat the inefficiencies and inequalities that restrict the development of smaller and poorer territories (Nosek, 2017).

In this context, it is interesting to look at inter-municipal cooperation. Recent evidence shows that local communities are beginning to realize the benefits of cooperation, becoming more willing to collaborate in regional economic development efforts (Arku, 2013, 2014; Gordon, 2007, 2009). Special attention has been paid to the issue of competition versus cooperation, particularly concerning economic development (Bowman, 1988; Goetz & Kayser, 1993; Gordon, 2007, 2009; Wells, 1990; Wolfson, 2000). Several authors confirm the role of municipality cooperation as an important factor in territorial development (Bel & Warner, 2015; Dušek, 2017; Hulst & Van Montfort, 2007; Nelles, 2013; Strebel & Bundi, 2022; Teles, 2016), tuning it an area of great interest for modern democracies (Denters & Rose, 2005; Strebel & Bundi, 2022; Teles & Swianiewicz, 2018). Local governments must naturally cooperate to overcome weaknesses and deal with shortcomings, often caused by the small size of the municipality (Rakar et al., 2015).

Although much of the literature on public sector competition focuses on the State level or between large cities, the fiercest competition, particularly for private investment, is often between small and medium-sized neighboring cities in the same or bordering regions (Goetz & Kayser, 1993). Indeed, the changes brought about by globalization have intensified competition between all types of cities (Morin & Hanley, 2004), which have seen their role become more important in the negotiation between global capital and local governments (Peck & Tickell, 2002).

Some studies have highlighted the benefits associated with cooperation, such as generating innovation in the urban economy, ensuring local control, and improving local and national efficiency (Arku, 2014). Additionally, it is argued that competition between local governments generates inefficiencies and inequalities (Goetz & Kayser, 1993) and distracts policymakers from promoting the regional economy (Wolfson, 2000). These arguments support the idea that today's global economy requires communities to work together. Thus, instead of competing, local governments have been encouraged to cooperate on economic development policies and projects (Arku, 2014; Gordon, 2009; Wolfson, 2000).

Teles and Kettunen (2016) identify four main justifications for inter-municipal cooperation (Fig. 1).

Cooperation provides local governments with better mechanisms to access the global economy regardless of the approach. This allows them to increase decision-making capacity, capture additional resources, achieve economies of scale, improve market strength, ensure cost-effectiveness, and gain larger political influence (Arku, 2014). Given these advantages, the benefits of cooperation extend beyond the individual community economy to impact multiple communities, particularly in neighboring municipalities (Goetz & Kayser, 1993), with studies reporting cases involving city-regions (Kim, 2020) and inter-municipal communities (Silva et al., 2018). Therefore, cooperation can be particularly critical for smaller communities that lack resources or are not sufficiently attractive to operate effectively in the global economy and achieve economic improvements and social well-being (Arku, 2014).

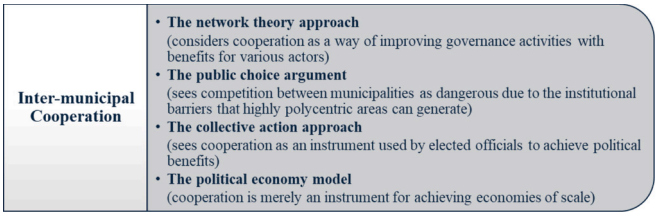

Fig. 1. Justifications for inter-municipal cooperation (Teles & Kettunen, 2016).

Even though the literature points to the willingness of political decision-makers to collaborate on territorial development policies (Arku & Oosterbaan, 2015; Gordon, 2007, 2009; Nelles, 2013), little is known about how these partnerships generate territorial and social marketing benefits. Considering that governance is one of the dimensions associated with the smart city concept, it is only natural that it should be a key factor when analyzing the successful implementation of smart strategies (Meijer & Bolívar, 2016), especially when the digital transformation is disrupting governance models, favoring new forms of action. Beyond the individual smart city projects, many cities participate in smart city networks where best practices are shared and promoted to share good governance practices (Palomo-Navarro & Navío-Marco, 2018). Participation in these networks is important for understanding whether and how inter-municipal cooperation among cities implementing individual smart city projects can benefit the territories they operate in. Integrative territorial governance is, therefore, increasingly becoming a tool for territorial intelligence in favor of the common and harmonious development of the territory (Alaoui, 2023; Lostrangio, 2025).

Evidence of the benefits of this approach is analyzed in a German case study of inter-municipal cooperation involving five small and medium-sized municipalities. The five cities established a consortium to position themselves as the smartest region in Germany by linking their individual smart city initiatives and the cooperation and interactions among them (Treude et al., 2022). The results highlighted the critical success factors for cooperation: (1) the financing structures and procurement capacity of the municipalities, (2) cooperation in the strategic phase to activate citizens and the administration, (3) communication of the strategy and its benefits to increase information among citizens and the administration, (4) political coherence to avoid discrepancies in existing strategies and responsibilities, (5) creation of a structure to manage smart city projects and smart city dissemination, (6) inter-community learning processes and dissemination of learning, (7) regular exchanges within and between cities to avoid duplication, mutual learning and benefiting from economies of scale in joint projects, and (8) recognizing the value of knowledge and sharing it successfully (Treude et al., 2022).

Cooperation is also a key factor in designing the smart transformation of cross-border regions. Organizations such as the Association of European Border Regions (AEBR) advocate for strengthening cross-border cooperation in accordance with the principles of territorial cohesion, subsidiarity, and partnership. Stakeholders in these regions associate smartification with strengthened cross-border cooperation. They stress the need for better funding allocation, greater administrative simplification, and enhanced strategic and functional cooperation. The importance of cross-border networks and actors, such as Euroregions and cross-border conurbations, in promoting functional and polycentric governance models is also emphasized (Lostrangio, 2025).

Considering the evidence, it can be concluded that cooperation between municipalities or cities is possible and desirable since it can generate several benefits. However, special attention must be paid to the critical factors that determine success, particularly the coordination structure, sharing experiences, and communication within and outside the region.

3. Methods

The main aim of this article is to identify the most relevant areas of intervention of three inland municipalities classified as smart cities in the Smart Cities 2023 Yearbook, namely the Portuguese municipalities of Castelo Branco, Fundão, and Idanha-a-Nova, and discuss inter-municipal cooperation that can foster a common positioning for the territory. The Smart Cities Yearbook is an annual publication published since 2018 in the Smart Cities magazine and distributed to all Portuguese municipalities. It is the primary channel for disseminating information on existing smart city initiatives.

The study adopted a qualitative approach, which stands out for its

depth in understanding complex social phenomena, exploring meanings and interpretations, and specific contexts (Creswell & Poth, 2018). Data collection was carried out through a careful selection of news published in newspapers, magazines, and online publications, freely available, about the municipalities of Castelo Branco, Fundão, and Idanha-a-Nova, considering the relevance of the content to the topic under study and the temporal representativeness of the data (Bryman, 2016). The choice to use news as the data source for this research was based on its accessibility, timeliness, and representativeness (Flick, 2018). The news reflects the discourses and narratives present in society, offering a comprehensive and contextualized view of the social phenomena under study (Altheide & Schneider, 2013). In addition, the availability of online news allows for continuous data collection over time, following the dynamics and evolution of the phenomenon under investigation (Hsieh & Shannon, 2005). The keywords "Castelo Branco", "Fundão", and "Idanha-a-Nova", plus "Smart Cities", "Innovation", and "technology" were used to begin the search. After the initial search, a second search was conducted within the newspapers and magazines returned in the results for the three municipalities that matched the theme and the geographical area under study. Specifically, all news items were evaluated for relevance based on the following three explicit inclusion criteria: (i) a direct reference to at least one of the six smart city dimensions; (ii) a mention of public policies, strategies, or initiatives related to innovation, technology, governance, or sustainable development; and (iii) an explicit association with one of the three municipalities under study. Articles with purely promotional content or lacking concrete descriptive elements were excluded.

In total, 219 news items were identified, collected, and analyzed: 113 about Fundão, 67 about Castelo Branco, and 39 about Idanha-a-Nova, covering the period from 2013 to 2023. The analysis yielded 749 references, categorized into the six identified dimensions.

Content analysis using NVivo14 was performed to analyze the data, which was categorized and interpreted according to the conceptual model in Fig. 2.

To ensure reliable coding, two researchers independently developed a detailed preliminary codebook guide based on the six dimensions of the smart city, including explicit definitions, inclusion and exclusion criteria, and examples derived from the dataset. To ensure interpretive stability, the researchers conducted two rounds of iterative coding on a pilot sample to refine code boundaries and resolve ambiguities before proceeding with full coding. Reflective memorization and constant comparison techniques were used throughout the analysis to monitor coding decisions and maintain consistency across categories. This systematic, iterative approach reinforced the reliability, transparency, and robustness of the thematic structure.

NVivo 14 was used to analyze the data, allowing for an in-depth understanding of the phenomenon under study and exploring nuances and complex relationships between the elements analyzed (Silver & Lewins, 2014). Matrix coding based on the conceptual model in Fig. 2 was employed to analyze the data. The intercoder agreement was assessed using Krippendorff's alpha. Overall agreement reached $\alpha = 0.84$, exceeding the commonly accepted 0.80 threshold for robust

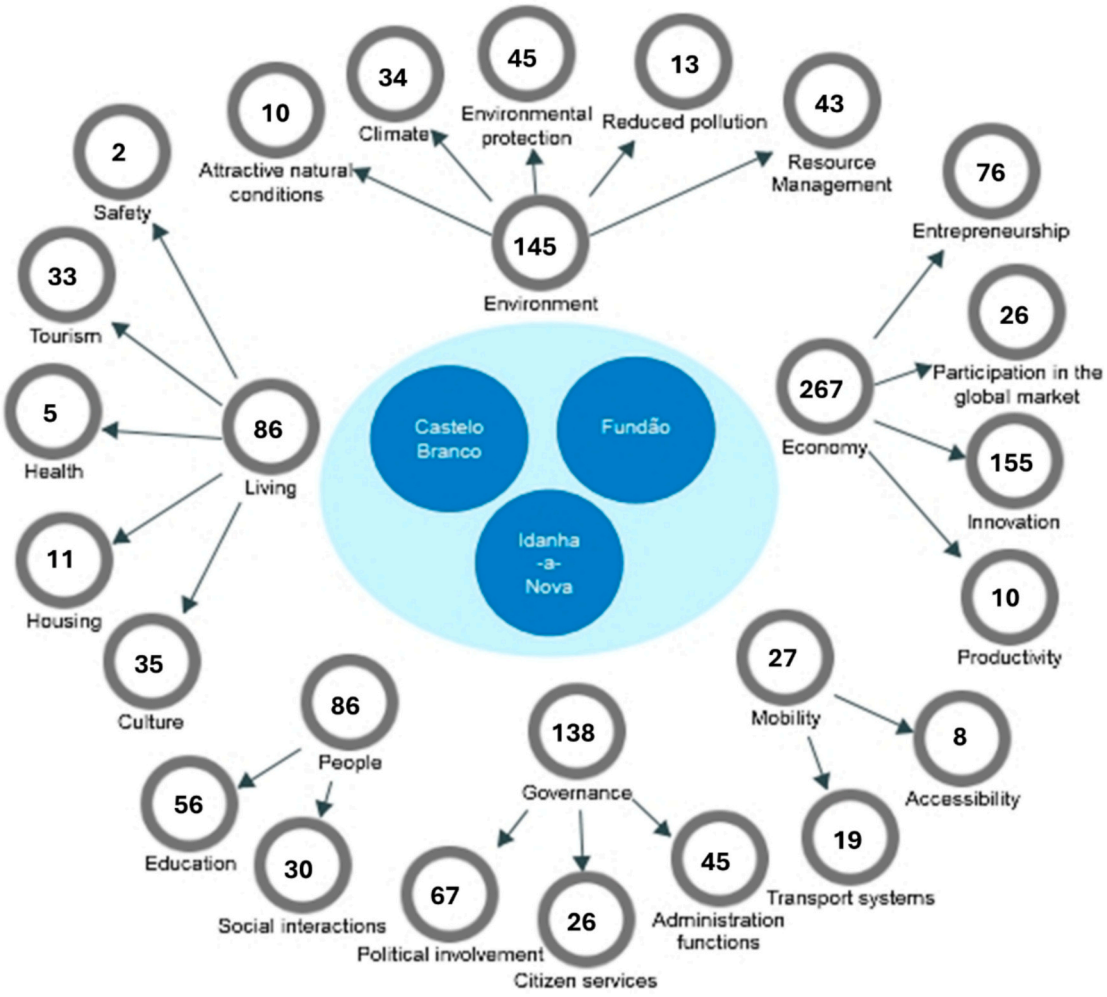

Fig. 2. Conceptual model. Source: Own elaboration based on Anthopoulos et al. (2016), Lai et al. (2020) *e* Nevado Gil et al. (2020).

interpretative consistency.

4. Results

The analysis revealed distinct strengths across the six smart city dimensions (economy, environment, governance, mobility, life, and people) for Castelo Branco, Fundão, and Idanha-a-Nova municipalities. While all three municipalities have achieved considerable progress in these areas, their initiatives highlight specific strengths that each municipality uniquely positions in the regional context. The results show that the three municipalities have the highest number of news and mentions in the economic dimension. Fundão is strongly associated with innovation, Castelo Branco is more associated with entrepreneurship and innovation, and Idanha-a-Nova is associated with innovation. Environmental issues are relevant to all three municipalities, with climate, environmental protection, and resource management as the most prominent variables. As for the governance dimension, political involvement is the most relevant variable in all three municipalities. In the life dimension, culture and tourism variables stand out. Fundão is more associated with the former, and Castelo Branco and Idanha-a-Nova are more prominent in the latter. The mobility dimension is more relevant for Castelo Branco and Fundão. Finally, the people dimension emphasizes the education variable in Fundão. The heat map in Fig. 3 portrays the differentiated strengths of each municipality, emphasizing the potential for complementary synergies. Future projects could use this data to align strategic efforts regionally.

The heat map reveals empirical patterns that align closely with three theoretical frameworks. The differentiated intensity across dimensions supports resource dependence theory (Pfeffer & Salancik, 1978), which posits that organizations cooperate when they possess complementary rather than duplicate resources. The parallel development across similar dimensions (all three investing in innovation, environmental protection, and tourism) reflects competitive regionalism theory (Jonas & Ward, 2007). Rather than complementary specialization, municipalities engage in "mimetic isomorphism" (DiMaggio & Powell, 1983) adopting similar strategies to signal competitiveness to stakeholders. The absence of formal cooperation despite these complementarities reveals that even when cooperation would benefit all parties, coordination failures prevent its emergence without institutional mechanisms. The municipalities face what Teles (2016) describes as the "cooperation paradox": recognizing mutual benefit yet lacking the governance architecture to operationalize collaboration. This pattern corroborates Arku's (2014) finding that neighboring municipalities also perceive themselves as competitors rather than partners, particularly in capital and human resources. Next, a detailed analysis of each dimension is presented.

4.1. Economic dimension

Castelo Branco, Fundão, and Idanha-a-Nova demonstrate different approaches to regional development through entrepreneurship and innovation. Castelo Branco, designated a European Entrepreneurial Region in 2021, fosters a diverse entrepreneurial ecosystem. This includes infrastructure such as the Center for Innovative Enterprises (CEI) and initiatives like the Young Entrepreneur Factory. The Attraction of People and Investments Support Office (GAPI) supports local businesses, while the Agri-Food Technological Support Center (CATAA) and INOVCLUSTER support the agri-food sector. Events such as the DISRU. PT Summit and EU-funded projects (INOV2B, INOV2AGRO, FUSILLI) increase visibility. Technological advances, including smart cities initiatives and support for key sectors such as automotive and agri-food, are prioritized. International companies such as Evox Technologies and established exporters such as Mecalbi and Aptiv contribute to Castelo Branco's economic dynamism. Collaboration between higher education, vocational education, and business and trade associations strengthens technological and entrepreneurial dynamics. The designation as a UNESCO Creative Cities Network 2023 for embroidery further supports local arts and sustainable development.

Since 2012, Fundão has strategically positioned itself as a technology hub, attracting high-tech companies and fostering innovation across traditional sectors like agriculture. The Business and Shared Services Centre (CNSP) has facilitated this growth by attracting companies like IBM and Capgemini. Fundão excels in collaborative projects, particularly in Agrotech, as evidenced by initiatives such as the Agrotech Challenge and Experimental Farms. Partnerships with research institutions strengthen agricultural innovation. The municipality's achievements have been recognized with prestigious awards, including the European Business Promotion Award and the designation as the "Most Innovative and Smart Municipality." The extensive coverage of the LoRa network and the establishment of the Living Lab Agrotech 4.0 further underscore Fundão's dedication to technological advancement. Participation in Digital Innovation Hub consortia reinforces its commitment to digital transformation and sustainable agriculture. The municipality's "Cereja do Fundão" cherry brand, bolstered by technological advancements, drives its economy, underscoring the pivotal role

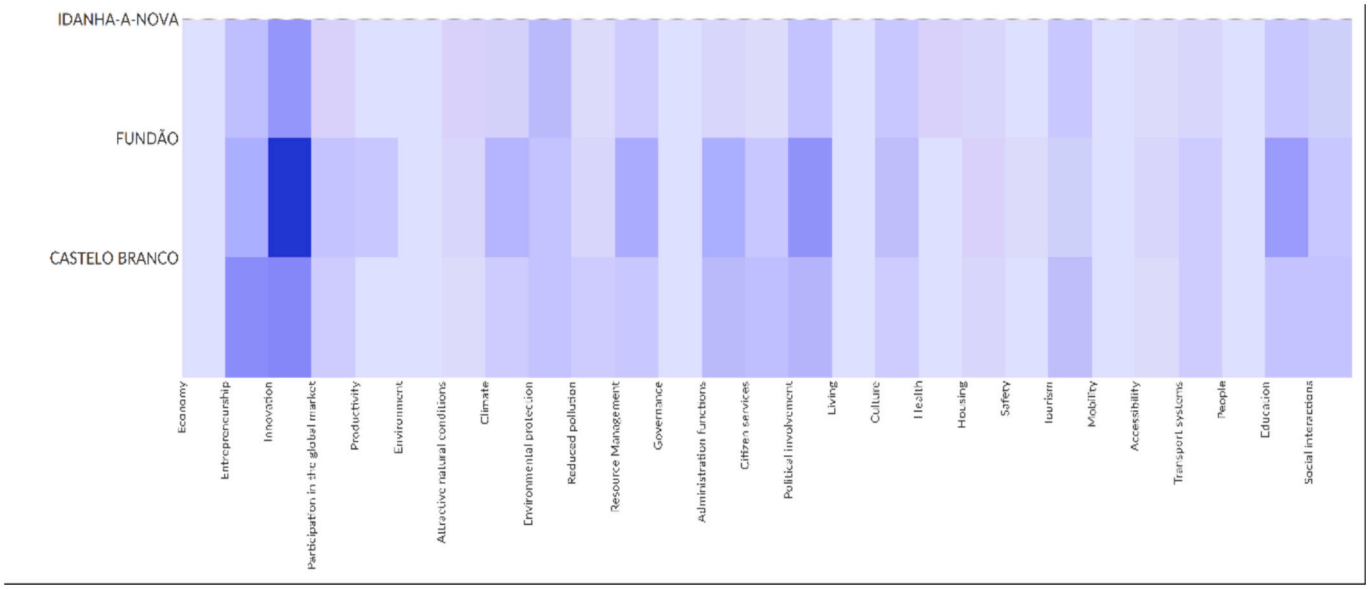

Fig. 3. Heat map. Source: Own elaboration.

of technology in enhancing production and quality.

Additionally, Fundão supports local cheese production, a practice that has garnered international acclaim. Recently, Queijaria Quinta do Pomar's buttery sheep's milk cheese from Soalheira was considered the best at the 'World Cheese Awards 2024', among 4786 cheeses from 47 countries. In addition, Fundão welcomes refugees and emigrants from 74 nationalities, promoting internationalization and increasing competitiveness by meeting local labor needs.

Idanha-a-Nova promotes well-being, entrepreneurship, and innovation through its Recomeçar program, which includes the I-Danha Social Innovation Incubator, the I-Danha Food Lab (the first green accelerator in the Iberian Peninsula), and the Green Valley Food Lab Business Center. As Portugal's first bioregion, Idanha-a-Nova promotes sustainable development by attracting companies with sustainable practices and supporting organic farming pilots. Initiatives such as CoLAB Food4Sustainability and the IdanhaEmprego platform exemplify its commitment to job creation and sustainability.

Recognized as Europe's Best Organic District in the 2023 EU Organic Awards, Idanha-a-Nova stands out in EU organic production. This award reflects its significant agricultural area dedicated to organic production and its support for projects promoting short supply chains and organic products. As Portugal's first organic county, Idanha-a-Nova promotes the green economy and sustainable tourism through initiatives such as the organic school canteen, educational gardens, and the organic regional market. The annual I-Danha Food Lab is a prominent agri-food, sustainability, and green economy event, often referred to as the "Green Web Summit". Events such as the Rural Innovation Forum and the Raiana Fair highlight innovative entrepreneurial experiences within the EUROACE region.

While participation levels remain modest, tourism remains a major focus. The municipality hosted international productions, including HBO's "House of the Dragon" and the Boom Festival. UNESCO also recognizes it as a Creative City of Music. As a member of the International Network of Bio-Regions, Idanha-a-Nova promotes sustainability and quality in line with European policies and global production and consumption trends. The municipality's strategic use of modern technologies facilitates remote work, addressing environmental, health, and food quality challenges. A protocol with the WINDS platform supports local producers to access global markets for their products and services.

4.2. Environment dimension

The environmental dimension, encompassing climate change, natural resources, environmental protection, and pollution reduction, is crucial to all three municipalities. Fundão distinguishes itself in sustainability and climate change adaptation through participation in European projects like MUV, Farclimate, DesirMed, PLENTY-LIFE, and the NetZeroCities Twin Cities. As a signatory of the Covenant of Mayors and participant in the EU Missions for Climate Change and Smart and Sustainable Cities and one of 60 New European Bauhaus Craft Cities, Fundão demonstrates a commitment to innovative solutions and climate resilience, exemplified by the Fundão Seminary Experimental Field. The Gardunha Mountain is notable for its mycological richness and its role in forest protection, while the Schist Villages serve as living laboratories for sustainable practices such as grazing, fire control, and the promotion of native species.

Fundão's circular economy pact emphasizes short supply chains, quality food, waste reduction/management, forest eco-points, and a Circular Economy Action Plan. As the leader of the Portuguese Circular Cities Network RURBAN Link, Fundão supports initiatives such as "Prato Saudável" (Healthy Plate), "Prato ZeroDesperdício" (ZeroWaste Plate), Smart Farming, and Biocycle. The municipality invests in regenerative agriculture, neighborhood markets, endogenous product certification, and the Circular Kitchen Stamp. Regarding environmental protection, Fundão established the Serra da Gardunha Integrated Landscape Management Area, which conserves soil and water and mitigates fire risks through the Gado Sapador project and a partnership with Quiron for AI-based prevention. Sensorized oil bins and smart pest traps have also been implemented. Fundão's energy efficiency improvements include upgraded public lighting and heat pumps in municipal buildings, achieving 80% energy savings, coupled with centralized technical management for consumption monitoring. Local companies use advanced water distribution technology, and SOFIS demonstrators are installed in experimental cherry fields to improve irrigation efficiency. The "Montanha Viva" (Living Mountain) project promotes sustainable exploitation of mountain plants. Fundão encourages waste separation and the use of eco-points to increase recycling and reduce the ecological footprint, raising environmental awareness, and has been recognized with the ECO XXI Green Flag.

Castelo Branco is part of a group called NEUROCLIMA, which works to make substantial changes and to involve citizens in addressing climate change. This group connects policymakers, institutions, and citizens. In the country, a project called ClimAdaPT.Local (part of the AdaPT Program) led to the Municipal Strategy for Climate Change Adaptation and a promise to work with the National Network of Municipalities for Adaptation to Climate Change. Castelo Branco is known for its green spaces and low water loss (among the nation's lowest) achieved through pipeline renovation, real-time flow measurement, and smart green space irrigation. Advanced equipment like flow/pressure readers, telemetry, and acoustic/geophone loggers are used to detect leaks. The RecolhaBio project turns bio-waste into high-quality compost for family farming. Local companies are developing efficient waste management (360Waste) and remote-controlled solar irrigation (Allbesmart). Castelo Branco initiated the Ecological Footprint of Portuguese Municipalities project, offering an online calculator to assess human impact on natural resource consumption. Castelo Branco and Idanha-a-Nova implement fire prevention projects in the Tejo Internacional Natural Park using the Ciclope video surveillance system for real-time fire detection and meteorological monitoring. The Firerisk app provides information about fire risks and specialized firefighting, electrical network, and geology companies operating in the area. The RecolhaBio project focuses on collecting selective food waste, community composting, and reducing food waste. It uses IT tools for monitoring and awareness campaigns. To reduce pollution, Castelo Branco participates in the Urban Cleaning - Partnership for Smart and Sustainable Cities, emphasizing efficiency, innovation, and the Circular Economy. Castelo Branco is recognized as ECOXXI and has implemented initiatives such as "Mercado + Sustentável" (which aims to reduce plastic bag use) and the MOBICAB strategy (which aims to reduce CO2 emissions).

Idanha-a-Nova has also endorsed the EU Climate Change Adaptation Mission Pact, and it is a prominent participant in food sustainability discussions. The municipality promotes family farming, sustainable production, biodiversity, traditional knowledge, and healthy diets, considering the escalating impacts of climate change. Idanha-a-Nova's appeal stems from its attractive natural environment, complemented by UNESCO certification as the Tejo Internacional World Biosphere Reserve and Naturtejo Geopark. This unique combination of tangible and intangible heritage fosters differentiation and attracts research. In 2023, Idanha-a-Nova received the European Prize for Organic Production in the Bio-Region, recognizing practices promoting geodiversity, biodiversity, decarbonization, soil regeneration, and sustainable water/energy use. As Portugal's first Bio Municipality, Idanha-a-Nova is a benchmark for organic production, green economy, and sustainable tourism, promoting environmentally harmonious agriculture and events like the Boom Festival. Local companies, supported by the CoLab Idanha Food Lab, have adopted sustainable agricultural practices focused on soil nutrition, pest control, and water resource management. Ecological housing investments include solar energy, rainwater recovery, and innovative wastewater treatment (Biomespace). The Food4Sustainability Collaborative Lab tests technologies to improve food production, mitigate CO2 emissions, eliminate synthetic chemicals, and increase value chain efficiency.

4.3. Governance dimension

In the Governance dimension, Fundão and Castelo Branco are the most outstanding municipalities. Castelo Branco has reduced water loss and supports entrepreneurship through structures such as CATAA, INOVCLUSTER, and CEI, in collaboration with educational institutions and business associations. Working with the Polytechnic University of Castelo Branco has been crucial to developing areas such as aeronautics and drones. Good fiscal management and an investment-attracting strategy have created many jobs in recent years, with export companies being established in Castelo Branco.

The European Committee of the Regions has recognized Castelo Branco as a good example of sustainable recovery, emphasizing innovation and environmental commitment. The Municipal Innovation Service helps businesses be more competitive, especially in the agri-food sector. The city is undergoing a transformation marked by urban renewal, quality public spaces, sustainability, leisure, and culture. This transformation is driven by education, culture, innovation, and employment.

In terms of services to citizens, Castelo Branco offers support infrastructure for entrepreneurship and initiatives such as Quinta do Chinco, a community garden. Participation in the Urban Cleaning Association promotes citizen co-responsibility. Tools like the ecological footprint calculator and a basic sanitation management application are available. The Mobicab Flexible project, awarded in 2022, promotes sustainable mobility and combats social isolation. Castelo Branco also invests in inclusion through the Municipal Plan for the Integration of the 2nd Generation of Migrants (PMIM-CB 2G).

Castelo Branco's political involvement is well known. The European Entrepreneurial Region Award recognized both the city's achievements and vision for the future. The city government invests in helping businesses grow and supports programs to encourage entrepreneurship. It has a strong agri-food sector and is committed to the green transition. The main areas of focus for Castelo Branco are education/culture, quality of life, innovation, and employment. They have been successful in generating new ideas and supporting small businesses. Providing buildings for companies is a key incentive.

The Beira Baixa Intermunicipal Climate Change Adaptation Plan (PIAACBB) is important for adapting to climate change at the local, regional, and national levels. The “Local commerce, it is now digital” platform, developed by the CEI-based ShopKit, supports local commerce. It initially focuses on online regional product sales and will include services in the future.

Castelo Branco's recognition as a UNESCO Creative City (in the Crafts and Popular Arts category) highlights the Embroidery of Castelo Branco, showing its commitment to valuing culture and tradition for a sustainable future.

Regarding Fundão, the governance stands out for its active policies promoting company setup in the Business and Shared Services Centre (CNSP) and for its close relationships with regional/national higher education institutions. The internationally recognized CNSP demonstrates the best practices in EU funds and the application of cohesion policy. Fundão's strategy focuses on value creation, investment attraction, employment, and innovation. The Agrotech 4.0 Living Lab strengthens the link between modern technologies and the rural world, fostering an agricultural technology ecosystem. A Farmer Support HelpDesk is also under development. The municipality invests in energy efficiency, public lighting refurbishment, and urban service management. Fundão is twinned with Marinha Grande, Montemor-o-Novo, and Vila Real de Santo António, forming the “Sister Cities” community.

For citizen services, Fundão is recognized for social and proximity services. In 2019, it was recognized as Municipality of the Year by the Centre for Migrations, which was created to welcome migrants and refugees seen as both a humanitarian response and a strategy to address the demographic crisis, reflecting community commitment and global openness.

Fundão is recognized for its innovative public policies in technology, social issues, and governance. The municipality promotes immigration, inclusion, and welcoming practices, creating synergies and benefits. ECOXXI flag recognition highlights good practices in sustainable development. The MUV (Mobility Urban Values) app allows citizens to map urban travel and inform mobility policy development. Waste separation is encouraged through fee reductions. Municipal leadership attracts strategic partners and serves as a benchmark. The municipality's strategic partnerships, exemplified by the IBM Technological Innovation Centre and other prominent companies, have strengthened the technological ecosystem, attracted talent, and countered the region's stigma. Fundão's commitment to innovation has been recognized with the European “Regiostars 2018” award for its pioneering contributions to the smart industrial transition. The municipality is a leader in European city networks, particularly in the Urbact program's urban solutions projects and other networks focused on innovative and sustainable agricultural solutions. Protocols support and protect sectors like the Denomination of Protected Origin (DOP) for cheese and horticulture, thereby improving product quality and competitiveness.

Idanha-a-Nova's Recomeçar program emphasizes social cohesion and wealth creation. In 2022, it was honored with the “Star Brand” award from Bloom Consulting, recognizing its exceptional socio-economic performance among municipalities with populations under 10,000. The municipality offers a 50% discount on the social cohesion tariff to all residents and companies headquartered. Since 2015, the Recomeçar program has promoted rural life, attracting hundreds of families by focusing on innovation and sustainability. Recomeçar, developed with the BGI accelerator, has attracted several start-ups to the municipality, resulting in positive migratory flows since 2019 and counteracting population exodus. In 2022, Idanha-a-Nova was among the first municipalities to sign the “Goesan Declaration for Organic 3.0,” further reinforcing its commitment to sustainability. Joining the Bio Regions network aligns with a sustainable development strategy. The Municipal Centre for Culture and Development (CMCD) and events such as FISAS are pivotal in promoting the transition to sustainable food systems.

4.4. Life dimension

In Castelo Branco, culture is linked to infrastructure like the Creativity Factory. The factory supports theater, dance, music, cinema, multimedia, design, graphic arts, and photography projects. It also promotes collaboration and the exchange of ideas. UNESCO recognized Castelo Branco as a Creative City in the Crafts and Popular Arts category. This highlights the Embroidery of Castelo Branco. Castelo Branco hosts cultural events on par with those in major cities, such as the 2023 First International Meeting of Creative Cities and Sustainable Development. CAATA's involvement in the Interior+ project aims to make agriculture and rural areas more inclusive and sustainable by promoting a local economy based on local resources, culture, and traditions.

Culture in Fundão values regional customs and products through events such as the several Gastronomic Festivals: “Fundão, Aqui Comese Bem”, the “Tibórnia,” Míscaros - Mushroom Festival in Alcaide, Maúnça Arts and Flavors Exhibition, and the Soalheira Cheese Fair. These events highlight local products such as olive oil, chestnuts, pumpkin, honey, walnuts, corn, quince, mushrooms, new wine, jeropiga, and cheese. The Casa do Queijo da Orca (Orca Cheese House) promotes local knowledge and traditions related to cheese. The municipality assists Projects to valorize Indigenous breeds, such as the Beira Baixa Merino Sheep and the Charnequeira Goat, which are important for their economic and ecological relevance. Protocols with Producers' Associations encourage the DOP certification of cheese and support farming activities. The Fundão cherry is recognized for its quality and is central to some gastronomic events. Fundão also participates in the Artéria Network, promoting cultural programs in various cities.

Idanha-a-Nova is a UNESCO Creative City (Music) member and hosts the Boom Festival. A cooperation agreement with the Idanha

Philharmonic provides free music education to children. The Arrebita Idanha Bio gastronomic festival, which focuses on sustainability, received recognition in 2020.

Regarding health, Idanha-a-Nova offers the Raiano Health Card 0–114, a complementary insurance to the National Health Service, providing quick access to primary care and other health services to improve resident health and attract new inhabitants.

For housing, Castelo Branco is converting an old residential building into shared housing for students and professionals, increasing accommodation options. Fundão offers competitively priced housing to attract talent through a pool of low-cost rentals for qualified professionals, and implemented the Home Data 4 Better Life project to analyze indoor air quality. Idanha-a-Nova is investing in a Biomespace production unit for ecological and sustainable housing, aligning with its sustainability strategy and aiming to export these solutions globally.

The safety variable is only mentioned in Fundão. Energy efficiency in street lighting has improved the quality of service and reinforced the feeling of security among residents while promoting sustainability.

Tourism in Castelo Branco is particularly important, with the Castelo Branco in the Palm of Your Hand app offering ten routes to discover the territory: Active Route, Extreme Route, Living Route, Leisure Route, Embroidery Route, Museum Route, Murals Route, Heritage Route and the Arts and Crafts Route. In addition, the Francisco Tavares Proença Júnior Museum offers an app that provides interactive visits with augmented reality.

In Fundão, tourism is boosted by the “Elephant's Journey” tourist-literary route, inspired by the work of the Nobel prize José Saramago. It also promotes nature tourism in the Serra da Gardunha with the “Montanha Viva” project. In historic villages, electric vehicles are made available to visitors free of charge.

Idanha-a-Nova has been recognized for the new Dragon's Nest tourist route in the village of Monsanto, inspired by the filming of “Game of Thrones”. The municipality participated in ITB Berlin, where the Idanha and Naturtejo Geopark partnership won the Sustainability Award. Incentives from the Valorizar Program enabled improvements in communication and the promotion of modern technologies in innovative tourism projects, enhancing the territory, heritage, and nature.

4.5. Mobility dimension

In the mobility dimension, the analysis includes the variables of accessibility and transport systems. In Castelo Branco, Altice Portugal installed XGS-PON technology, providing high-speed fixed internet. In addition, the Mobicab Flexible project aims to improve people's access to transportation. It uses a network of centrally managed taxis to help reduce social isolation. This includes regular road transport, flexible transport, pedestrianization, and cycling, ensuring access to transport for all residents. Partnerships with local taxi drivers provide transport from homes to the nearest bus stop, making public transportation more economical and sustainable through on-demand routing. This initiative helps reduce social isolation, CO2 emissions, and accidents. Charging stations for electric vehicles are available.

In Fundão, optic-fiber and mobile network coverage were expanded to the 27 Schist Villages to fight desertification, address territorial inequalities, and promote investment and tourism. The municipality implemented the MUV mobile application, which adapts mobility policies to the needs of the population, and actively participated in European Mobility Week activities. Charging stations for electric vehicles have been installed as part of sustainable and intelligent urban mobility plans. In addition, another project provides free electric vehicles in the Historic Villages of Portugal, promoting sustainable mobility for tourists and residents. Fundão also participated in Get in The Ring Urban Mobility Portugal 2021, seeking innovative solutions to mobility problems. The Environmental Fund financed the cycle path that will link Fundão to Covilhã.

In Idanha-a-Nova, a contract was signed with the Historical Villages Association to provide high-quality Wi-Fi at tourist sites. The municipality has invested in electric buses and charging stations. It offers the Social Transport on Request service, connecting the villages to the county and district capital. The Raiano Card Road Transport continues to operate, meeting the population's mobility needs while minimizing passenger concentration.

4.6. People dimension

In the people's dimension, variables include citizens' qualifications and education, social interactions, and perceptions of public life.

In the area of education, Castelo Branco promotes entrepreneurial skills from primary to secondary school through the Young Entrepreneur Factory and its Entrepreneurship Bootcamps. Companies such as Albatroz Engenharia and Aptiv have attracted qualified human resources in IT, aeronautics, electronics, mechanics, and electrotechnology. They are planning new investments to create jobs for specialized technicians and operators, positioning the city in the electric car market. The CEI is crucial for attracting qualified talent. Proside, in collaboration with the municipality, has created the Proside Academy for training in modern technologies. Allbesmart developed a smart irrigation system for the municipality and provided training for operators.

In Castelo Branco, there is concern about social interaction, which is promoted through conferences among specialists, entrepreneurs, and businesspeople. The municipality organized an awareness-raising campaign to reduce plastic bag use, distribute reusable bags, and encourage local commerce and the consumption of regional products. CATAA, through European projects, develops actions in the agri-food sector that involve citizens in a “citizen science” context. The In Social Incubator focuses on innovative solutions to social problems, promoting greater humanization and less inequality among the elderly and underprivileged populations, especially in the historic part of the city. The Municipal Plan for the Integration of Migrants 2nd Generation (PMIM 2G) helped immigrants with legalization and social support.

Fundão stands out in education with various initiatives. In 2013, a partnership between UBI, Altran, the Municipality of Fundão, and IEFP resulted in the creation of a center for advanced training in technology. Altran has promoted projects such as the Altran Academy and Ignite Your Future. Fundão is recognized for its strong commitment to training, complementing the education of the region's universities with computer skills for young people and professionals from other areas. This commitment earned the Municipality of the Year 2016 title and the UNESCO City of Learning nomination. It was the first municipality in Portugal to include programming for children from elementary school onwards, introducing junior coding academies for children aged six. The municipality also excels in research and development, triangulating universities and companies. IBM chose Fundão to set up a Technology Innovation Centre because of the local talent. The twinning between Fundão, Marinha Grande, Montemor-o-Novo, and Vila Real de Santo António resulted in the educational project “Discovering the 4 Cities”, which began in 1994.

The CNSP supports smart growth through its training center, offering courses in industrial management, software development, and machine programming, benefiting the entire population, including children and women encouraged to pursue technology careers. A 2021 protocol created the Living Lab Agrotech 4.0, promoting agricultural innovation and technology integration in rural areas. A protocol with the National Horticultural Operational and Technological Centre (COTHN) strengthens the Fundão Experimental Field, boosting horticultural sector competitiveness.

Fundão attracts those seeking a sustainable lifestyle and has a technological hub with diverse professionals, including a growing international community. Known for inclusiveness, Fundão welcomes migrants and refugees, offering host scholarships, job offers, psychological support, and school integration. Its migration center in the former seminary welcomes refugees, international students, and temporary workers,

promoting labor market integration and social inclusion. This center received funding for competency development, welcoming, and migrant training. Fundão won the Bronze Award in the European Capitals of Inclusion and Diversity. Initiatives supporting migrants include intercultural mediators, gender-focused actions, and social services for the elderly. Through socio-cultural programs and "community museums," Fundão invests in lifelong learning and intercultural dimensions to welcome working-age individuals from other countries.

In Idanha-a-Nova, the local government helps families with education and housing. All kindergarten and first-cycle children receive free music education. Basic schools have wireless internet (mLAN project), which promotes the use of digital educational resources and innovative teaching. This program is implemented with the Directorate-General for Education and Science Statistics. The IdanhaEmprego portal connects job seekers and employers, offering vacancies, training, and content on business financing, interview preparation, and internal communication. This is part of the Recomeçar Program. The Germinar Program (Vera Cruz company) helps people find jobs and offers training.

Idanha-a-Nova is reversing depopulation. The I-Danha Social Innovation Incubator aims to create a network of social activators that offers training and support. The I-Danha Food Lab connects people in the agri-food sector to network and share knowledge. Local companies share social concerns. The Boom Festival has social and environmental projects, employs locals, and prioritizes local and organic products. Vera Cruz is also committed to its community. They offer competitive salaries, profit-sharing, regular training, and the Germinar Social project to address inflation.

Although the three municipalities have developed individual strategies across the six dimensions of the smart city, empirical evidence suggests that implementing specific collaborative initiatives, such as those tested in rural European regions, could significantly improve results at the territorial level. Examples include the German Südwestfalen smart region consortium of five municipalities, which implemented joint smart city initiatives that generated cost reductions of 30–40% through shared infrastructures (Treude et al., 2022) and the "Smart Villages" initiatives supported by the European Commission and developed in the Galicia-Northern Portugal Euroregion. The latter addresses cross-border "smartification" as part of cross-border cooperation reported to have reduced per-municipality costs by 35% in digital infrastructure deployment and increased visitor numbers by 18% over three years using joint tourism marketing actions (Lostrangio, 2025). Finally, five municipalities in Tuscany (Italy) formed a digital alliance to foster smart territory initiatives. Their combined efforts led to a 40% improvement in healthcare access via telemedicine, a 27% rise in tech jobs from enhanced digital skills training, and the attraction of 15,000 additional tourists each year across member municipalities. These initiatives reveal consistent patterns showing that small and medium-sized municipalities can achieve transformative results when smart city actions are collaboratively designed and managed.

Greater cooperation among the municipalities under study could have a positive impact on the territory. Firstly, by strengthening innovation ecosystems. By taking advantage of existing infrastructure for joint innovation uses and promoting a shared agricultural technology and green economy cluster, combining Fundão's agricultural technology, Castelo Branco's entrepreneurial ecosystem, and Idanha-a-Nova's expertise in organic production, it would be possible to reduce duplication and create critical mass for research, experimentation, and attracting investment. This integration would lead to more efficient resource use and economies of scale. The joint acquisition of digital platforms, mobility solutions, or environmental monitoring would reduce costs and fragmentation. Coordinated on-demand transportation systems and a harmonized expansion of broadband would help mitigate mobility inequalities and support resident retention.

Territorial identity and branding would also become stronger. A unified territorial brand could capitalize on the complementary profiles revealed in the heat map: Fundão's technological leadership, Castelo Branco's entrepreneurial dynamism, and Idanha-a-Nova's sustainability credentials. Such a brand would align with the European Union's Smart Specialization (S3) principles, thereby improving competitiveness and visibility.

Finally, improvements in climate adaptation and environmental governance could be achieved. A joint strategy integrating fire management, water efficiency, and the circular economy would align with the requirements of the EU's "Adaptation to Climate Change" mission and strengthen eligibility for EU funding. In short, adopting these cooperative initiatives would enable municipalities to evolve from isolated smart city practices to a shared smart territorial strategy, optimizing public spending and positioning the region competitively in the European rural innovation landscape.

5. Conclusions

The cases of Castelo Branco, Fundão, and Idanha-a-Nova illustrate the potential of territorial marketing and smart city initiatives in revitalizing inland regions. The comparative analysis with other European examples (Südwestfalen, Galicia-Northern Portugal, and Inner Tuscany) shows that structured inter-municipal cooperation is not merely theoretically desirable but practically achievable with measurable impacts.

The three Portuguese municipalities possess comparable or superior conditions for successful cooperation: their geographic contiguity and complementary specializations form an integrated value proposition, while their shared participation in national and European networks provides existing institutional frameworks for collaboration. Realizing this potential requires deliberate actions.

However, the lack of direct cooperative projects suggests a missed opportunity to create a unified territorial identity in the current case. Despite sharing the same territory, the three municipalities do not seem to ignore the benefits of cooperation. They have developed similar initiatives and partnerships with various organizations inside and outside the territory, but have not developed joint projects or cooperated directly, apart from compulsory participation through the CIMS. This exemplifies a classic case of "parallel development paths," a phenomenon frequently identified in cooperation literature (Arku, 2014; Gordon, 2009). Despite operating within the same territorial system, the municipalities exhibit fragmented governance, which Teles (2016) defines as local actors pursuing similar objectives independently. This practice severely limits the emergence of integrative territorial intelligence. The empirical patterns identified in the heat map mirror theoretical expectations: when municipalities do not engage in structured cooperation, specialization reinforces fragmentation rather than synergy. In fact, they seem to prefer competing across several areas rather than promoting synergies from complementary offers. Future regional strategies should prioritize integrated planning frameworks that leverage complementary strengths and shared resources to position the region as a competitive, sustainable, and inclusive hub.

Conversely, cooperation theory predicts that complementarities, such as Fundão's tech-driven innovation, Idanha-a-Nova's environmental specialization, and Castelo Branco's entrepreneurial base, form the ideal foundation for a shared regional development platform.

The comparative analysis of the six smart city dimensions revealed distinct areas of strength and specialization among Castelo Branco, Fundão, and Idanha-a-Nova. Castelo Branco excels in economic initiatives, particularly entrepreneurship and innovation, supported by infrastructure such as the Centre for Innovative Companies (CEI) and a network of high-tech enterprises. Its commitment to reducing water losses and advancing urban sustainability is also commendable within the governance and environmental dimensions. In contrast, Fundão's prominence lies in education and technological innovation, as demonstrated by its robust training programs and pioneering efforts in Agro-tech solutions. Idanha-a-Nova's unique contribution is its leadership in environmental sustainability, emphasizing organic agriculture, the green economy, and sustainable tourism initiatives, making it a model

for ecological resilience.

Despite these individual strengths, a notable discrepancy emerges in their collaborative efforts across dimensions. The findings suggest that while the municipalities share overlapping objectives, such as fostering innovation and promoting sustainability, their strategies are localized. For instance, technological initiatives in Fundão, such as the Agrotech Living Lab and Castelo Branco's smart waste management systems, could synergize to create a more unified regional technological hub. Similarly, Idanha-a-Nova's green economy initiatives and Fundão's advancements in circular economy practices could integrate to position the region as a pioneer in sustainable rural development. The absence of formalized inter-municipal projects represents a missed opportunity to amplify these initiatives and achieve a competitive edge as a cohesive region.

The comparison also highlights shared challenges, such as addressing mobility disparities and enhancing digital inclusion, which requires a cooperative approach. While Castelo Branco has demonstrated innovation in flexible transport systems such as Mobicab Flexible, similar initiatives have not been equally prioritized in Fundão and Idanha-a-Nova. A coordinated strategy to improve accessibility and to invest in shared ICT infrastructure could bridge these gaps. By leveraging complementary strengths across the six dimensions, the municipalities could create a robust framework for smart territorial governance that balances localized innovation with regional collaboration, fostering more inclusive and sustainable development.

These findings strongly align with current European policy frameworks. The EU's Long-Term Vision for Rural Areas (2021–2040) (European Commission, 2024) emphasizes smart rurality, polycentric cooperation, and digital transition as key pillars for revitalizing inland regions. Additionally, the Smart Villages Initiative highlights the importance of inter-municipal and cross-border cooperation in fostering innovation and creating resilient rural ecosystems (European Commission, 2019). While the municipalities studied already align with several of these priorities individually, a coordinated regional approach would better position the territory to benefit from EU funding instruments. Castelo Branco, Fundão, and Idanha-a-Nova could serve as a pilot example of a Smart Region by integrating their strategies and aligning with the EU's cohesion policy objectives of territorial balance and cooperative governance.

The findings underscore the urgent need for municipalities to transcend individualistic development approaches by fostering inter-municipal synergies. This strategic shift can amplify resource efficiency, attract broader investment, and foster a cohesive identity for inland territories, particularly in the context of evolving global challenges like digital transformation and climate resilience. The current absence of joint initiatives represents a policy gap and a structural inefficiency. This validates the core hypothesis that structured cooperation is the missing link in smart rural development.

Further research could explore the role of digital platforms and advanced ICT in streamlining inter-municipal cooperation, providing a foundation for smart territorial governance models. Empirical studies comparing international similar inland territories could yield actionable insights into replicable best practices.

As a limitation of this work, it is recognized that the number of news items found and analyzed may not sufficiently represent the issues under study. In addition, there was an imbalance in the number of news items relating to the three municipalities, which may have influenced the results and conclusions. Future research should include data triangulation to add rigor, breadth, and depth (Denzin & Lincoln, 2000; Gonçalves et al., 2021). Future studies could include interviewing the heads of the three municipalities.

CRediT authorship contribution statement

Sara Brito Filipe: Writing – original draft, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Paulo Duarte:** Writing – review & editing, Supervision.

Declaration of competing interest

The authors have no conflicts of interest to disclose.

Acknowledgement

NECE, Research Centre for Business Sciences, Research Centre and this work are funded by FCT – Fundação para a Ciência e a Tecnologia, IP, project UID/04630/2025 and DOI identifier 10.54499/UID/04630/2025.

Data availability

Data will be made available on request.

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